

STUDENT SUPPORT MATERIAL
Class XII
BIOLOGY



तत् त्वं पूषन् अपावृणु
केन्द्रीय विद्यालय संगठन

Session 2016-17

Kendriya Vidyalaya Sangathan
New Delhi



संतोष कुमार मल्ल, भा.प्र.से.
आयुक्त

Santosh Kumar Mall, I.A.S.
Commissioner



केन्द्रीय विद्यालय संगठन

KENDRIYA VIDYALAYA SANGATHAN

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A WORD TO MY DEAR STUDENTS

It gives me great pleasure in presenting the Students' Support Material to all KV students of class XII.

The material has been prepared keeping in mind your needs when you are preparing for final exams and wish to revise and practice questions or when you want to test your ability to complete the question paper in the time allotted or when you come across a question while studying that needs an immediate answer but going through the text book will take time or when you want to revise the complete concept or idea in just a minute or try your hand at a question from a previous CBSE Board exam paper or the Competitive exam to check your understanding of the chapter or unit you have just finished. This material will support you in any way you want to use it.

A team of dedicated and experienced teachers with expertise in their subjects has prepared this material after a lot of exercise. Care has been taken to include only those items that are relevant and are in addition to or in support of the text book. This material should not be taken as a substitute to the NCERT text book but it is designed to supplement it.

The Students' Support Material has all the important aspects required by you; a design of the question paper, syllabus, all the units/chapters or concepts in points, mind maps and information in tables for easy reference, sample test items from every chapter and question papers for practice along with previous years Board exam question papers.

I am sure that the Support Material will be used by both students and teachers and I am confident that the material will help you perform well in your exams.

Happy learning!

Santosh Kumar Mall
Commissioner, KVS

FOREWORD

The Students' Support Material is a product of an in-house academic exercise undertaken by our subject teachers under the supervision of subject expert at different levels to provide the students a comprehensive, yet concise, learning support tool for consolidation of your studies. It consists of lessons in capsule form, mind maps, concepts with flow charts, pictorial representation of chapters wherever possible, crossword puzzles, question bank of short and long answer type questions with previous years' CBSE question papers.

The material has been developed keeping in mind latest CBSE curriculum and question paper design. This material provides the students a valuable window on precise information and it covers all essential components that are required for effective revision of the subject.

In order to ensure uniformity in terms of content, design, standard and presentation of the material, it has been fine tuned at KVS Hqrs level.

I hope this material will prove to be a good tool for quick revision and will serve the purpose of enhancing students' confidence level to help them perform better. Planned study blended with hard work, good time management and sincerity will help the students reach the pinnacle of success.

Best of Luck.



U.N. Khaware
Additional Commissioner (Acad.)



BIOLOGY

STUDENT SUPPORT MATERIAL

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BIOLOGY – CLASS XII (044) UNIT WISE WEIGHTAGE

Unit	Title	Marks
1.	Reproduction	14
2.	Genetics and evolution	18
3.	Biology and human welfare	14
4.	Biotechnology and its applications	10
5.	Ecology and environment	14
	TOTAL	70

CBSE 2016 - BLUE PRINT

Content	VSA 1 mark	SA I 2 marks	SA II 3 marks	VBQ 4 marks	LA 5 marks	Total
UNIT 6 Reproduction		1(2)	1(3)	1(4)	1(5)	14
UNIT 7 Genetics and Evolution	2(1)	1(2)	3(3)		1(5)	18
UNIT 8 Biology in Human Welfare	1(1)	2(2)	3(3)			14
UNIT 9 Biotechnology	1(1)		3(3)			10
UNIT 10 Ecology	1(1)	1(2)	2(3)		1(5)	14
TOTAL	5	10	36	4	15	70



Series ONS

SET-2

 रोल नं.

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 Roll No.

कोड नं. 57/2

Code No

परीक्षार्थी कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें ।

Candidates must write the Code on the title page of the answer-book.

- कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ 11 हैं।
- प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए कोड नम्बर को छात्र उत्तर- पुस्तिका के मुख-पृष्ठ पर लिखें।
- कृपया जाँच कर लें कि इस प्रश्न-पत्र में 26 प्रश्न हैं।
- कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, प्रश्न का क्रमांक अवश्य लिखें।
- इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है। प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा। 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे।
- Please check that this question paper contains 11 printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains 26 questions.
- Please write down the Serial Number of the question before attempting it.
- 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 to 10.30 a.m. , the students will read the question paper only and will not write any answer on the answer-book during this period.

जीव विज्ञान (सैद्धान्तिक)
BIOLOGY (Theory)

निर्धारित समय: 3 घण्टे

अधिकतम अंक: 70

Time allowed : 3 hours

Maximum Marks : 70

सामान्य निर्देश :

- i. प्रश्न-पत्र में पाँच खण्डों में 26 प्रश्न दिए गए हैं। सभी प्रश्न अनिवार्य हैं।
- ii. खण्ड A में प्रश्न संख्या 1 से 5 अति लघु-उत्तरीय प्रश्न हैं, प्रत्येक प्रश्न 1 अंक का है।
- iii. खण्ड B में प्रश्न संख्या 6 से 10 लघु-उत्तरीय प्रश्न प्रकार I के हैं, प्रत्येक प्रश्न 2 अंकों का है।
- iv. खण्ड C में प्रश्न संख्या 11 से 22 लघु-उत्तरीय प्रश्न प्रकार II के हैं, प्रत्येक प्रश्न 3 अंकों का है।
- v. खण्ड D में प्रश्न संख्या 23 मूल्य आधारित प्रश्न 4 अंकों का है।
- vi. खण्ड E में प्रश्न संख्या 24 से 26 दीर्घ-उत्तरीय प्रश्न हैं, प्रत्येक प्रश्न 5 अंकों का है।
- vii. प्रश्न-पत्र में समग्र पर कोई विकल्प नहीं है, फिर भी 2 अंकों वाले एक प्रश्न में, 3 अंकों वाले एक प्रश्न में और 5 अंकों वाले सभी तीनों में भीतरी चयन-विकल्प दिए गए हैं। प्रत्येक परीक्षार्थी को ऐसे प्रश्नों के दो विकल्पों में से कोई एक प्रश्न हल करना है।

General Instructions:

- i. There are a total of 26 questions and five sections in the question paper. All questions are compulsory.
- ii. Section A contains questions number 1 to 5, very short-answer type questions of 1 mark each.
- iii. Section B contains questions number 6 to 10, short-answer type I questions of 2 marks each.
- iv. Section C contains questions number 11 to 22, short-answer type II questions of 3 marks each.
- v. Section D contains question number 23, value based question of 4 marks.
- vi. Section E contains questions number 24 to 26, long-answer type questions of 5 marks each.
- vii. There is no overall choice in the question paper, however, an internal choice is provided in one question of 2 marks, one question of 3 marks and all the three questions of 5 marks, In these questions, an examinee is to attempt any one of the two given alternatives.

खण्ड-A

SECTION-A

1. होमो हैबिलिस और होमो इरेक्टस की आहार-प्रवृत्तियों में संभावी अंतर बताइए। 1

Write the probable differences in eating habits of Homo habilis and Homo erectus.

2. मोटर गाड़ियों के ईंधन में डीजल के स्थान पर CNG को वरीयता दिए जाने के दो लाभ बताइए। 1

Mention two advantages for preferring CNG over diesel as an automobile fuel.

3. नर मधुमक्खी में 16 गुणसूत्र होते हैं जबकि उसकी मादा में 32 गुणसूत्र होते हैं। एक कारण बताइए। 1

A male honeybee has 16 chromosomes whereas its female has 32 chromosomes Give one reason.

4. हमारी सरकार द्वारा GEAC स्थापित करने के दो उद्देश्य क्या हैं। 1

Mention two objectives of setting up GEAC by our Government.

5. MOET में ' आनुवंशिक माँ की भूमिका की चर्चा कीजिए। 1

Mention the role of 'genetic mother' in MOET.

खण्ड - B

SECTION-B

6. ऐमीनोएसिलेशन क्या होता है? इसका महत्व बताइए। 1

What is aminoacylation \ State its significance.

खण्ड-C

SECTION-C

11. (a.) मानव जीनोम परियोजना (HGP) में इस्तेमाल किए जाने वाले 'YAC' और 'BAC' में **3**
Y और B किसके लिए प्रयुक्त होते हैं ? परियोजना में उनकी भूमिका बताइए।
- (b.) सकल मानव जीनोम की प्रतिशतता लिखिए जो प्रोटीनों का कूटलेखन ;कोडनरू करती है और खोजे गए उन जीनों की प्रतिशतता भी बताइए। जिनके कार्य भी विदित हैं ,जैसे कि कि HGP के दौरान देखे गए।
- (c.) HGP में वैज्ञानिकों द्वारा पहचाने गए SNP का पूरा नाम लिखिए।
- (a.) What do 'Y' and 'B' stand for in 'YAC' and 'BAC' used in Human genome Project (HGP). Mention their role in the Project.
- (b.) Write the percentage of the total human genome that for proteins and the percentage of discovered genes whose functions are known as observed during HGP.
- (c.) Expand 'SNPs identified by scientists in HGP.
12. अपसारी और अभिसारी विकास में अंतर बताइए। प्रत्येक का एक-एक उदाहरण दीजिए।
3 Differentiate between divergent and convergent evolution. Give one example of each.
13. (a) एक आदर्श गर्भनिरोधक की कोई चार विशेषताएँ बताइए। **3**
- (b) उन दो अंतगर्भाशयी गर्भनिरोध युक्तियों के नाम बताइए जो शक्राणुओं की गतिशीलता को प्रभावित करते हैं।

अथवा

- (a) बीजों की शिथिलता/सुप्तवस्था का एक किसान किस प्रकार लाभ उठाता है।
- (b) पौधे को एक बीज क्या लाभ पहुँचाता है।
- (a) List any four characteristics of an ideal contraceptive.
- (b) Name two intrauterine contraceptive devices that affect the motility of sperms.

OR

- (a) How does a farmer use the dormancy of seeds to his advantage?
- (b) What advantages a seed provides to a plant?
14. (a) यह सामान्य रूप से देखा जाता है कि जिन को बच्चों को उनके बचपन में छोटी माता का सक्रमण हो जाता है हो सकता है कि उनकी वयस्कावस्था में यह रोग नहीं हो। किसी व्यक्ति में ऐसी प्ररिक्षा के आधार का कारण बताते हुए व्याख्या कीजिए। इस प्रकार के प्रतिरक्षा का नाम बताइए।
- (b) इंटरफेरॉन क्या होते हैं ? उनकी भूमिका बताइए।
- (a) It is generally observed that the children who had suffered from chicken- pox in their childhood may not contract the same disease in their adulthood. Explain giving reasons the basis of such an immunity in an individual. Name this kind of immunity.
- (b) What are interferons ? Mention their role.
15. (a) उन परम्परागत प्रजनन तकनीकों की दो सीमाएँ बताइए जो सूक्ष्म प्रवर्धन को बढ़ावा देती हैं। 3
- (b) सूक्ष्म प्रवर्धन के दो लाभ बताइए।
- (c) दो उदाहरण दीजिए जहाँ इस विधि को व्यापारिक स्तर पर अपनाया जाता है।
- (a) Write the two limitations of traditional breeding technique that led to promotion of micro propagation.
- (b) Mention two advantages of micro propagation.
- (c) Give two examples where it is commercially adopted.
16. पाथमिक और द्वितीयक अनुक्रम में अंतर बताइए। दोनों का एक-एक उदाहरण भी दीजिए 3

Differentiate between primary and secondary Succession. Provide one example of each.



BIOLOGY

- 17 परभक्षण को आमतौर से हानिकारक संबंध माना जाता है। पारितंत्रा में किसी परभक्षी की कोई तीन सकारात्मक भूमिकाएँ बताइए। 3

Predation is usually referred to as a detrimental association. State any three positive roles that a predator plays in an ecosystem.

- 18 ऐडेनोजीन डिऐमीनेज न्यूनता के उपचार में एंजाइम- प्रतिस्थापन चिकित्सा की व्याख्या कीजिए। इस विधि के दो नुकसान बताइए।

Explain enzyme-replacement therapy to treat adenosine deaminase deficiency
Mention two disadvantages of this procedure.

- 19 (a) जैव किसान पीडकों का नियंत्रण किस प्रकार करते हैं! दो उदाहरण दीजिए। 3

(b) परंपरागत पीडक- नियंत्रण विधियों और उपरोक्त किसानों के उपागम में अंतर बताइए।

(a) How do organic farmers control pests ?Give two examples.

(b) State the difference in their approach from that of conventional pest control methods.

20. (a) जैवप्रौद्योगिकी के प्रयोगों में कोशिका को 'सक्षम' बनाया जाता है। ऐसा करने में कैल्सियम आयन किस प्रकार सहायता करता है? 3

(b) जैवप्रौद्योगिकी प्रयोगों में 'जैवप्राक्षोपिक(जीन) गन' की भूमिका बताइए।

(a) Why must a cell be made 'competent' in biotechnology experiments? How does calcium ion help in doing so?

(b) State the role of 'biolistic gun' in biotechnology experiments.

21. (a) क्लोनिंग वेक्टर (संवाहक) pBR322 में वरण योग्य चिह्नक का नाम बताइए। इनकी भूमिका की भी चर्चा कीजिए। 3

(b) ऊपर बताए गए चिह्नकों की तुलना में एंजाइम ठ गैलैक्टोसाइडेज के कोडिंग अनुक्रम का एक वरण योग्य चिह्नक माना जाता है। क्यों?



- 17 (a) Name the selectable markers in the cloning vector pBR322? Mention the role they play.
- (b) Why is the coding sequence of an enzyme B-galactosidase a preferred selectable marker in comparison to the ones named above?
22. परीक्षार्थ क्रॉस क्या होता है? इससे पौधे की विषमयुग्मजता का पता निश्चय रूप से किस प्रकार 3 लगाया जा सकता है ?

What is a test cross? How can it decipher the heterozygosity of a plant ?

खण्ड.D

SECTION-D

23. दुनिया भर में ऐसे अनेक विवाहित दंपति हैं जो निःसंतान हैं। यह जानकर दुःख होता है कि 4 भारतवर्ष में दंपति के निःसंतान होने के लिए स्त्री को ही दोषी ठहराया जाता है।
- (a) भारतवर्ष में इन परिस्थितियों में प्राः स्त्री को ही दोषी क्यों माना जाता है? अपना मत प्रस्तुत कीजिए। ऐसे कोई दो मूल्य बताइए जो एक जीव विज्ञान छात्रा होने के नाते आप इस सामाजिक बुराई को दूर करने के लिए प्रोत्साहित करेंगे।
- (b) अनुर्वरता के लिए उत्तरदायी कोई दो कारण बताइए।
- (c) उन परिस्थितियों में जहाँ पुरुष दोषी हैं, एक तकनीक का सुझाव दीजिए जिससे दंपति को संतति प्राप्त करने में सहायता मिल सके।

A large number of married couples the world over are childless. It is shocking to know that in India the female partner is often blamed for the couple being childless.

- (a) Why in your opinion the female partner is often blamed for such situations in India ? Mention any two values that you as a biology student can promote to check this social evil.
- (b) State any two reasons responsible for the cause of infertility.
- { c} Suggest a technique that can help the couple to have a child where the problem is with the male partner.

खण्ड-E

SECTION-E

24. (a) उन दो वृद्धि मॉडलों के लाम बताइए जो समष्टि वृद्धि का निरूपण करते हैं, तथा इन मॉडलों द्वारा क्रमशः निरूपित वृद्धि वक्रों का आरेख बनाइए। 5
- (b) इन वक्रों की आकृति में आने वाले अंतर का आधार बताइए।
- (c) आज मानव जनसंख्या वृद्धि का निरूपण उपरोक्त दो वक्रों में से कौन-से वक्र द्वारा होता है? आप क्या सोचते हैं कि क्या यह वक्र लंबी अवधि तक बना रह सकता है? अपने उत्तर के समर्थन में कारण बताइए।

अथवा

- (a) छोटे-से तालाब के उदहरण की सहायता से व्याख्या कीजिए कि पारितंत्र के चार घटक एक इकाई की भांति कैसे कार्य करते हैं।
- (b) इन वक्रों की आकृति में आने वाले अंतर का आधार बताइए।
- (a) Name the two growth models that represent population growth and draw the respective growth curves they represent.
- (b) State the basis for the difference in the shape of these curves.
- { c } Which one of the curves represent the human population growth at present? Do you think such a curve is sustainable? Give reason in support of your answer.

OR

- (a) Taking an example of a small pond explain how the four components of an ecosystem function as a unit.
- (b) Name the type of food chain that exists in a pond.

25. (a) स्त्री में आर्तव प्रावस्था की व्याख्या कीजिए। इस प्रावस्था के दौरान अंडाशयी और पिट्यूटरी हार्मोनो के स्तरों की चर्चा कीजिए। 5
- (b) आर्तप-चक्र की पुटकीय प्रावस्था को प्रचुरोद्भवनी प्रावस्था भी क्यों करते हैं? व्याख्या कीजिए।
- (c) अंडोत्सर्ग के समय और उसके बाद ग्राफी पुटक में होने वाली घटनाओं की व्याख्या कीजिए।
- (d) ग्राफी पुटक का आरेख बनाइए तथा उसमें गहवर (**antrum**) तथा द्वितीयक अंडक का नामांकन कीजिए।

अथवा

- (a) जीव विज्ञान के एक वरिष्ठ विद्यार्थी होने के नाते आपको कहा गया है कि आप अपने स्कूल के सेकेन्डरी स्तर के छात्रों को उन क्रियाविधियों का निदर्शन करें जिनसे उन्हें एक उभयलिंगी फूल में पर-परगण स्पष्टतः समझ में आ जाए। आनके द्वारा सुझाए गए विभिन्न चरणों की सूची बनाइए तथा उनमें से प्रत्येक चरण के लिए कारण भी बताइए।
- (b) एक आवृतबीजी पौधे के गुरु बीजाणु धानी की काट का आरेख बनाइए, तथा उसमें फ्यूनिकुलस, सूक्ष्मद्वार, भ्रूणकोष और गुरुबीजाणु द्वितीयक (न्यूसेलस) का नामांकन कीजिए।
- (a) Explain the menstrual phase in a human female. State the levels of ovarian and pituitary hormones during this phase.
- (b) Why is follicular phase in the menstrual cycle also referred as the as proliferative phase? .
- (c) Explain the events that occur in a graafian follicle at the time of ovulation and thereafter.
- (d) Draw a graafian follicle and label antrum and secondary oocyte.

OR

- (a) As a senior biology student you have been asked to demonstrate to the student of secondary level in your school, the procedure (s) that shall ensure cross-pollination in a hermaphrodite flower. List the different steps that you would suggest and provide reasons for each one of them.
- (b) Draw a diagram of a section of a megasporangium of an angiosperm and label funiculus, micropyle, embryo sac and nucellus.

26. निम्नलिखित क्रॉस (संकरण) की आनुवंशिक व्याख्या कीजिए। जब एक मटर के लंबे तथा गोल बीज वाले पौधे को बौने तथा झुर्रीदार बीजों वाले पौधे को क्रॉस किया गया तब F₁ के सभी पौधे लंबे और जोल बीजों वाले थे। हालांकि, F₁ समष्टि को स्वयं परागित किया गया तब लक्षण प्ररूपी अनुपात 9 : 3 : 3 : 1 प्राप्त हुआ। 5

अथवा

- (a) एफ. ग्रिफिथ के श्रृंखलाबद्ध प्रयोगों का वर्णन कीजिए। उनके द्वारा प्राप्त परिणामों के महत्व की चर्चा कीजिए।
- (b) मैक्लिऑड, मैकार्टी एवं ऐवरी के योगदान बताइए।

Give a genetic explanation for the following cross. When a tall pea plant with round seeds was crossed with a dwarf pea plant with wrinkled seeds then all the individual of F₁-populations were tall with round seeds. However selfing among F₁- population led to a 9 : 3 : 3 : 1 phenotypic ratio.

OR

- (a) Describe the series of experiments of F. Griffith. Comment on the significance of the results obtained.
- (b) State the contribution of Macleod, Mc Carty and Avery.

Question Paper Code 57/2

SECTION - A

Q. Nos. 1-5 are of one marks each

1. write the probable differences in eating habits of Hoo habilis and Homo erectus.

Ans Homo habilis did not eat meat/ vegetarian
Homo erectus ate meat (meat eater) = $\frac{1}{2} \times 2$

[1 Mark]

2. Mention two advantages for preferring CNG over diesel as an automobile fuel.

Ans Advantage of CNG-
i) burns efficiently / less unburnt residues.
ii) Cheaper than petrol / diesel.
ii) Causes less pollution.
v) Cannot be adulterated.
v) cannot be siphoned by thieves (any two) = $\frac{1}{2} \times 2$

[1 Mark]

3. A male honeybee has 16 chromosomes whereas its female has 32 chromosomes. Give one reason.

Ans male Honey bee develops from unfertilized female gamete / unfertilized egg / Parthenogenesis of female gamete (16 chromosomes), female develops by fertilization / fertilized egg (32 chromosomes) $\frac{1}{2} + \frac{1}{2}$

1 Mark

4. Mention two objectives of setting up GEAC by our government.

Ans Make decision regarding the validity of GM research, assure safety of introducing GM organism for public services = $\frac{1}{2} \times 2$

5. Mention the role of 'genetic mother' in MOET.

Ans Genetic mother is used to produce many eggs / for superovulation / 6-8 eggs (under the influence of FSH)

SECTION - B

Q. Nos. 1-5 are of two marks each

6. What is aminoacylation? State its significance.

Ans Amino acids are activated in the presence of ATP and linked to (cognate) t-RNA = 1
Carries amino acid to the site of protein synthesis / reaches amino acids to the respective codon=1

[2 Marks]



7. Explain the relationship between CFC's and Ozone in the stratosphere.

Ans UV rays act on cfc's release Cl atom, which act on ozone to release O_2 , resulting in ozone layer depletion / causing ozone hole = $\frac{1}{2} \times 4$ [2 Marks]

OR

Why are sacred groves highly protected ?

Ans Sacred groves are highly protected - because of religious and cultural traditions, refuges for large number of rare and threatened plants / ecologically unique and biodiversity rich regions = 1+1 [2 Marks]

8. Gynoecium of a flower may be apocarpous or syncarpous. Explain with the help of an example each.

Ans Carpels are free (apocarpous) , Eg Michelia = $\frac{1}{2} \times 2$
Carpels are fused (syncarpous), Eg Papaver = $\frac{1}{2} \times 2$
(Any other suitable correct e.g) [2 Marks]

9. "Large scale cultivation of spirogyra is highly advantageous for human population." Explain giving two reasons.

Ans Source of good protein fats carbohydrates minerals and Vitamins for undernourished humans and animal population , reduce environmental pollution / can grown in waste water / molasses / straw / animal manure , easy to cultivate. (any Two) = 1 x 2 [2 Marks]

10. Name a genus of baculovirus. Why are they considered good biocontrol agents ?

Ans Nucleopolyhedrovirus = $\frac{1}{2}$

Species specific, narrow spectrum insecticidal application, no negative impact on non target organisms = $\frac{1}{2} \times 3$ [$\frac{1}{2} + 1\frac{1}{2} = 2$ Marks]

SECTION - C

Q. Nos. 11-22 are of three marks each

- 11. (a) What do 'Y' and 'B' stand for in YAC' and 'BAC' used in Human Genome Project (HGP). Mention their role in the project.**
(b) write the percentage of the total human genome that coded for proteins and the percentage of discovered genes whose functions are known as observed during HGP.
(c) Expand 'SNPs' identified by scientists in HGP.

Ans (a) Y = Yeast = $\frac{1}{2}$
B = Bacterial = $\frac{1}{2}$
Used as vector for cloning foreign DNA = $\frac{1}{2}$
(b) (A) 2%, (A) 50% = $\frac{1}{2} + \frac{1}{2}$
(c) Single Nucleotide Polymorphism = $\frac{1}{2}$ [3 Marks]



12. Differentiate between divergent and convergent evolution Give one example of each.

Ans	Divergent	Convergent	
	Same structure developed along different direction	Different structures evolving for the same function	
	Due to adaptation to different needs	Due to adaptation to meet similar needs	
	Examples	Examples	= 1+1
	Vertebrates heart & brain	Wing of bird & insects	
	thorn of Bougainvillea and tendrils of cucurbita	Potato & sweet potato	
	fore limbs of whales, bat , cheetah, humans.	Eye of Octopus & mammals	
	(any one examples)	Flippers of Penguins & dolphin (any one examples)	

13. (a) List any four characteristics of an ideal contraceptive. = ½ x 2

(b) name two intrauterine contraceptive devices that affect the motility of sperms.

Ans (a) User friendly, no side effect, recersible , effective, should not interfere with sexual drive / desire of the user , easily available (any four) = ½ x 4
 (b) copper T / Copper 7 / Multiload 375 (any two) ½ x 2 [3 marks]

OR

(a) How does a farmer use the dormancy of seeds to his advantage ?

(b) What advantages a seed provides to a plant ?

Ans (a) For storage (dehydration) of seeds to be used as food, to raise the coop in the next season = ½ x ½
 (b) Seed formation is more dependable better adaptive strategy for dispersal to new habitat, hard seeds provide protection to the young embryo , being a product of sexual reproduction they generate new genetic combinations / genetic variations / sufficient food reserve for the young seeding to be nourished = ½ x 4 [3 marks]

14. (a) It is generally observed that the children who had suffered from chicken – pox in their childhood may not contact the same disease in their adulthood . Explain giving reasons the basis of such an immunity in an individual. Name this kind of immunity.

(b) What are interferons ? Mention their role.



BIOLOGY

Ans {a} The first infection of chicken pox produce a primary response and antibodies are generated against chicken pox virus ,subsequent encounter with the same virus elicits a highly intensified secondary response ,due to the memory cells formed during the first encounter active immunity = $\frac{1}{2} \times 4$ [3 Marks]

{b} proteins secreted by viral infected cells, which protect non-infected cells from viral infection/when a α -interferon is given to cancer patient 9(it activates immune system); destroys tumour = $\frac{1}{2} \times 2$

15. (a) write the two limitations of traditional breeding technique that led to promotion of micro propagation [3 Marks]
(b) mention two advantage of micro propagation.
(c) give two examples where it is commercially adopted.

Ans (a) failed to keep pace with demand ,failed to provide fastand efficient system of improvement=,,
(b) large number of plants can be developed in a short duration/production of genetically identical plants/somaclones/healthy plants can be recovered from diseased plants. (any two) = $\frac{1}{2} \times 2$
(c) tomato/banana/apple(any two) = $\frac{1}{2} \times 2$

16. Differentiate between primary and secondary succ or ession .provide one example of each.

Ans	primary succession -it begins with areas where no living organism ever existed -establishment of a biotic community is very slow Example- newly cooled lava/bare rocks/newly created ponds or reservoir.	Secondary succession -it begins in areas where natural behave biotic communities have been destroyed. -establishment of a biotic community is faster = 1×2 Example A bandoned farm land/burnt or cut forests/lands that have been flooded = $\frac{1}{2} \times 2$
-----	---	--

17. predation usually referred to as a detrimental association. State any three positive roles that a predator plaus in an ecosystem [3 Marks]

Ans keeps pray population(phytophagus/herbivores/carnivore)under control ,maintenance of ecological balance/maintenance of species diversity ,acts as conduit for energy transfer = $1+1+1$

18. explain enzyme –replacement therapy to treat adenosine deaminase deficiency .mention two disadvantage of this procedure. [3 Marks]

Ans functional adenosine deaminase is given to the patient by injection= 1

Disadvantages

- therapy is not completed curative,periodic infusion of enzyme required= $1+1$

[3 Marks]

Out-B-16.57/1,2,3 DPSVK/17



BIOLOGY

19. (a) How do organic farmers control pests? Give two examples.

(b) State the difference in their approach from that of conventional pest control methods.

Ans (a) Natural predation / biological control = 1

Examples – lady bird used to kill aphids // dragon flies used to kill mosquitoes // *Bacillus thuringiensis* use to kill cotton ball worm / caterpillar / butterfly caterpillar

(Any two = $\frac{1}{2} + \frac{1}{2}$)

(b) Conventional Pest control

- use of chemicals insecticides & pesticides
- harmful to non target organisms
- Cause environmental pollution

Organic farming based pest control

- No comical used.
- Not harmful to not target organisms
- No adverse impact on environment

{Any two} = $\frac{1}{2} \times 2$

[3 Marks]

20. (a) Why must a cell be made 'competent' in biotechnology experiments ? How does calcium ion help in doing so?

(b) State the role of 'Biolistic gun' in biotechnology experiments-

Ans (a) To take up the 9hydrophilic DNA from the external medium =1

Divalent calcium ions increase the efficiency of DNA entering the cell through pores in the cell wall = 1

(b) To introduce alien DNA into the plant cell by bombarding them with high velocity microparticles (gold or tungsten coated with DNA) = 1

21. (a) Name the selectable markers in the cloning vector pBR322 ? Mention the role they play.

(b) Why is the coding sequence of an enzyme (B-galactosidase) a preferred selectable marker in comparison to the ones named above? [3 Marks]

Ans (a) amp^R / ampicillin resistance genes, tet^R / tetracycline resistance gene = $\frac{1}{2} \times 2$

They help in identifying and eliminating non-transformants / non recombinants and selectively permitting the growth of the transformants / recombinants = 1

(b) Simpler process / less cumbersome, in the presence of chromogenic substraterecombinants are colorless and non recombinants are blue in colour = $\frac{1}{2} \times 2$

22. What is a test cross ? How can it decipher the heterozygosity of a plant ?

[3 Marks]

Ans A cross to analyse whether genotype of dominant individual is homozygous = 1

On crossing with a recessive parent, if 50% of progeny have dominant trait and 50% have recessive trait then the plant is said to be heterozygous= 1+1

The above value points can be considered with the help of test cross = 1+1

[3 Marks]

Out-B-16.57/1,2,3 DPSVK/18

BIOLOGY



SECTION – D
Q No. 23 is of four mark

23. A large number of married couples the world over are childless. It is shocking to know that in India the female partner is often blamed for the couple being childless

**(a) Why in your opinion the female partner is often blamed for such situations in India ?
Mention any two values that you as a biology student can promote to check this social evil.**

(b) State any two reasons responsible for the cause of infertility.

(c) Suggest a technique that can help the couple to have a child where the problem is with the male partner.

Ans (a) Female partner is blamed due to social mind set / inequality of sexes / lack of awareness / male dominated society / any other relevant point (Any two) = $\frac{1}{2} \times 2$

-

Awareness to be created that abnormality can occur in both male and females and infertility issues with suitable examples.

- - Mutual respect towards both the partners in case of the problem and to find the remedy from medical experts instead of visiting quacks.

- - Educate them to find the reason and not believe in superstitions (Any two) = $\frac{1}{2} \times 2$

- (b) Physical (abnormality in reproductive system), congenital, immunological or psychological (Any two) = $\frac{1}{2} \times 2$

- (c) Intra cytoplasmic sperm injection (ICSI) artificial insemination (AI) / Intra uterine insemination (IUI) = 1

[4 Marks]

- SECTION – E

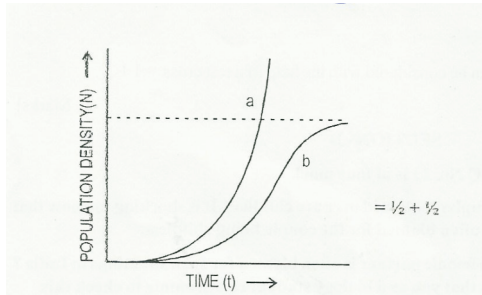
- Q No. 24-26 are of five mark each

24. (a) Name the two growth models that represent population growth and draw the respective growth curves they represent.

(b) State the basis for the difference in the shape of these curves.

(c) Which one of the curves represent the human population growth at present ? Do you think such a curve is sustainable ? Give reason in support of your answer.

Ans (a) Exponential growth curve, logistic growth curve = $\frac{1}{2} \times \frac{1}{2}$



(a) exponential growth curve b – logistic growth curve

(b) Exponential growth – food resources and space unlimited, Logistic growth – food resources and space limited = $\frac{1}{2} + \frac{1}{2}$

(c) Exponential growth = 1

[5 Marks]

Not sustainable, as resources are limited / carrying capacity = $\frac{1}{2} + \frac{1}{2}$

OR

(a) Taking an example of a small pond explain how the four components of an ecosystem function as a unit.

(b) Name the type of food chain that exists in a pond.

(a) Productivity – conversion of inorganic substance into organic material with the help of radiant energy / sunlight by the autotrophs / producers (phytoplankton, algae, floating, submerged plants) = 1

Decomposition – decomposers (fungi, bacteria, flagellates) breakdown dead decayed organic matter into simpler compounds = 1

Energy Flow – Unidirectional movement of energy towards higher trophic levels (producer to consumer) and its dissipation and loss as heat to the environment = 1

Nutrient cycle – Mineralisation of dead matter to release them back for reuse of autotrophs = 1

(b) Grazing food chain / detritus food chain = 1

[5 Marks]

25. (a) Explain the menstrual phase in a human female. State the levels of ovarian and pituitary hormones during this phase.

(b) Why is follicular phase in the menstrual cycle also referred as proliferative phase?

(c) Explain the events that occur in a graafian follicle at the time of ovulation and thereafter.

(d) Draw a graafian follicle and label antrum and secondary oocyte.

BIOLOGY

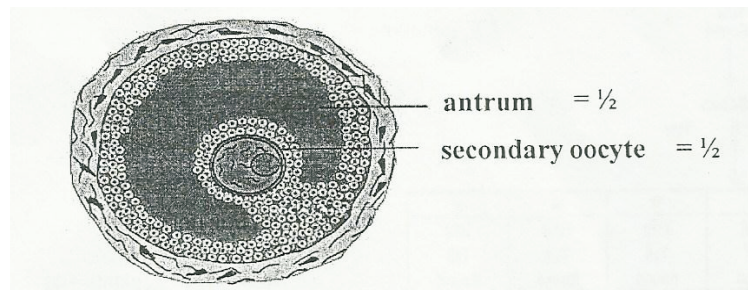
Ans (a) Menstrual phase occurs when released ovum not fertilized, break down of endometrial lining (of the uterus) and its blood vessel form the liquid that comes out through the vagina, lasts for 3 to 5 days =,,,,,, Level of ovarian and pituitary hormones fall = ½

//
Graphically represented

(b) Primary follicle grows into graafian follicle under the influence of LH & FSH, regeneration of endometrium (under the influence of estrogen) = ½ x 2

(c) Graafian follicle ruptures to release the ovum (secondary oocyte), remaining parts of the graafian follicle transform into corpus luteum = ½ x 2

(d)



antrum = ½
secondary oocyte = ½

[5 Marks]

(a) As a senior biology student you have been asked to demonstrate to the students of secondary level in your school, the procedure(s) that shall ensure cross – pollination in a hermaphrodite flower. List the different steps that you would suggest and provide reasons for each one to them.

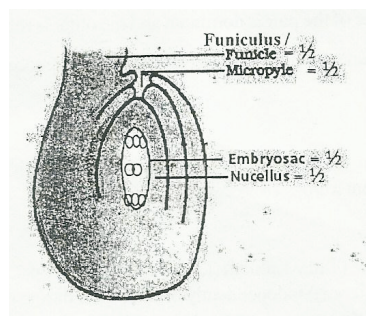
(b) Draw a diagram of a section of a megasporangium of an angiosperm and label funiculus, micropyle, embryo sac and nucellus

Ans (a) Emasculation, removal of anthers from the flower bud before the anther dehisce to avoid self pollination = ½ + ½

Bagging, to prevent contamination of its stigma with unwanted pollen grains = ½ + ½

Rebagging, the stigma of the mature ovary are dusted with desired pollen grains and rebagged to allow the fruit to develop = ½ + ½

(b)

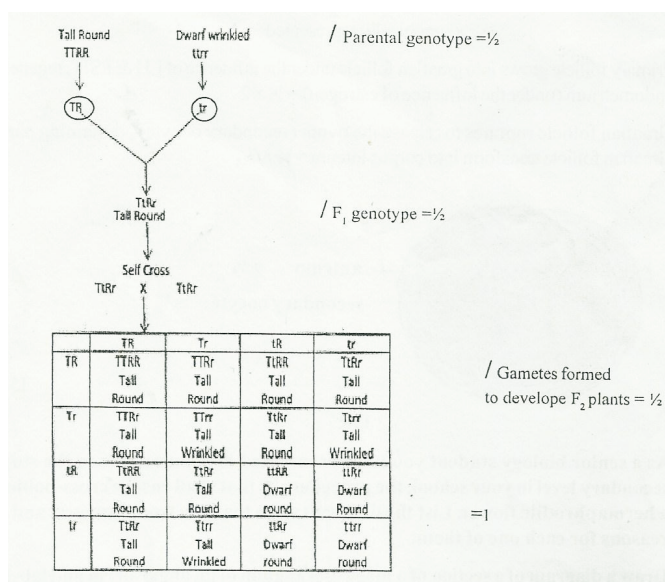


Funiculus /
Funicle = ½
Micropyle = ½
Embryosac = ½
Nucellus = ½

[5 Marks]

26. Give a genetic explanation for the following cross . When a tall pea plant with round seeds was crossed with a dwarf pea plant with wrinkled seeds then all the individual of F – population were tall with round seed. However selfing amount F – population led to a 9:3:3:1 phenotypic ratio.

Ans.



Phenotypic ratio

Tall Round 9 : Tall Wrinkled 3 : Dwarf Round 3 : Dwarf Wrinkled 1
/F₂ Phenotype = $\frac{1}{2}$

Law of dominance

In a dissimilar pair of factors one member of the pair is dominant and the other is recessive.

In the given cross tall and round are dominant where as dwarf and wrinkled are recessive (explain with or without a cross) = $\frac{1}{2}$

Law of Segregation

Allelic pairs separate or segregate during gamete formation and the paired condition is restored during fertilization (explain with or without a cross) = $\frac{1}{2}$

Law of Independent Assortment

The new combination seen inn F 2 generation (Tall wrinkled) (Dwarf round) is only possible when the two gene pairs for height and seed shape (assort) independently of each other during gamete formation / The law states that whn two pairs of traits are combined in a hybrid segregation of one pair of characters is independent of the other pair of characters = 1

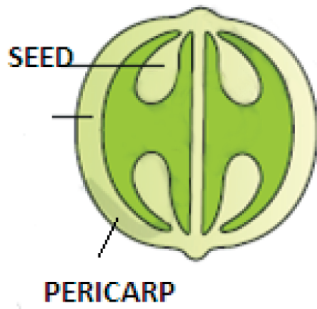
[3+ $\frac{1}{2}$ + $\frac{1}{2}$ +1=5 Marks]

Out-B-16.57/1,2,3 DPSVK/22

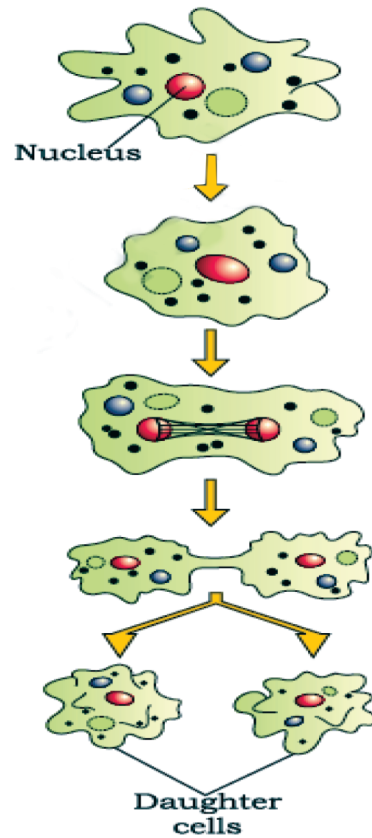
FREQUENTLY ASKED DIAGRAMS

CHAPTER – 1 REPRODUCTION IN ORGANISMS

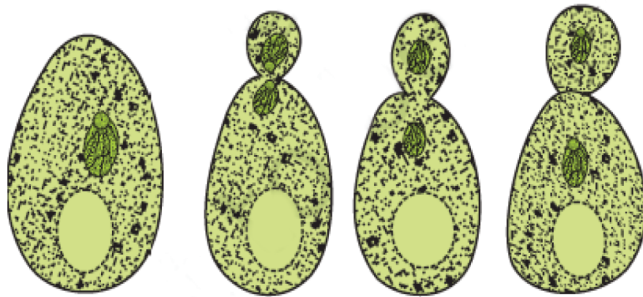
1. FRUIT SHOWING SEEDS



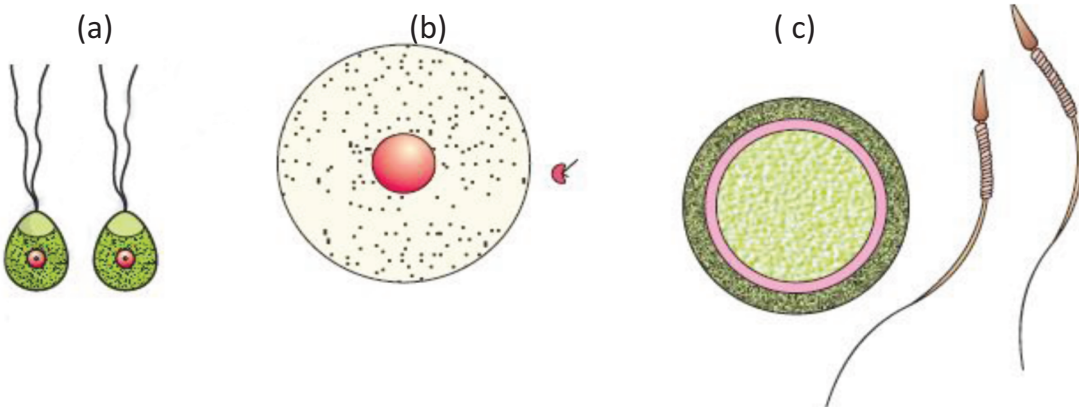
2. BINARY FISSION IN AMOEBA



3. BUDDING IN YEAST

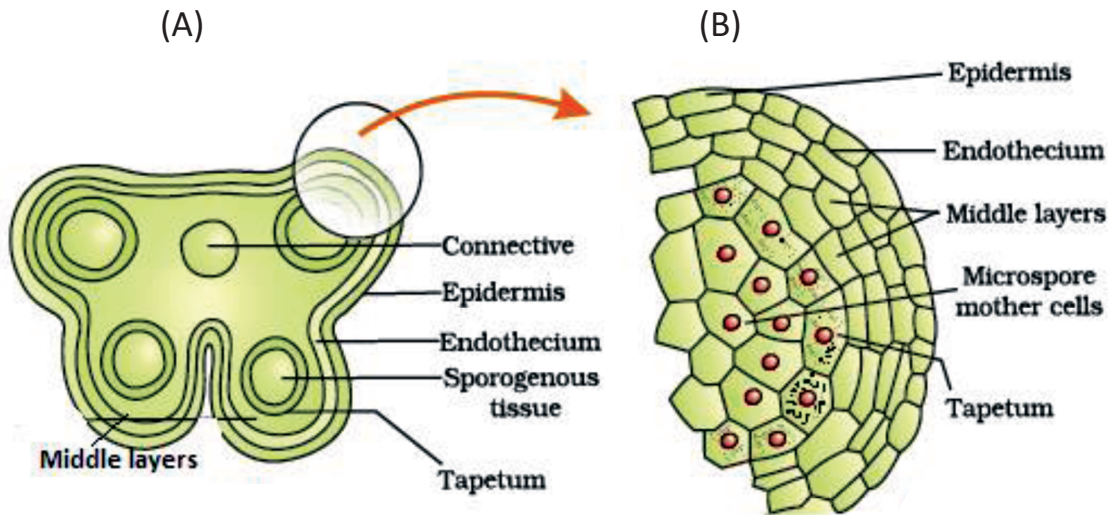


4. TYPES OF GAMETES a) ISOGAMETES b).& c) ANISOGAMETES



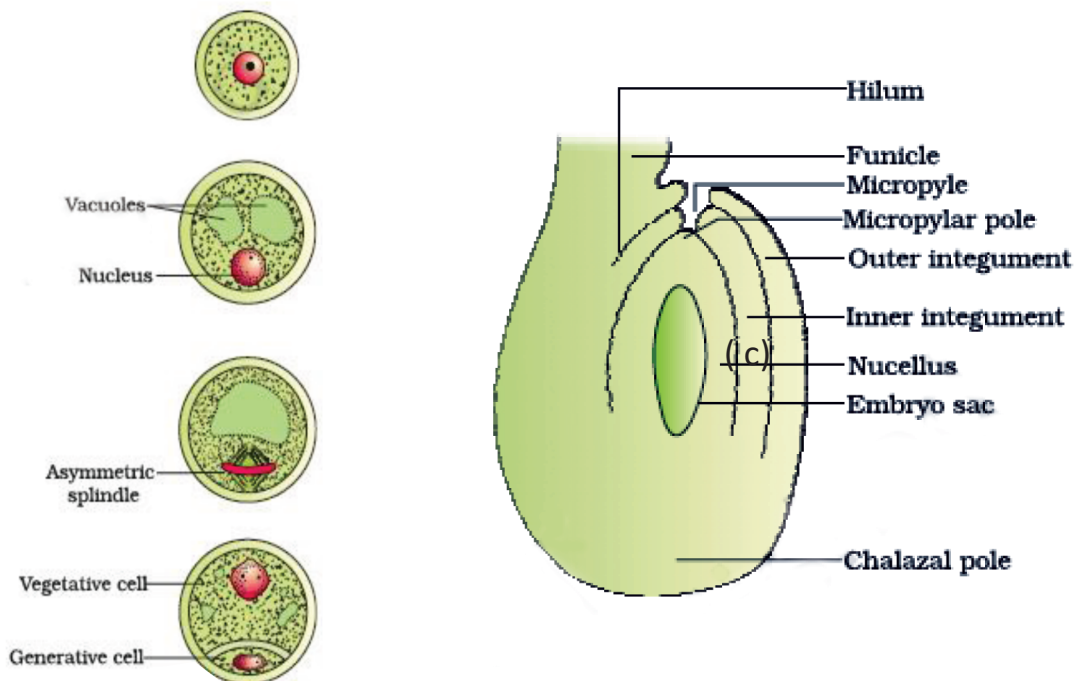
CHAPTER – 2 REPRODUCTION IN FLOWERING PLANTS

1. (A) T. S. OF A YOUNG ANTHR (B) ENLARGED VIEW OF A MICROSPORANGIUM SHOWING WALL LAYERS

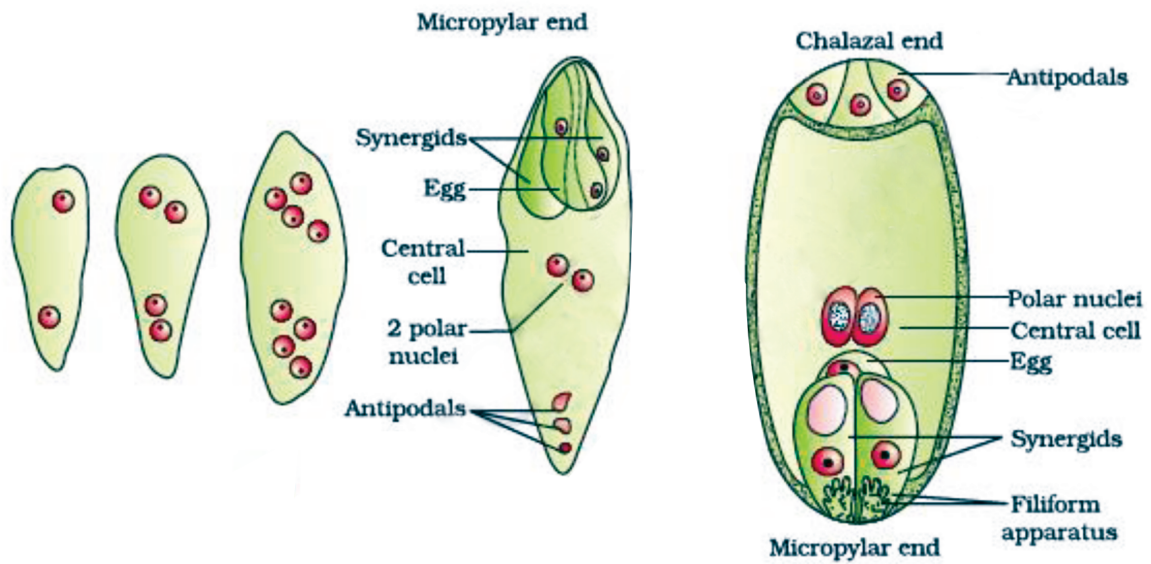


2. STAGES OF MICROSPORE MATURING INTO A POLLEN GRAIN

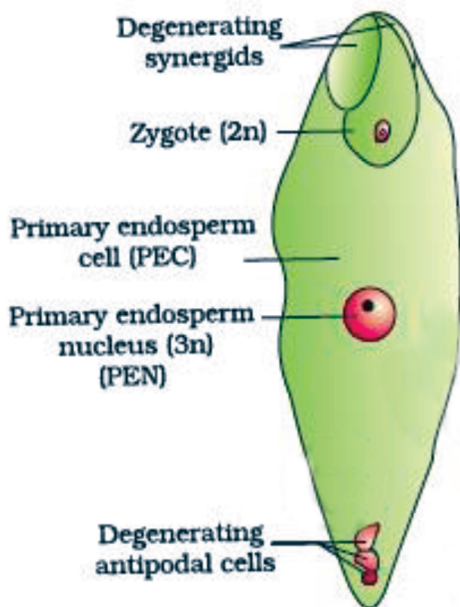
3. ANATROPUS OVULE



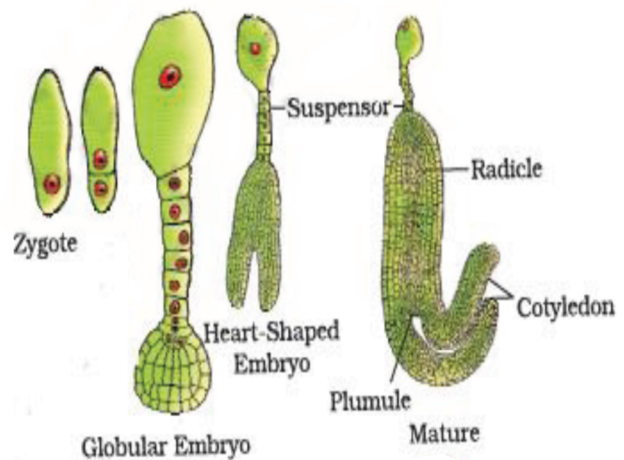
4. DIAGRAMMATIC REPRESENTATION OF DEVELOPMENT OF AN EMBRYO SAC



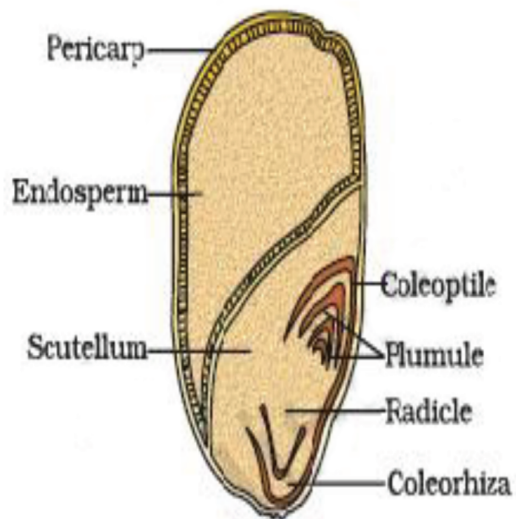
5. FERTILISED EMBRYO SAC



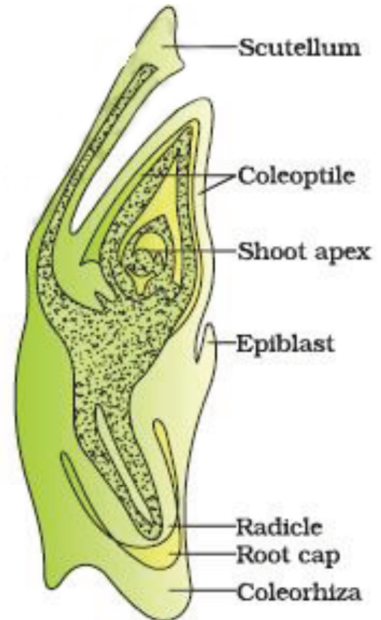
6. STAGES IN THE DEVELOPMENT OF DICOT EMBRYO



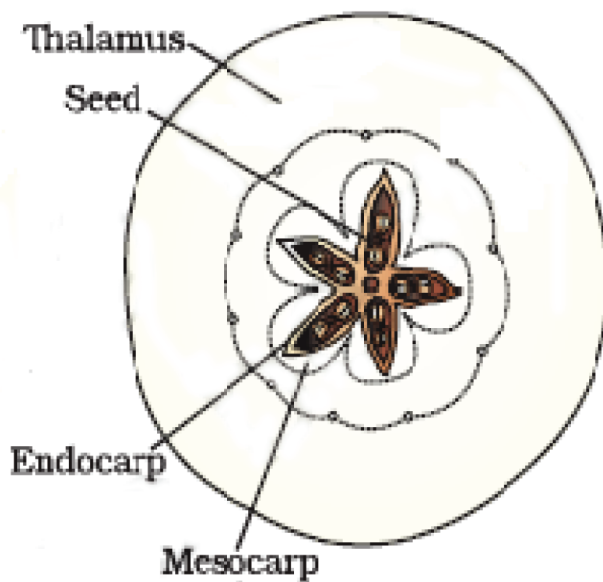
7. L. S. OF MONOCOT SEED



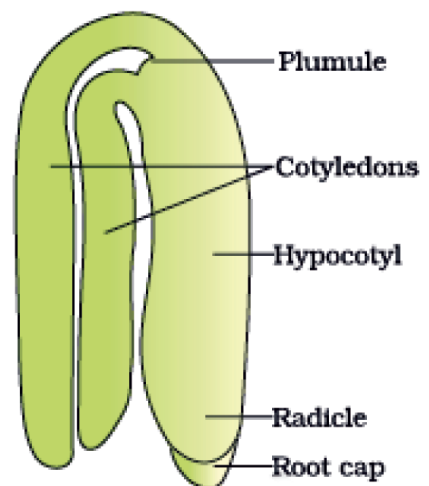
8. L. S. OF GRASS EMBRYO



9. FALSE FRUIT OF APPLE

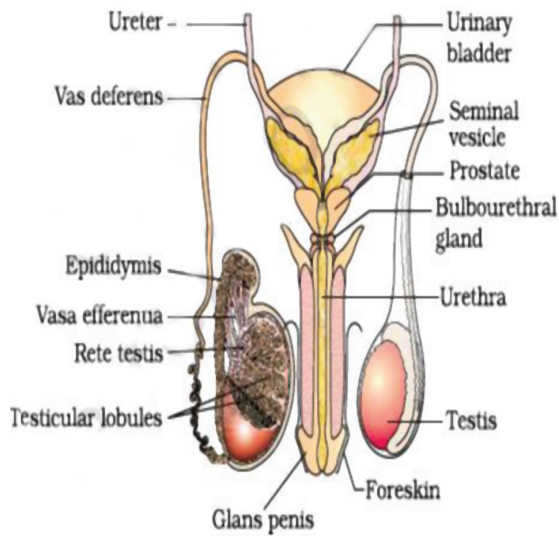


10.A DICOT EMBRYO

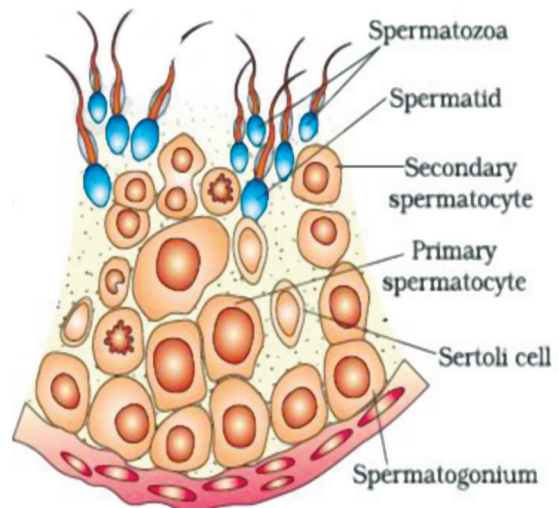


CHAPTER –3 HUMAN REPRODUCTION

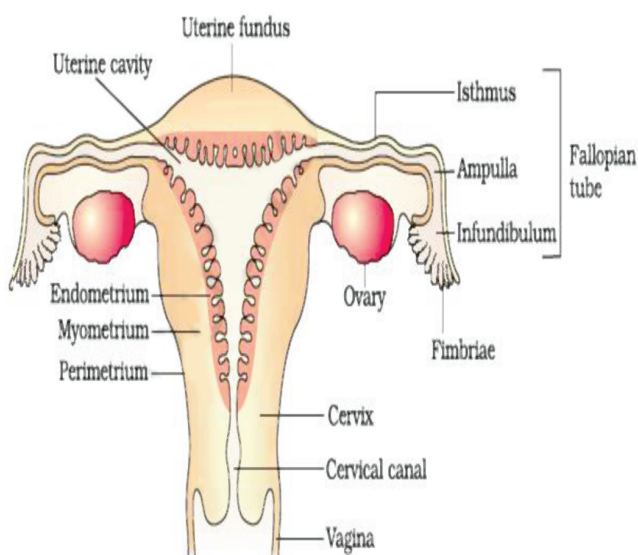
1. DIAGRAMMATIC VIEW OF MALE REPRODUCTIVE SYSTEM



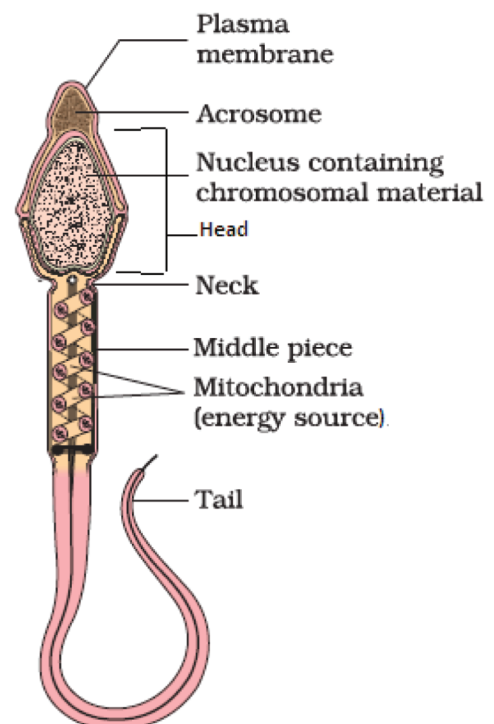
2. SEMINIFEROUS TUBULES SECTIONAL VIEW



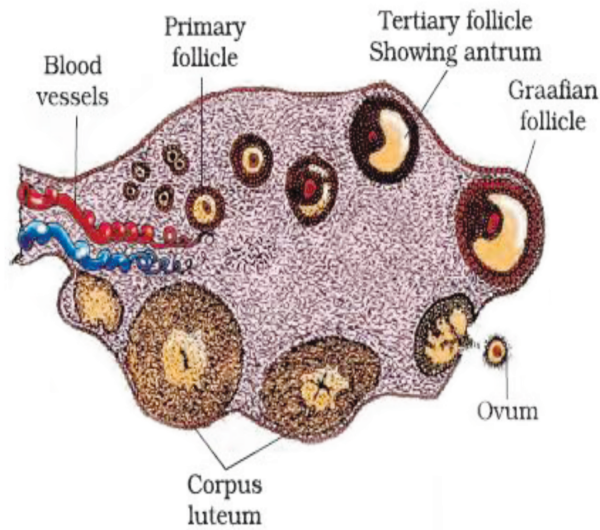
3. DIAGRAMMATIC VIEW OF FEMALE REPRODUCTIVE SYSTEM



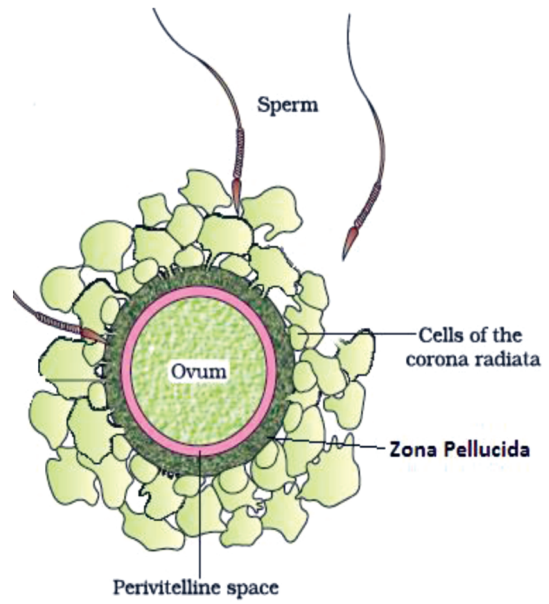
4. STRUCTURE OF SPERM



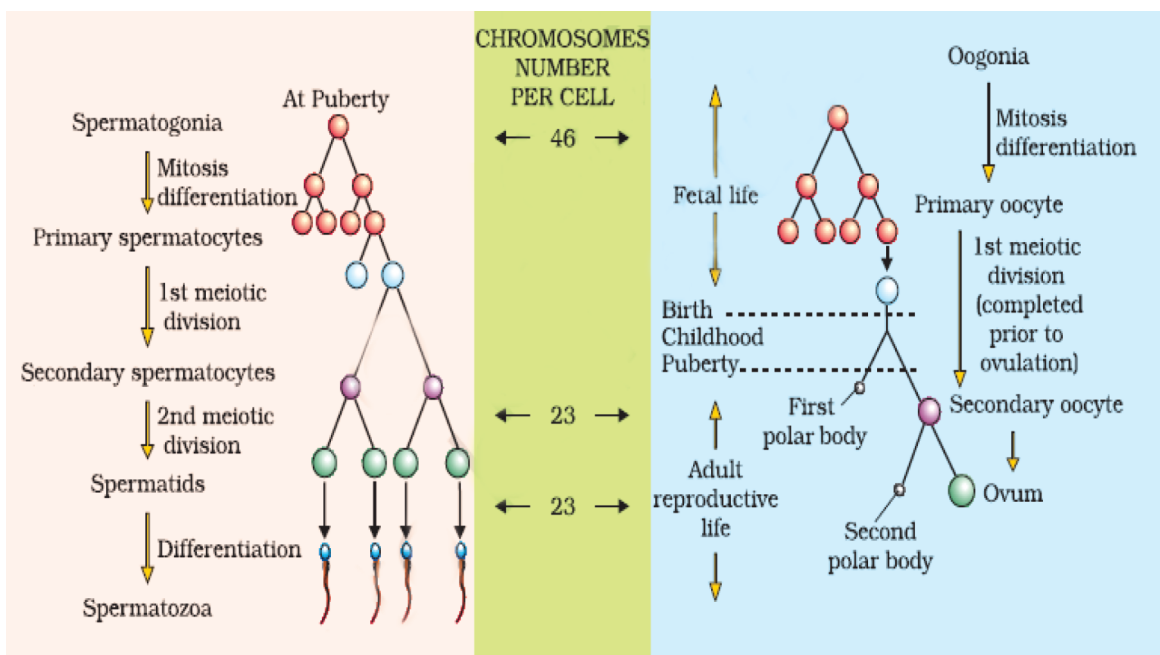
5. SECTIONAL VIEW OF OVARY



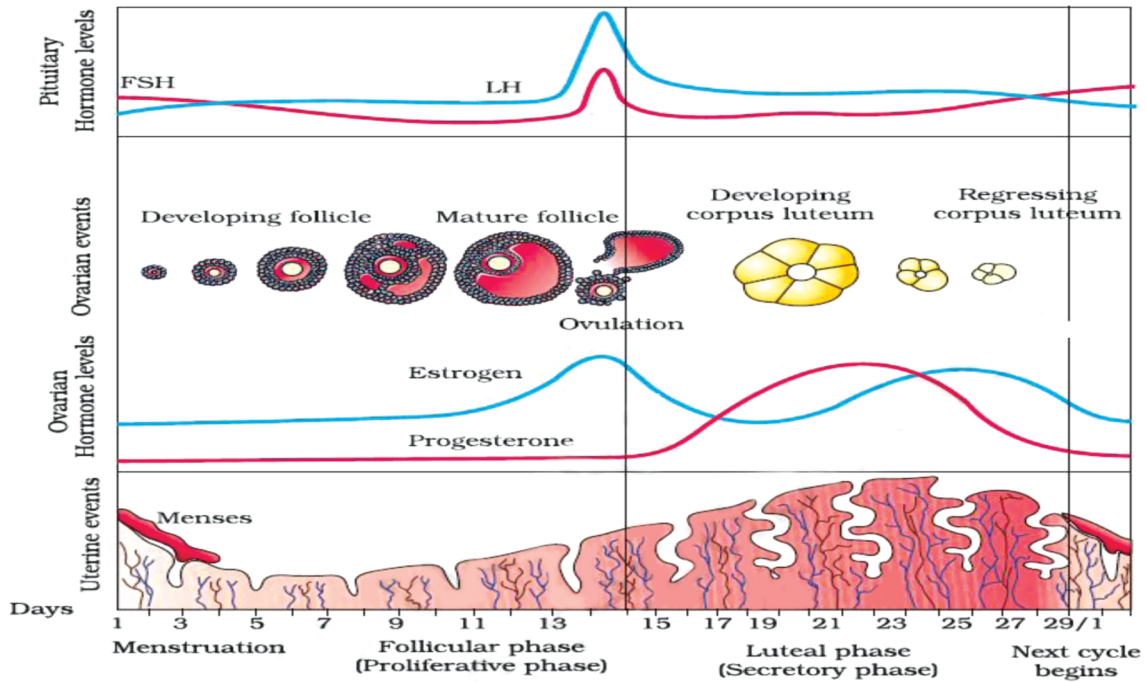
6. OVUM SURROUNDING BY FEW SPERM (FERTILISATION)



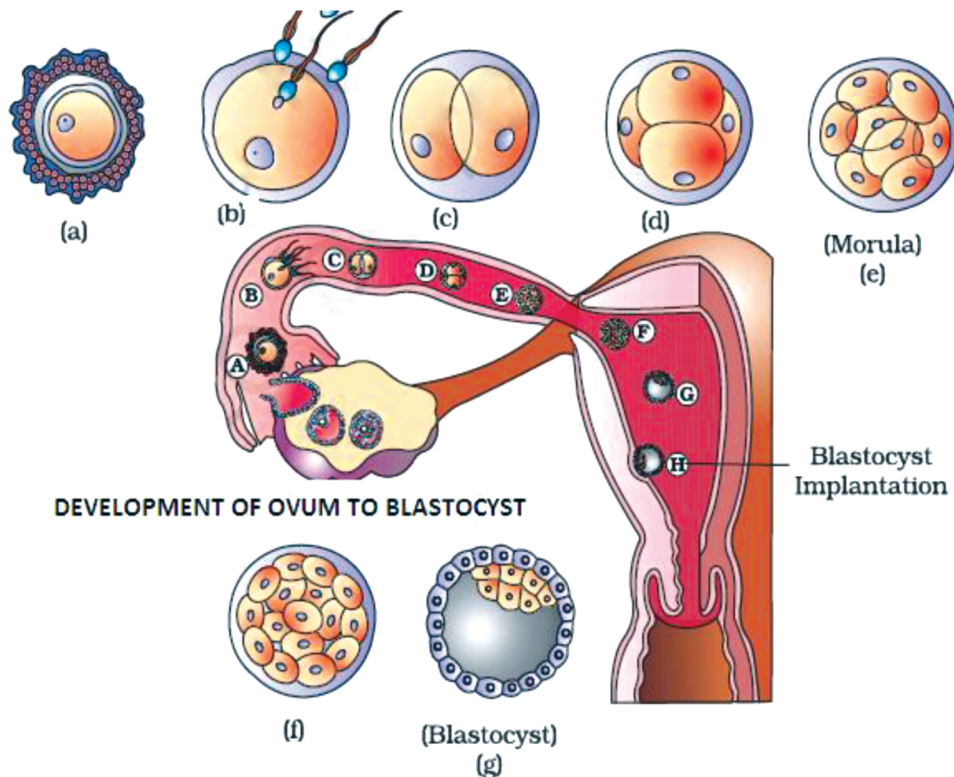
7. SCHEMATIC REPRESENTATION OF OOGENESIS & SPERMATOGENESIS



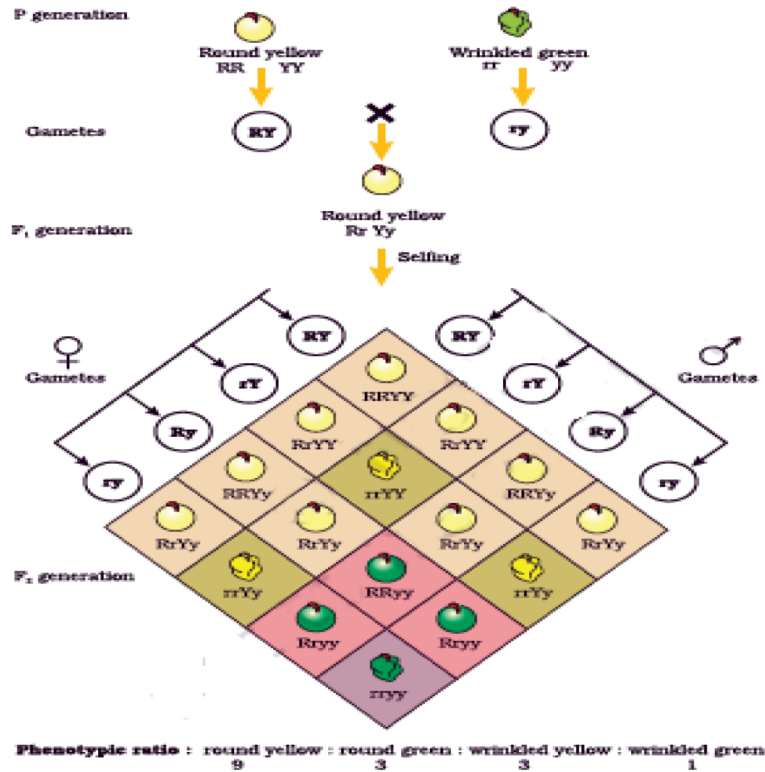
8. DIAGRAMMATIC REPRESENTATION OF VARIOUS EVENTS DURING MENSTRUAL CYCLE



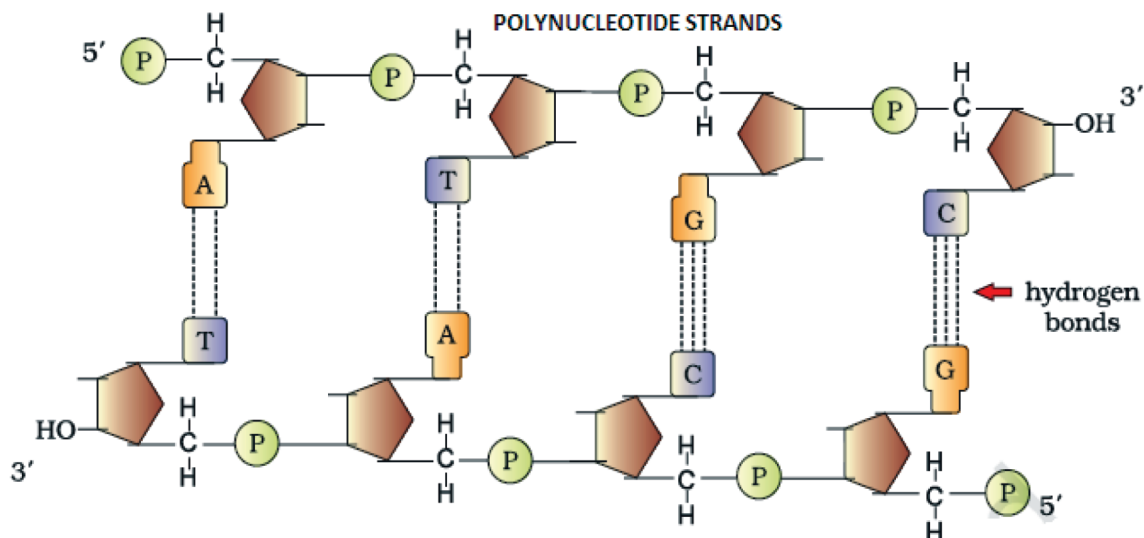
9. FERTILISATION, TRANSPORT OF OVUM, PASSAGE OF GROWING EMBRYO IN FALLOPIAN TUBE



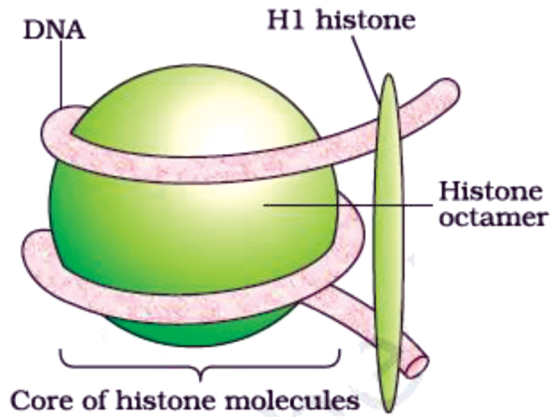
CHAPTER –5 PRINCIPLES OF INHERITANCE
1. MENDEL'S DIHYBRID CROSS



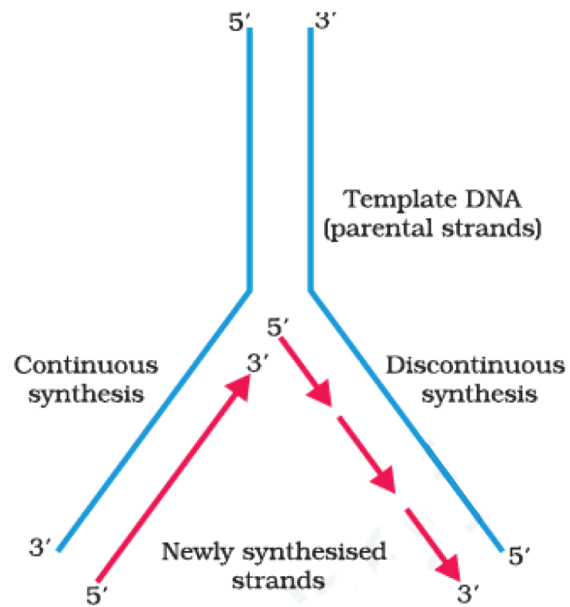
CHAPTER –6 MOLECULAR BASIS OF INHERITANCE
1. Double stranded polynucleotide chain



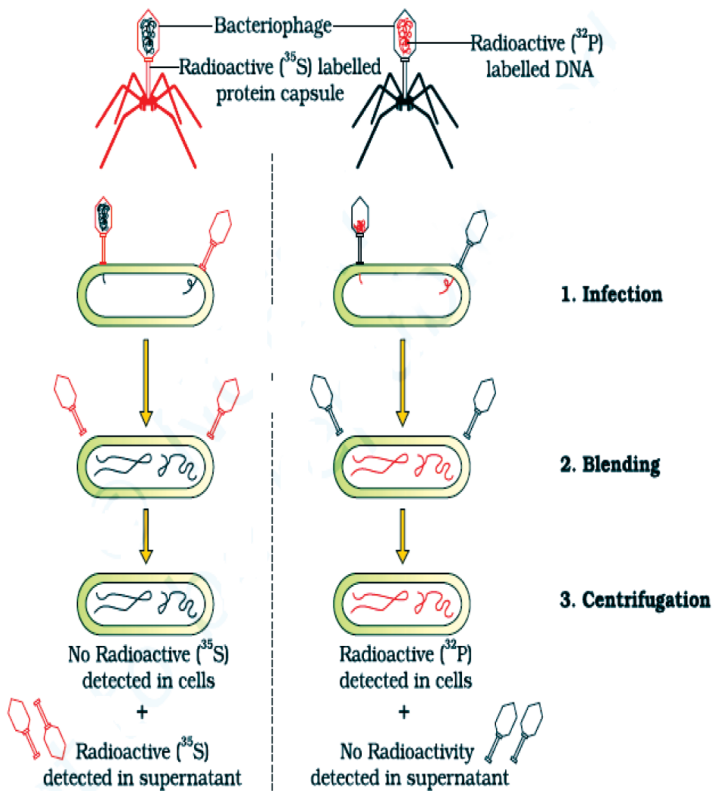
2. NUCLEOSOME



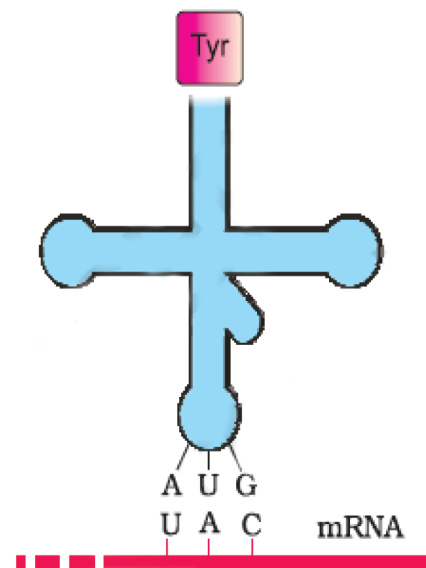
3. REPLICATION FORK OF DNA



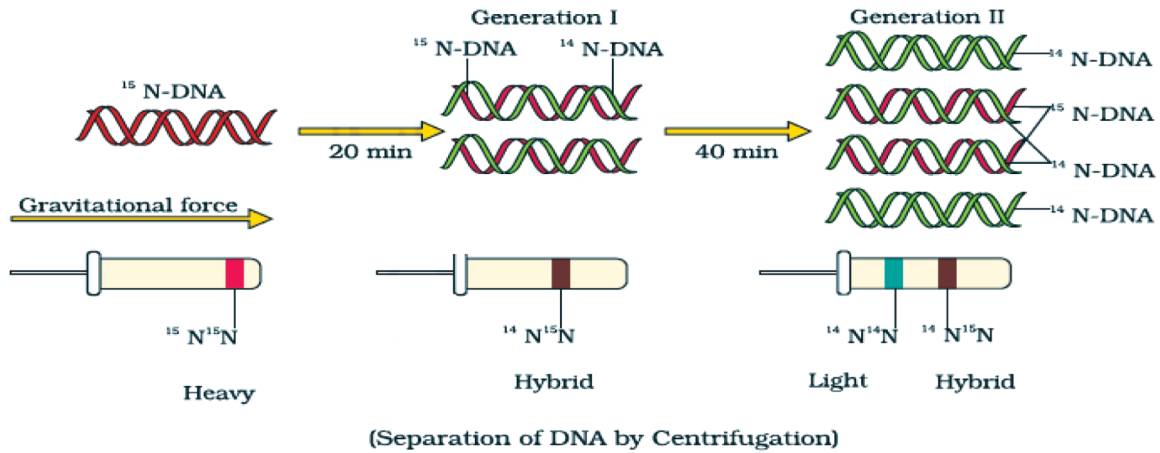
4. HERSHEY AND CHASE EXPERIMENT



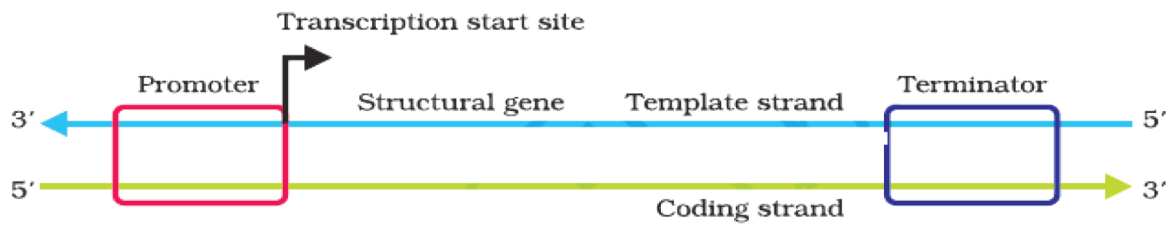
5. tRNA- adapter MOLECULE



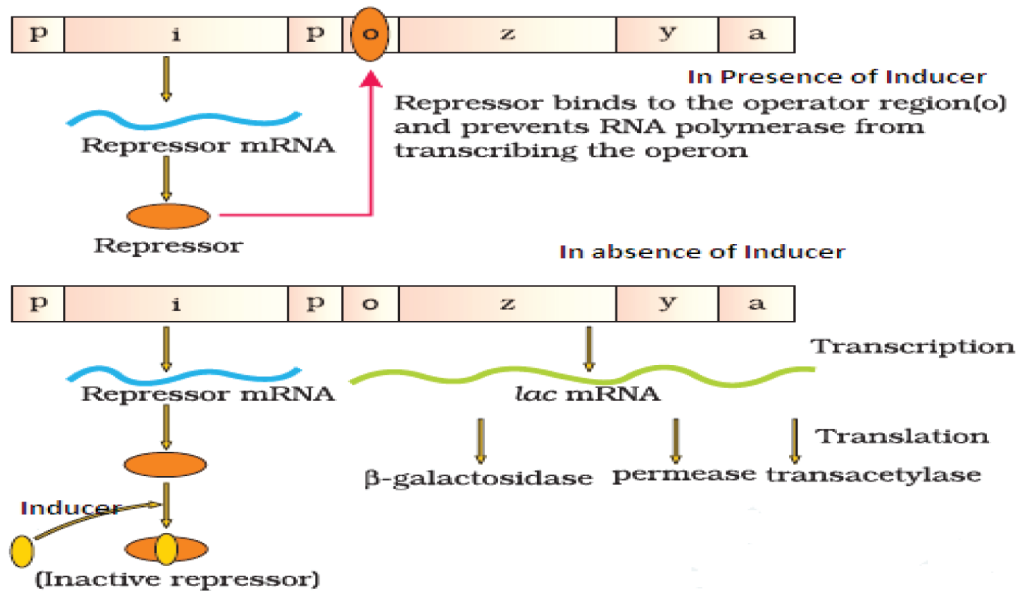
6. MESELSON & STAHL'S EXPERIMENT



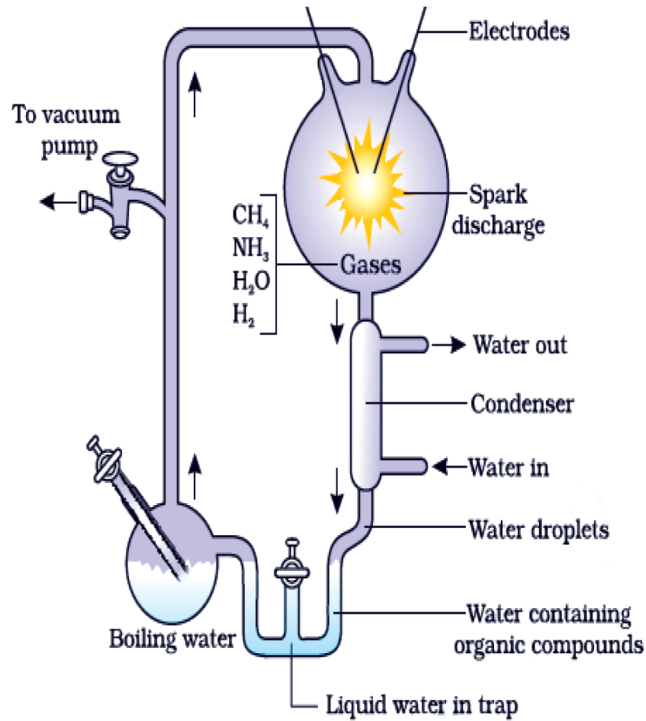
7. STRUCTURE OF TRANSCRIPTION UNIT



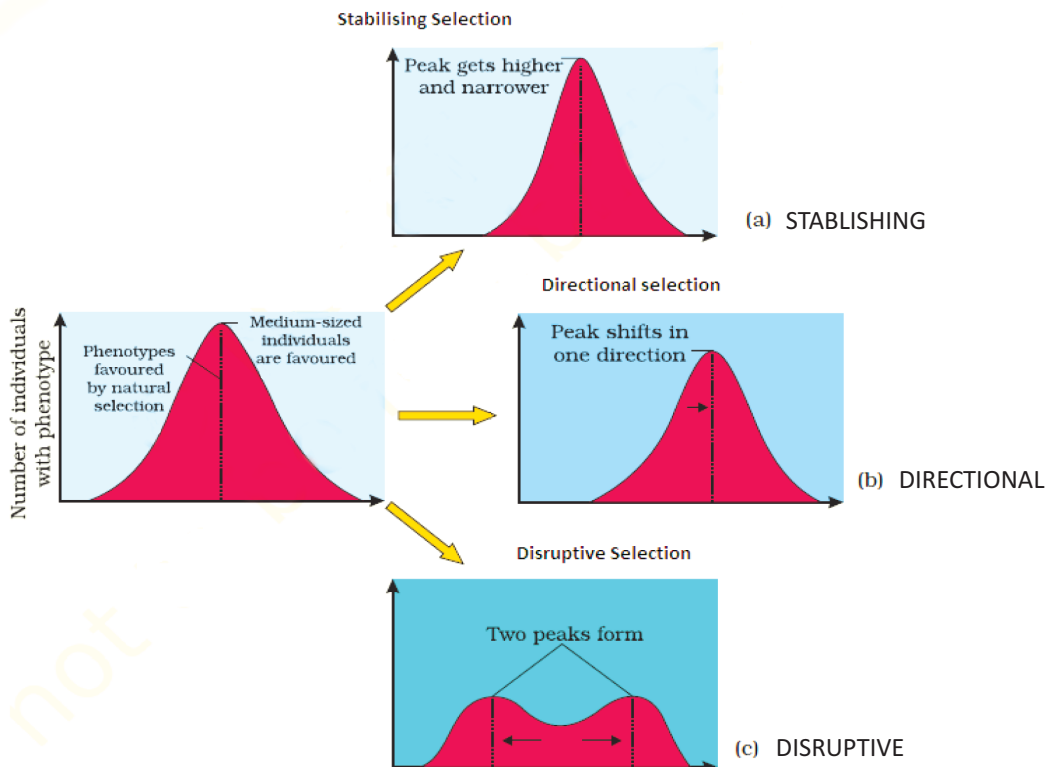
8. LAC OPERON



CHAPTER -7 EVOLUTION
1. MILLER'S EXPERIMENT

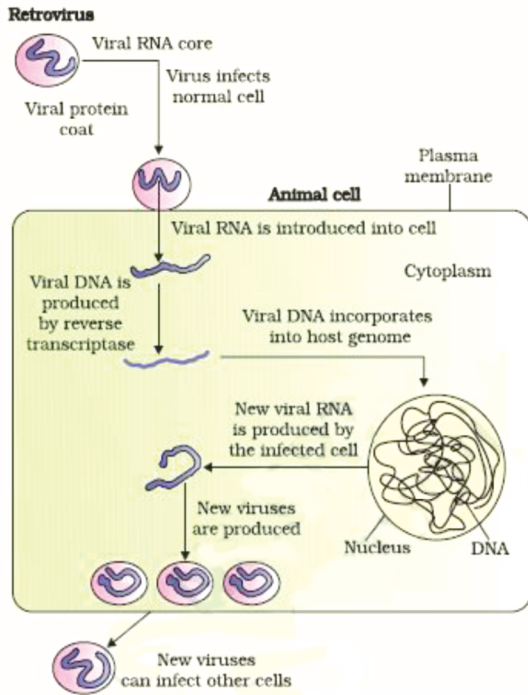


2. HARDY - WEINBERG PRINCIPLE, TO SHOW OPERATION OF NATURAL SELECTION

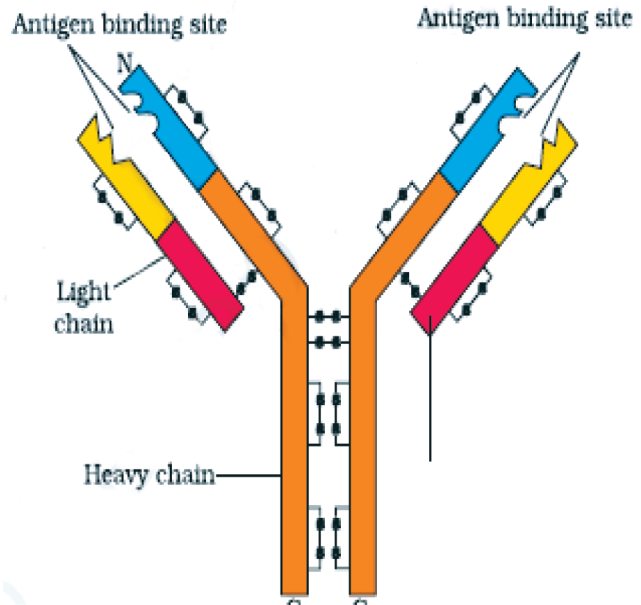


CHAPTER-8 HUMAN HEALTH & DISEASES

1. REPLICATION OF RETROVIRUS (AIDS VIRUS)

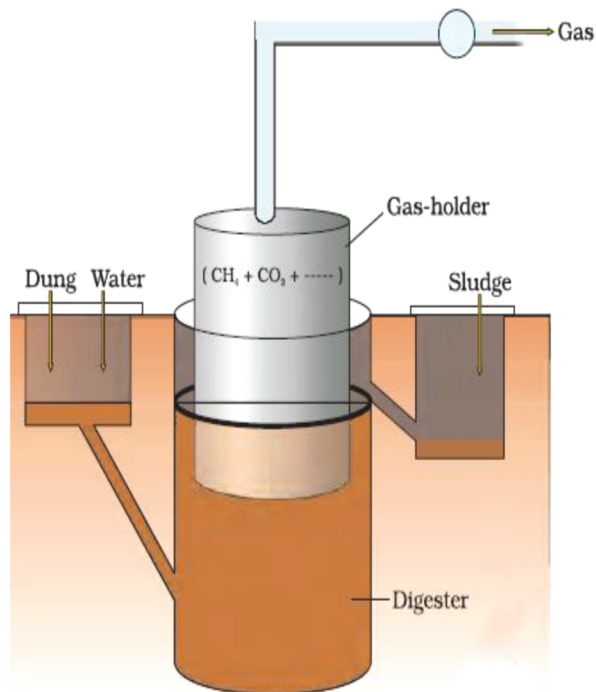


2. STRUCTURE OF ANTIBODY MOLECULE



CHAPTER-10 MICROBES IN HUMAN WELFARE

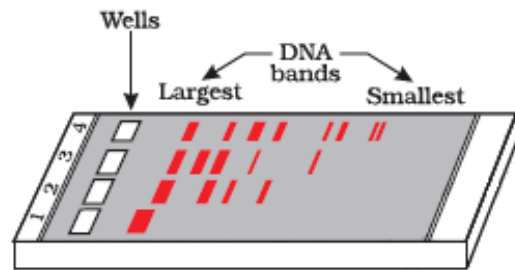
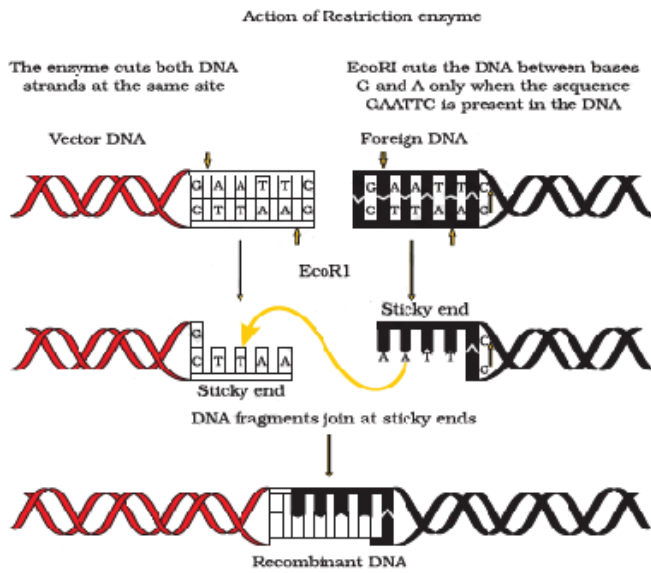
1. BIOGAS PLANT



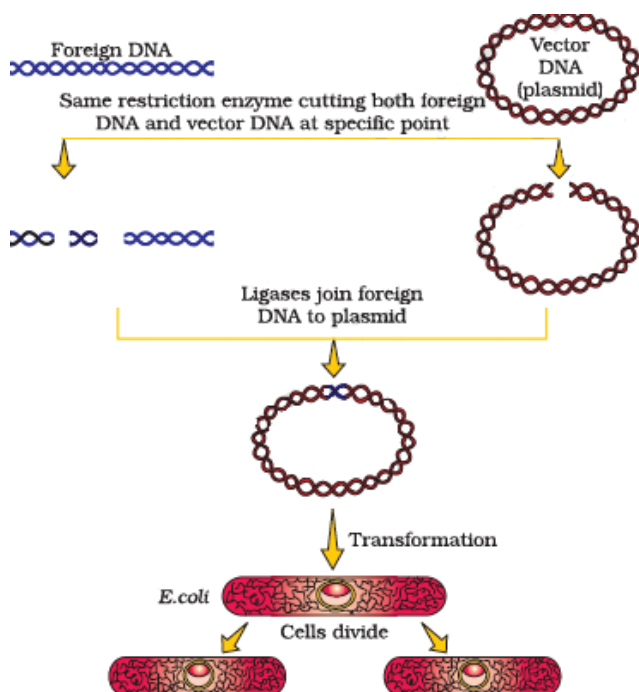
CHAPTER – 11 BIOTECHNOLOGY-PRINCIPLES & PROCESSES

1. Steps in the formation of rDNA by the action of ECO RI

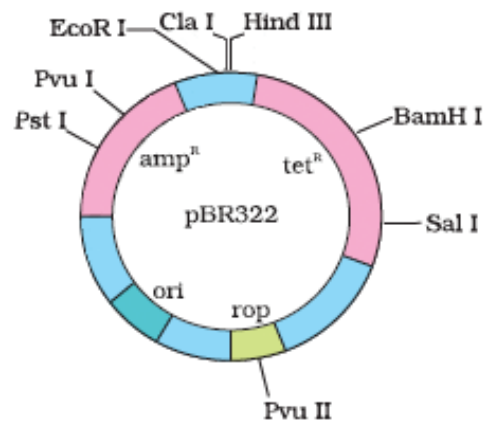
2. Agarose gel Electrophoresis



3. Diagrammatic representation of rDNA formation (Recombinant of DNA technology)

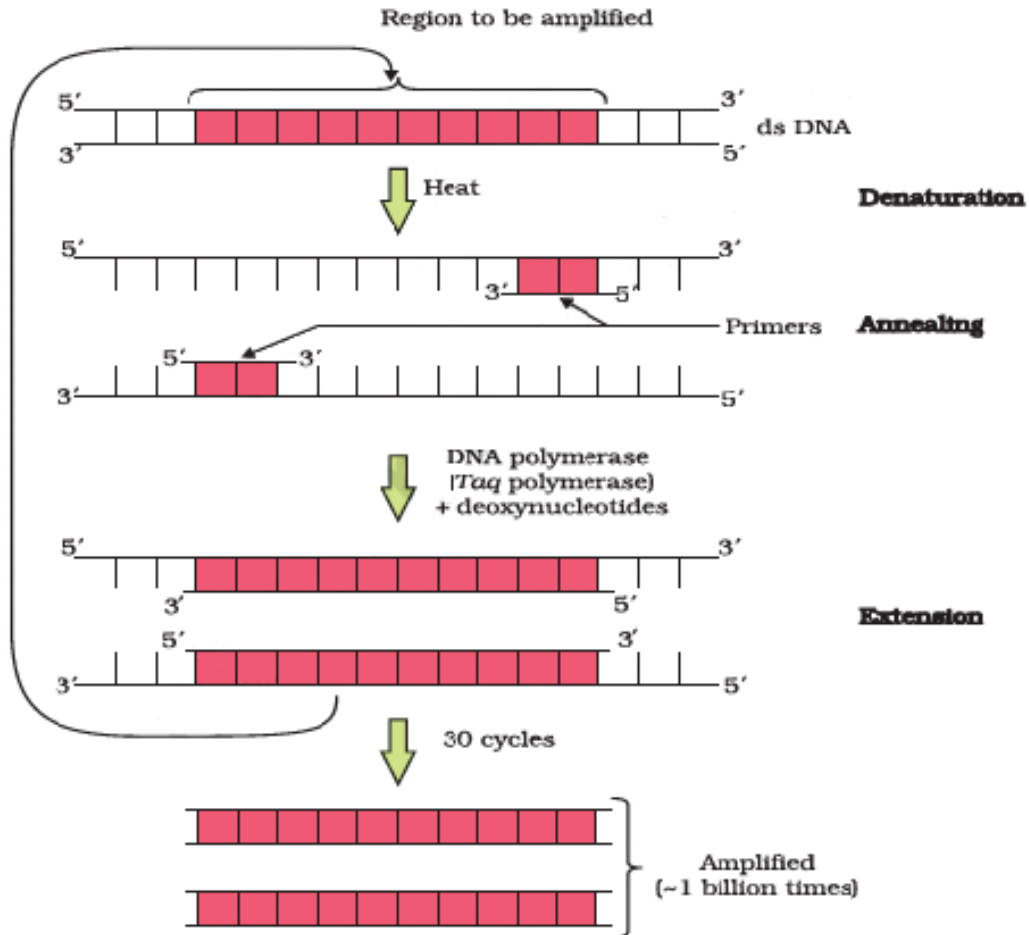


4. Cloning Vector pBR322

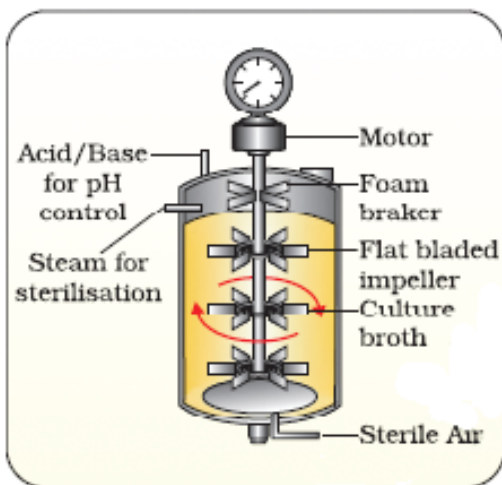


E. coli cloning vector pBR322 showing restriction sites (*Hind* III, *Eco*R I, *Bam*H I, *Sal* I, *Pvu* II, *Pst* I, *Cla* I), *ori* and antibiotic resistance genes (*amp*^r and *tet*^r). *rop* codes for the proteins involved in the replication of the plasmid.

5. POLYMERASE CHAIN REACTION {PCR}

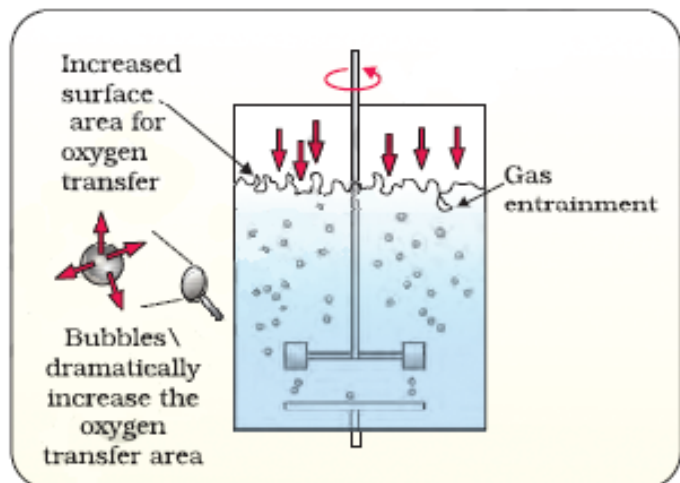


6. SIMPLE STIRRED TANK BIOREACTOR



(a)

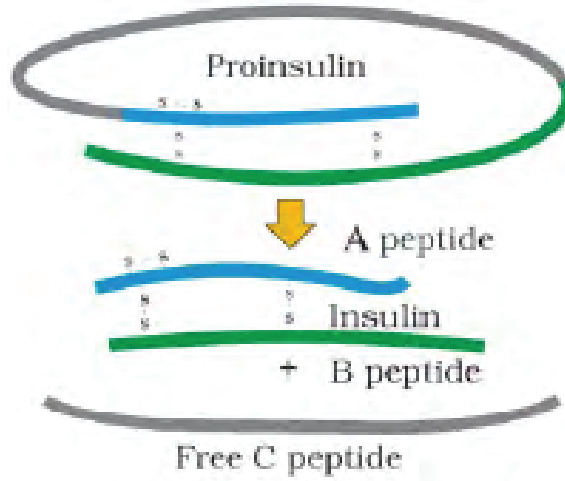
7. SPARGED STIR TANK BIOREACTOR



(b)

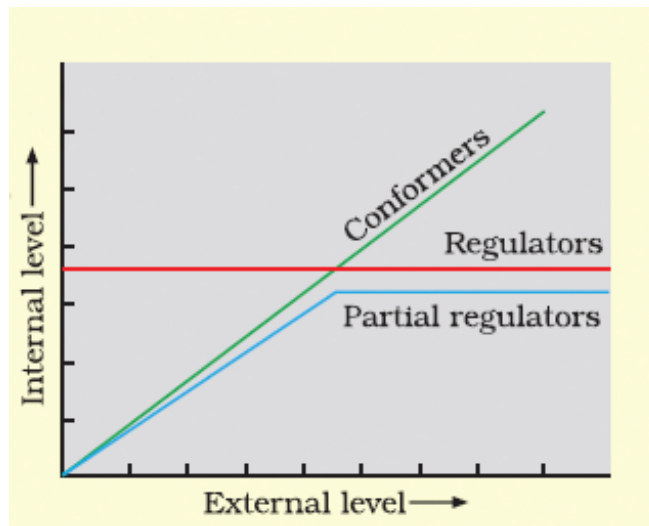
CHAPTER – 12 BIOTECHNOLOGY & ITS APPLICATIONS

1. MATURATION OF PROINSULIN INTO INSULIN

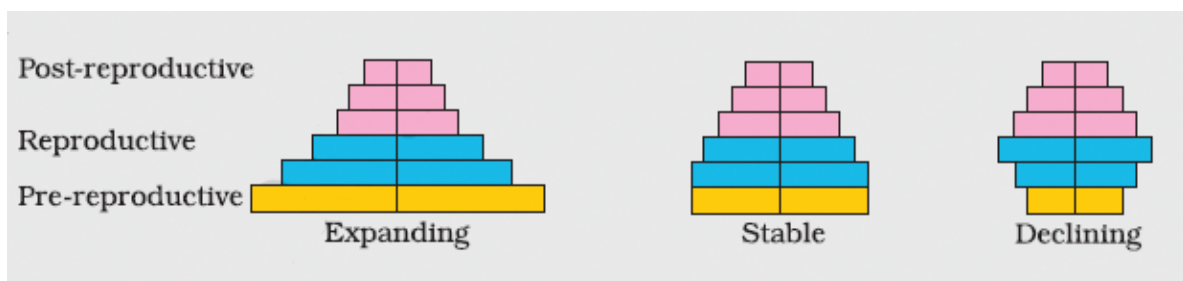


CHAPTER – 13 ORGANISMS & POPULATIONS

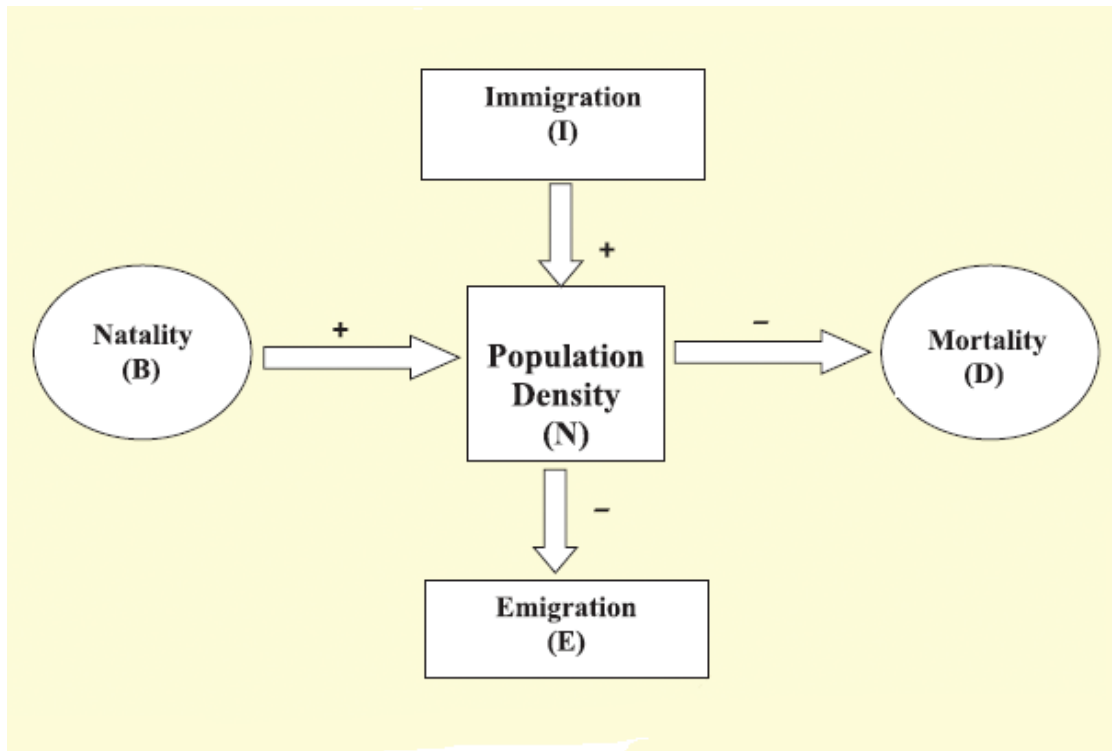
1. RESPONSE OF ORGANISMS TO ABIOTIC FACTORS



2. REPRESENTATION OF AGE PYRAMIDS FOR HUMAN POPULATION

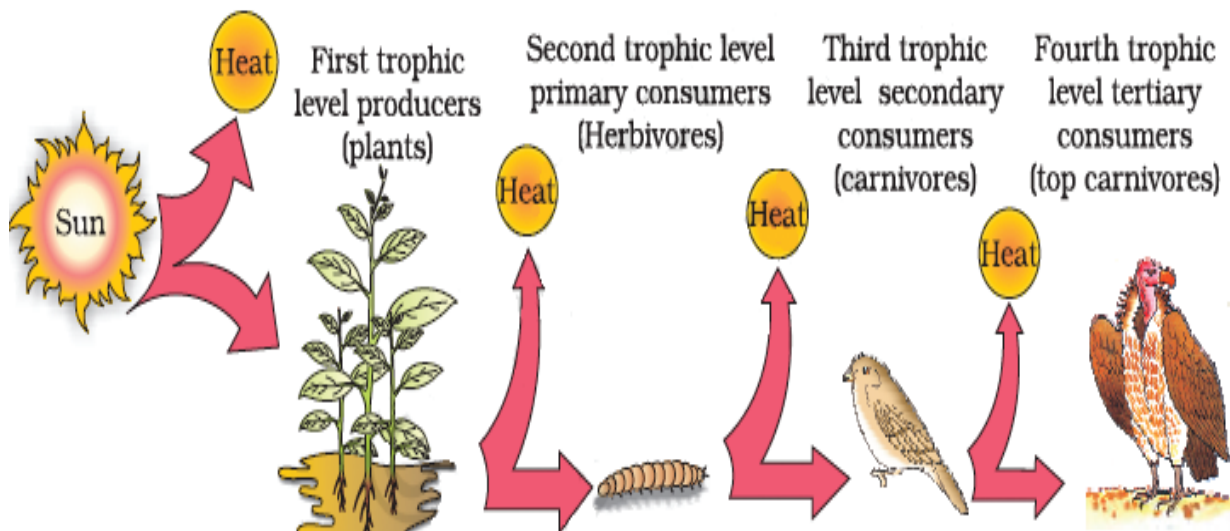


3. FACTORS AFFECTING POPULATION DENSITY



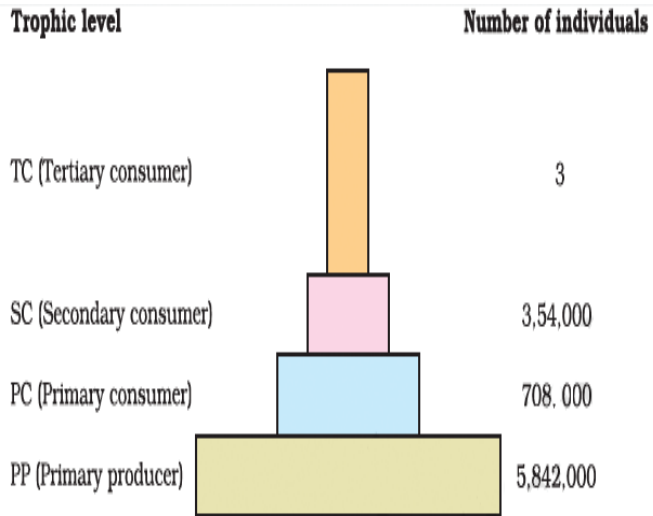
CHAPTER – 14 ECOSYSTEM

1. FLOW OF ENERGY THROUGH A FOOD CHAIN

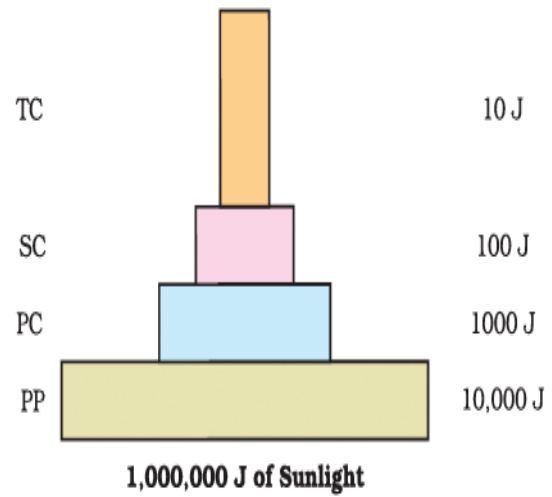


2. PYRAMID OF BIOMASS

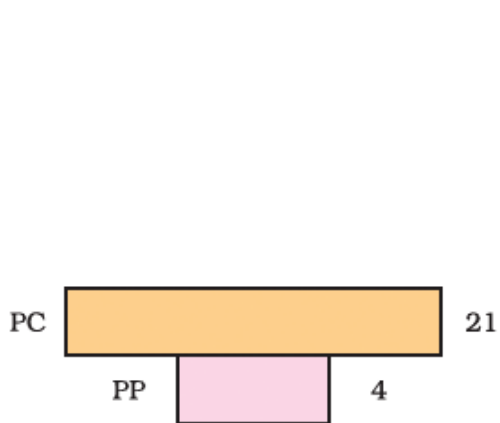
A. PYRAMID OF NUMBER



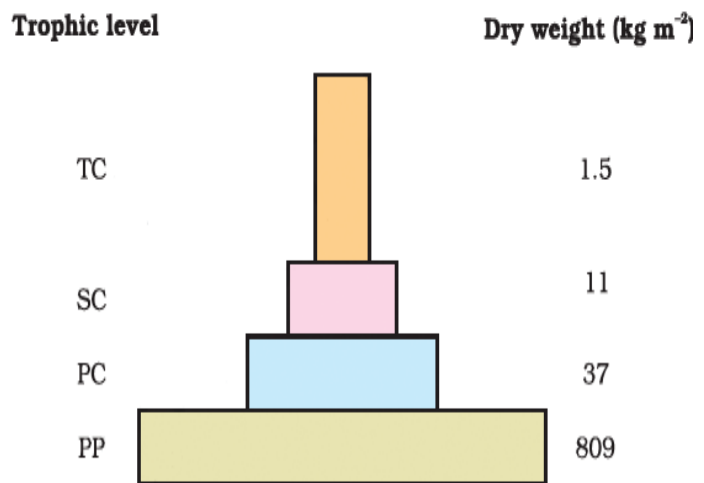
B. PYRAMID OF BIOMASS



C. INVERTED PYRAMID OF BIOMASS

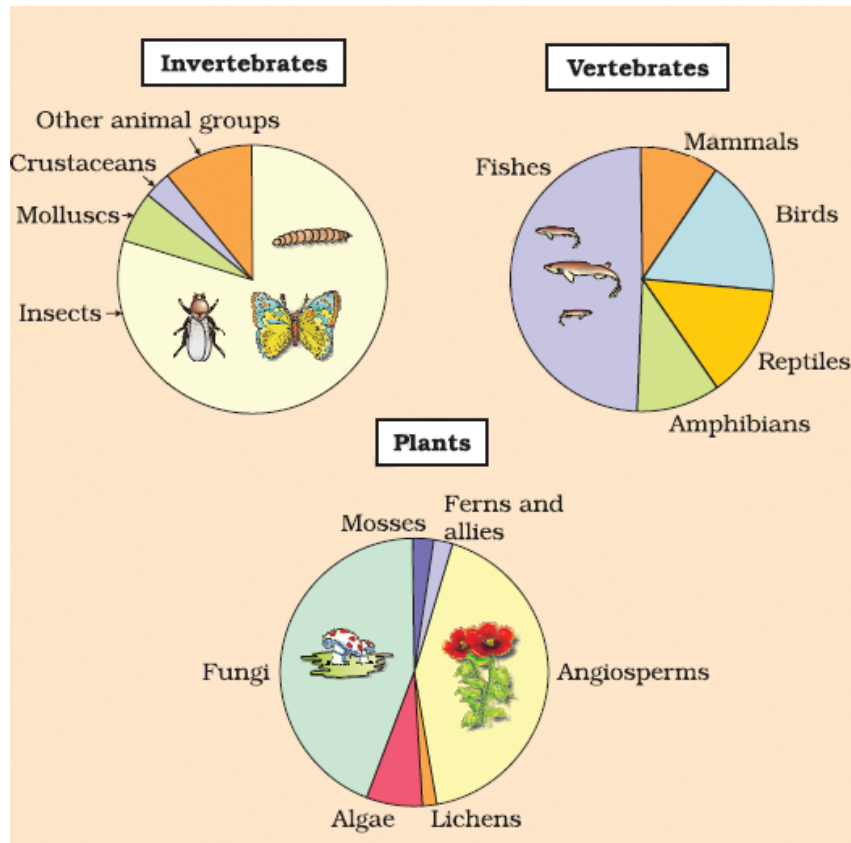


D. AN IDEAL PYRAMID OF ENERGY

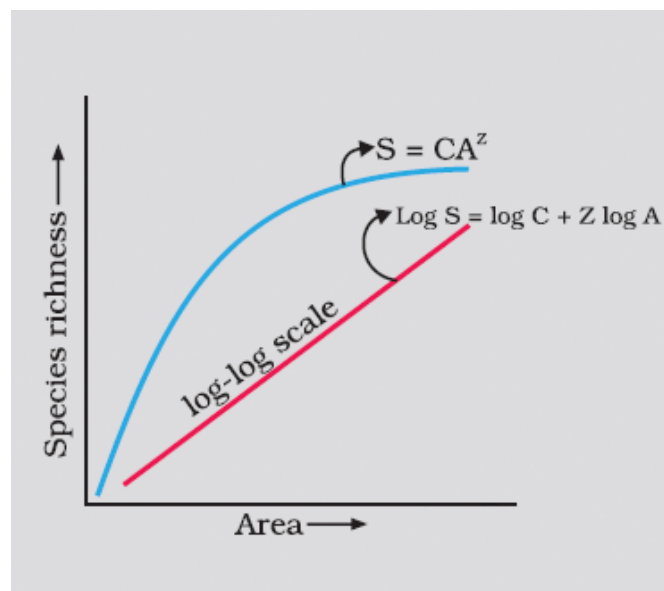


CHAPTER – 15 BIODIVERSITY & ITS CONSERVATION

1. REPRESENTATION OF GLOBAL BIODIVERSITY

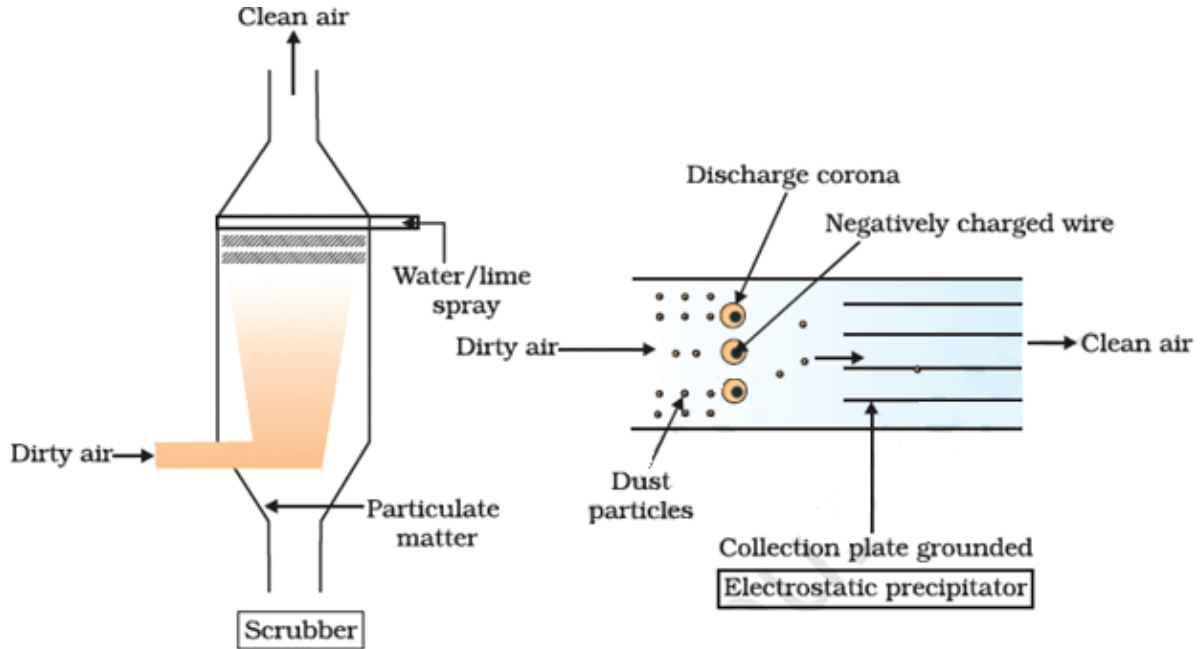


2. SPECIES-AREA RELATIONSHIP

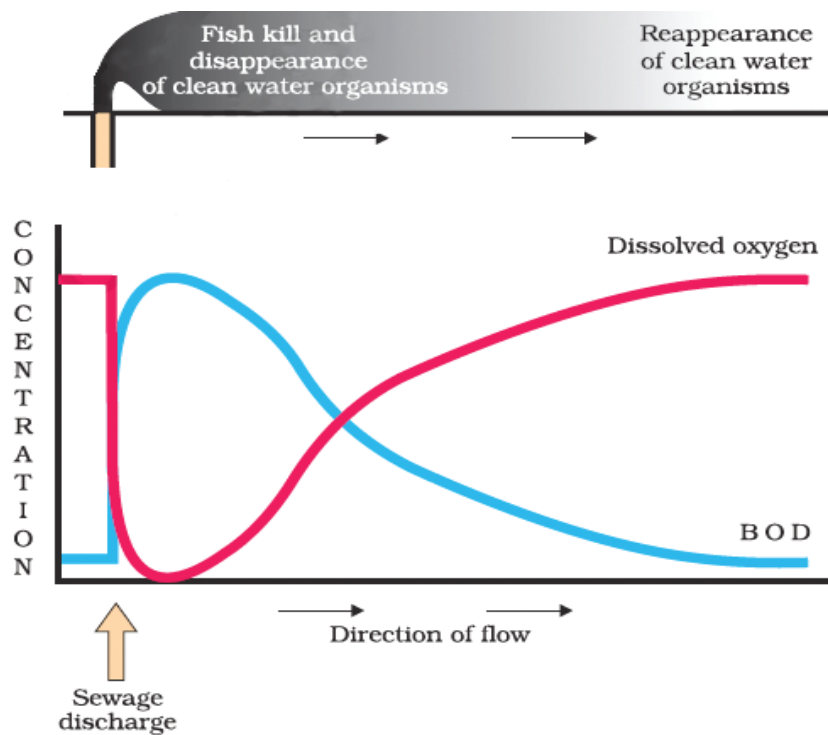


CHAPTER – 16 ENVIRONMENTAL ISSUES

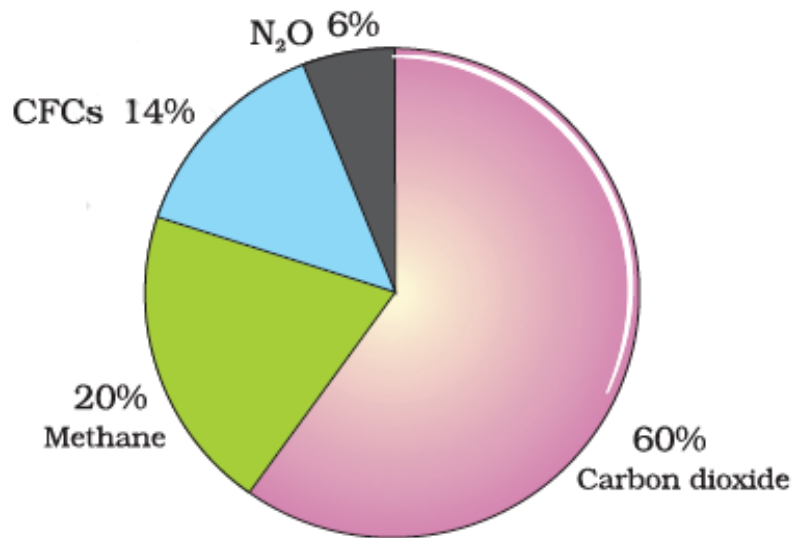
1. ELECTROSTATIC PRECIPITATOR



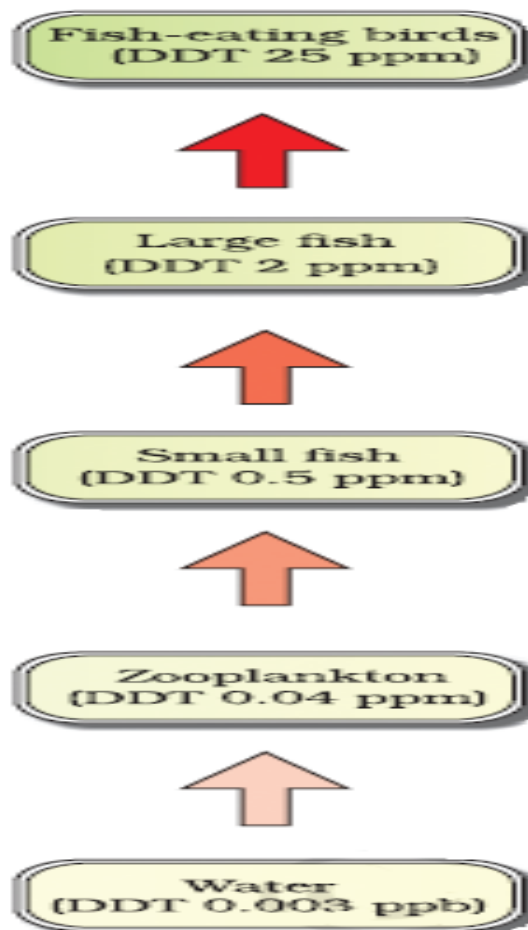
2. EFFECT OF SEWAGE DISCHARGE ON THE CHARACTERISTICS OF A RIVER



3. .RELATIVE CONTRIBUTION OF VARIOUS GREENHOUSE GASES TO GLOBAL WARMING



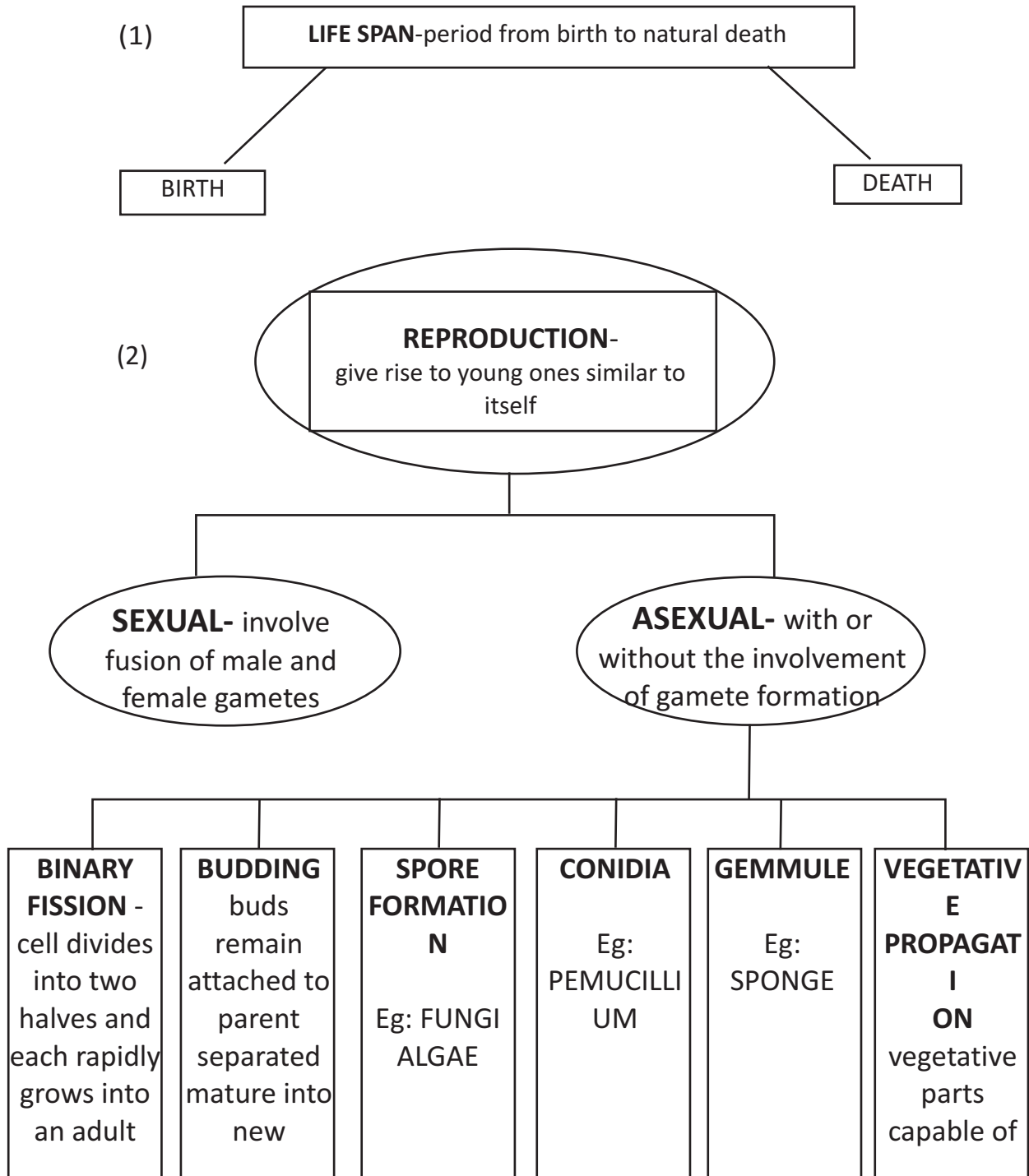
3. BIOMAGNIFICATION IN AN AQUATIC FOOD CHAIN



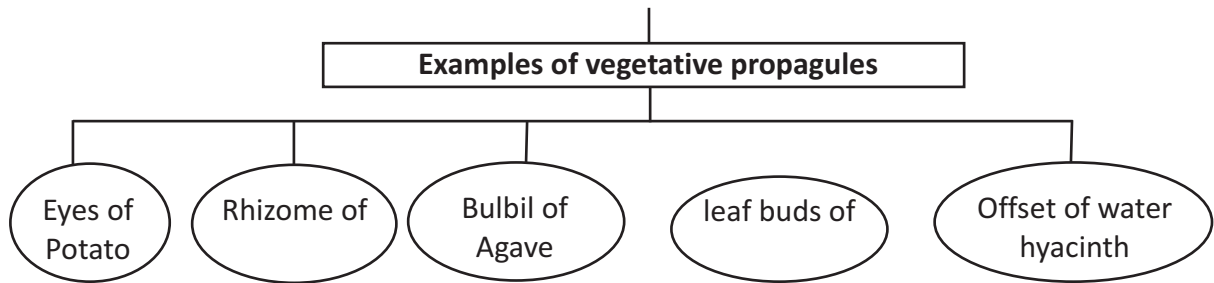
UNIT VI - REPRODUCTION
CHAPTER -1 REPRODUCTION IN ORGANISMS
(KEY POINTS)

S.NO	Term	Explanation
1	Pollination	Transfer of pollen grains from anther to stigma
2	Syngamy	The fusion of male and female gamete
3	Parthenogenesis	The female gamete undergoes development to form new organisms without fertilisation
4	Oviparous	Fertilised eggs covered by a calcareous shell are laid in a safe place and after a period of incubation young ones hatch out
5	Viviparous	Zygote develops into a young one inside the body of the female organism
6	Cell differentiation	Cells undergo certain modifications to form specialised tissues and organ to form an organism
7	Clone	Morphologically and genetically similar individuals
8	Zoospores	Microscopic motile structures
9	Homogametes (isogametes)	Similar in appearance
10	Hetero gametes (Anisogametes)	Morphologically distinct
11	Homothallic/monoecious	Denote bisexual condition
12	Heterothallic/dioecious	Describe unisexual condition
13	Staminate Flowers	Male flower
14	Pistillate Flowers	Female flower
15	Hermaphrodite	Possess both male and female reproductive organs with in the some body.
16	Meiocytes	Gamete mother cell undergo meiosis
17	Pericarp	Protective thick wall of the fruit
18	Pollination	Transfer of pollen grains from anther to stigma
19	Syngamy	The fusion of male and female gamete
20	Neelakuranji Strobilanthus kunthiana	Flowers once in 12 yrs.Found in Nilgiris

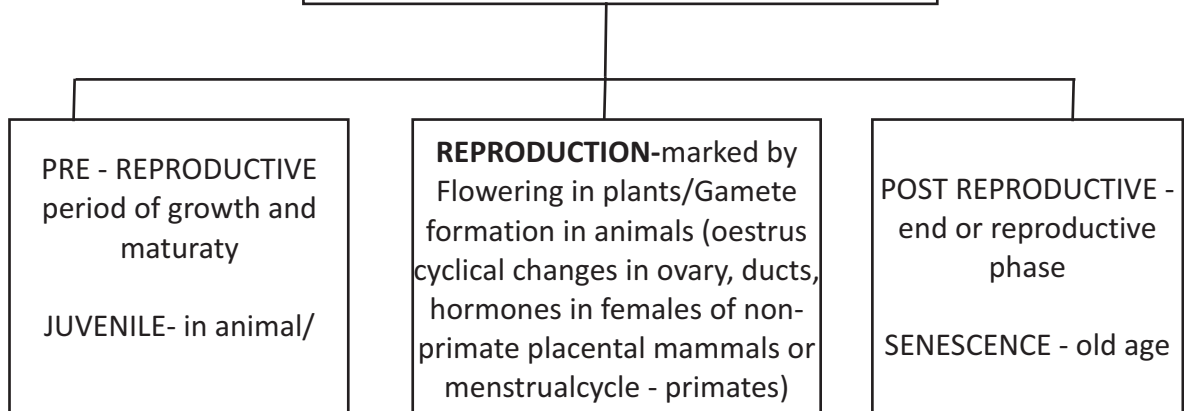
**CHAPTER 1- REPRODUCTION IN ORGANISMS
(Flow Chart)**



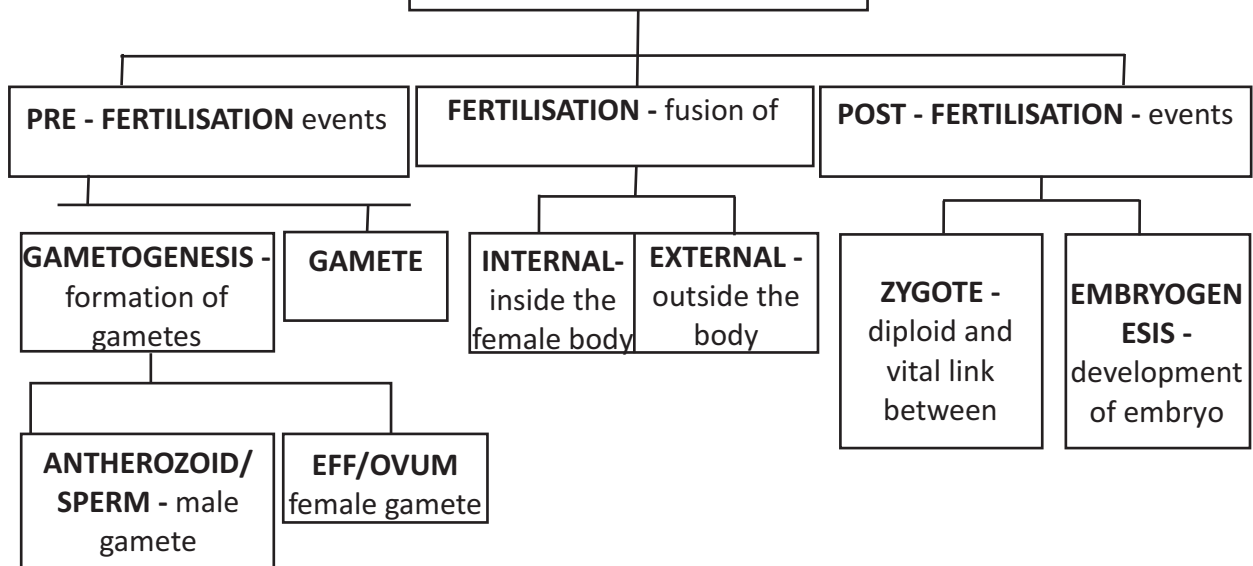
(3) **VEGETATIVE PROPAGULES-** Structures used for vegetative propagation



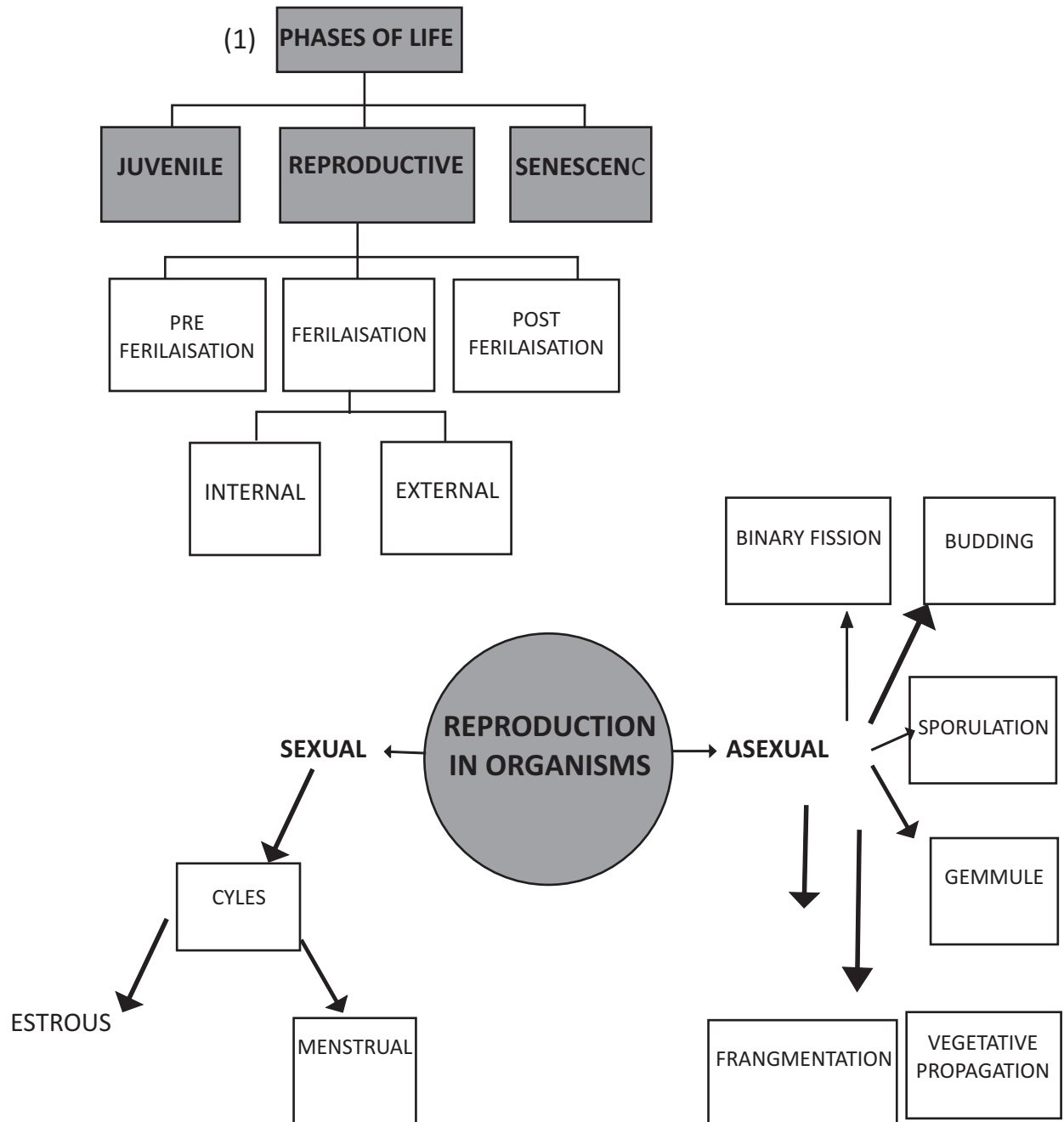
(4) **SEXUAL REPRODUCTION**



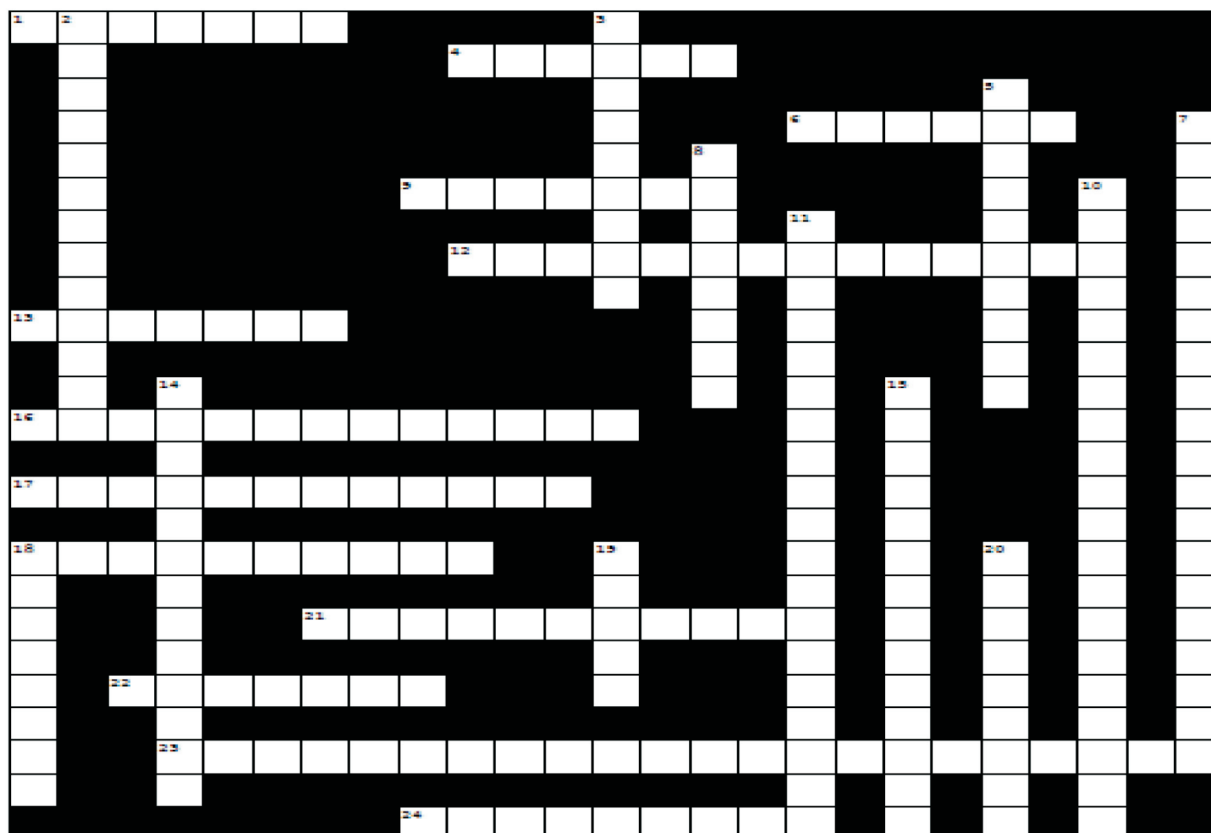
(5) **EVENTS IN SEXUAL**



CHAPTER : 1 REPRODUCTION IN ORGANISMS (Concept Map)



CHAPTER 1 : REPRODUCTION IN ORGANISMS (CROSS WORD)



Across

- 1 ASEXUAL REPRODUCTIVE STRUCTURE OF PENICILLIUM
- 4 SEXUAL REPRODUCING ORGANISM BEGINS ITS LIFE
- 6 VEGETATIVE PROPAGULE OF AGAVE
- 9 VEGETATIVE PROPAGULE OF AGAVE
- 12 STAGE OF GROWTH AND MATURITY IN ANIMALS
- 13 FUSION OF GAMETES
- 16 BISEXUAL ANIMALS
- 17 BIOLOGICAL PROCESS GIVING RISE TO YOUNG ONES
- 18 DENOTE BISEXUAL CONDITION
- 21 MALE GAMETE
- 22 ASEXUAL REPRODUCTIVE STRUCTURE OF SPONAGE
- 23 FUSION OF GAMETES OCCURE INSIDE THE BODY
- 24 PERIOD FROM BIRTH TO NATURAL DEATH

Down

- 2 CYCLICAL CHANGES IN FEMALES OF NON-PRIMATE MAMMALS
- 3 MICROSCOPIC MOTILE STRUCTURES
- 5 GIVE BIRTH TO YOUNG ONES
- 7 CELLS UNDERGO MODIFICATION TO FORM SPECIALISED TISSUES
- 8 PROTECTIVE THICK WALL OF THE FRUIT
- 10 OFFSPRINGS PRODUCED WITHOUT GAMETE FORMATION
- 11 PROCESS WHICH INVOLVES FUSION OF MALE AND FEMALE GAMETES
- 14 PROCESS OF DEVELOPMENT OF EMBRYO
- 15 CELL DIVIDES INTO TWO HALVES
- 18 GAMETE MOTHER CELL MALE GAMETE
- 19 IDENTICAL INDIVIDUALS
- 20 UNISEXUAL MALE FLOWER

CHAPTER: 1 REPRODUCTION IN ORGANISMS
(QUESTION BANK)

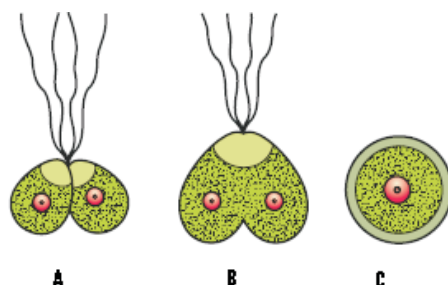
- No organism is immortal, then why do we say there is no natural death in single – celled organisms?
- What is the significance of reproduction?
- Name the type of reproduction wherein the off springs produced are identical to each other and to the parent.
- Name the stage of growth and maturity in the life of animals before they can reproduce sexually.
- Name the scientific name of the plant which flower once in 12 years.
- Name the type of fertilization wherein the survival of the organism up to adulthood is threatened.
- Name the structure from where every sexually reproducing organism begins their life.
- What is a meiocyte?
- What do you mean by clones?
- What is a vegetative phase in plants?
- Name the type of plants that show clear cut vegetative, reproductive and senescent phases.
- Name the plant which flower only once in their life time.
- In seed plants how the non-motile gametes are carried to female gamete?
- Differentiate between asexual and sexual method of reproduction.
- Gametes are always haploid .How are the gametes produced from a haploid plant body and a diploid plant body?
- How do the following organisms reproduce? Yeast, Amoeba.
- Life spans of organisms are not necessarily correlated with their sizes. Explain
- Name the asexual reproductive structures of the following: Chlamydomonas, Penicillum, Hydra, Sponge.
- Explain the following terms. Isogametes, Anisogametes, staminate flower, Pistillate flower.
- Why are Chara and Marchantia are referred to as monoecious and dioecious plants ?
- What are hermaphrodite? Give an example.
- Why do you refer Water Hyacinth as an invasive weed? Why is it difficult to get rid off them?
- Why the number of male gametes produced is more than the number of female gamete?
- Name the gametes produced by staminate and pistillate flowers.
- Why are offsprings of oviparous animals at a greater risk as compared to offsprings of viviparous animals?
- Cell division is itself a mode of reproduction .Name two single celled organisms and explains this.
- What are zoospores ? Why are they referred so?
- What do the following parts of a flower develop into after fertilization? Ovary, zygote, ovary wall, ovules.
- Mention the three phases in the life cycle of plants and animals.
- Study the figure, label the parts



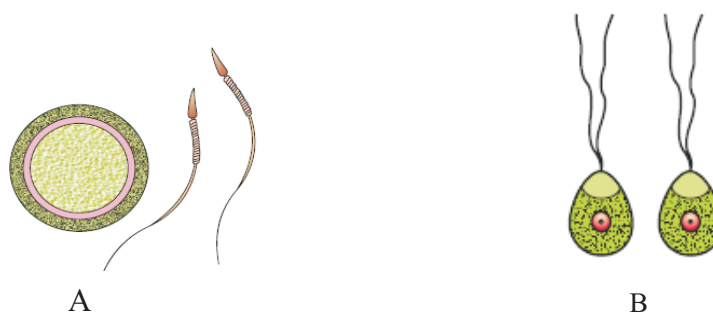
- What are vegetative propagules? Name the vegetative propagules of the following plants .Ginger, Agave, Bryophyllum ,Water hyacinth.
- What are continuous breeders and seasonal breeders?
- Where does syngamy occur?Explain with examples .
- Explain the features exhibited by the organisms showing external fertilization to enhance the chances of syngamy .What is the disadvantage of external fertilization ?
- Differentiate between oestrus and menstrual cycle with examples.
- Write the sexuality in the following organisms.(a) earthworm (b) Cockroach (c) Chara (d) Marchantia (e) Sweet Potato (f)Leech.
- What is parthenogenesis? Give an example.
- What are oviparous and viviparous animals? Give examples.

BIOLOGY

39. Give the term for the following figure A,B and C .



40. Give the term for kinds of gametes in the given figures A and B . In the figure A give the specific terms for the gametes



41. Child marriages are more prevalent in our society. i)As a student of biology how will you support a ban stating the biological reasons for the same and give valid reasons .
ii) Will you stand up against this social issue if you are a witness of a child marriage.

CHAPTER 1 :REPRODUCTION IN ORGANISMS

Q.NO.	(MARKING SCHEME)	Marks allotted
1	Parent cell divides to give rise to new individuals	1
2	Continuity of species	1
3	Asexual reproduction	1
4	Juvenile phase	1
5	Strobilanthus kunthiana	1
6	External fertilisation	1
7	Zygote	1
8	Gamete mother cell undergo meiosis	1
9	Morphologically and genetically similar individuals	$\frac{1}{2} + \frac{1}{2}$
10	Period of growth in plants	1
11	Annual , biennial	$\frac{1}{2} + \frac{1}{2}$
12	Bamboo	1



BIOLOGY

13	Pollen grains	1
14	Single parent ,two parents with or without gamete formation , fusion of gametes	$\frac{1}{2} \times 4$
15	Mitosis by haploid ,meiosis by diploid	1 x 2
16	Budding , binary fission	1 x 2
17	Size of crow and parrot are not very different ,life span is 15 and 140 years	1 x 2
18	Zoospores ,Conidia , Buds ,Gemmules	$\frac{1}{2} \times 4$
19	Similar in appearance ,dissimilar in appearance, male flower , female flower	$\frac{1}{2} \times 4$
20	Both sex organs in the same individual , separate individuals	1 x 2
21	Bisexual animals earthworm or any other	1 + 1
22	Drains oxygen from water, death of fishes	1 x 2
23	Fail to reach female gamete , to compensate loss during transport	1 x 2
24	Male gamete , female gamete	1 x 2
25	Viviparous animals – proper care and protection chances of survival is more in oviparous	1 x 2
26	Binary fission in Amoeba cell divides into two halves , buds in yeast attached to parent gets separated and mature into yeast	$\frac{1}{2} \times 4$
27	Asexual reproductive structures of Fungi , algae , microscopic motile structures	1 x 2
28	Fruit , embryo,pericarp, seed	$\frac{1}{2} \times 4$
29	Vegetative , reproductive , senescent phases	$\frac{1}{2} \times 2 + 1$
30	A -Seed B - Pericarp	1 x 2
31	Structures used for vegetative propagation , Rhizome , bulbil ,leafbuds, offset	1 x $\frac{1}{2}$ x 4
32	Reproductively active throughout their reproductive phase,exhibit only during favourable seasons	$\frac{1}{2} \times 2$
33	External fertilization- outside amphibians , internal fertilization- internal reptiles	$\frac{1}{2} \times 2$
34	Synchrony between sexes ,release of large number of gametes ,vulnerable to predators	1 x 3
35	Female placental animals , exhibit cyclical changes, non-primate,cows , primate, monkeys	6 x $\frac{1}{2}$
36	Bisexual – leech ,earthworm,chara,sweet potato unisexual-cockroach , Marchantia	6 x $\frac{1}{2}$
37	Femal gamete,undergoes development, to form new organism,without fertilization ,Rotifers	$\frac{1}{2} \times 4 \times 1$
38	Oviparous –fertilised eggs covered by hard calcareous shell ,incubation young ones hatch out eg. reptiles Viviparous – zygote develops into a young ones inside the body of female eg. mammals	1 x $\frac{1}{2}$ x 2
39	(A) Fusion of gametes (B) zygote (c) new individual	1 x 3
40	(A) Heterogametes (B) Homogametes, Egg and Sperm	1 x 3
41	(I) Genuin and valid reason (ii) Yes, example of a real event	2 x 2



BIOLOGY

**CHAPTER : 2 SEXUAL REPRODUCTION IN FLOWERING PLANTS
(KREY POINTS)**

S.No	Term	Explanation
1	Microsporogenesis	Formation of microspores from a PMC through meiosis
2	Megasporogenesis	Formation of megaspores from the mega spore mother cell
3	Monosporic development	Embryo sac formation from a single megaspore
4	Pollination	Transfer of pollen grains from anther to the stigma of a pistil
5	Autogamy	Transfer of pollen grains from the anther to the stigma of the same flower
6	Geitonogamy	Transfer of pollen grains from the anther to the stigma of another flower of the same plant
7	Xenogamy	Transfer of pollen grains from anther to the stigma of a different plant
8	Artificial hybridisation	Crossing different species to combine desirable characters to produce superior varieties
9	Emasculation	Removal of anthers from flower bud before the anther dehisces
10	Bagging	Covering emasculated flowers with a bag to prevent contamination of its stigma with unwanted pollen
11	Syngamy	Fusion of male and female gamete
12	Triple fusion	Fusion of three haploid nuclei
13	Double Fertilisation	Two types of fusions syngamy and triple fusion that takes place in an embryo sac
14	Post fertilization events	Events of endosperm ,embryo development ,maturation of ovule into seed, ovary into fruit
15	Free –nuclear endosperm	The stage of endosperm development wherein PEN undergoes successive nuclear divisions to give rise to free nuclei
16	Dormancy of seed	Embryo enter a state of inactivity (Resting period of seed)
17	False fruit	Thalamus contributes to fruit formation
18	True fruit	Fruits develop from the ovary
19	Parthenocarpic fruits	Fruits develop without fertilisation
20	Apomixis	Production of seeds without fertilisation of grasses
21	Polyembryony	More than one embryo in a seed
22	Filament	Long slender stalk of stamen
23	Anther	Bilobed structure of stamen
24	Dithecous	Two theca in each lobe
25	Tapetum	Innermost wall layer of microsporangia
26	Sporogenous tissue	Compactly arranged homogenous cells in the centre of microsporangia
27	Microspore tetrad	Cluster of four microspores
28	Pollen grains	Male gametophyte



BIOLOGY

29	Exine	Hard outer layer of pollen grain
30	Sporopollenin	Most resistant organic material of exine
31	Germ pore	Apertures in pollen grain
32	Intine	Inner wall of the pollen grain
33	Generative cell	Cell floats in the cytoplasm of vegetative cell
34	Monocarpellary	Single pistil
35	Multicarpellary	More than one pistil
36	Syncarpous	Fused pistils
37	Apocarpous	Free pistils
38	Stigma	Landing platform of pollen grains
39	Style	Elongated slender part beneath the stigma
40	Ovary	Basal bulged part of pistil
41	Ovule	Megasporangia
42	Funicle	Stalk of ovule
43	Hilum	Region ,the body of the ovule fuses with funicle
44	Integuments	Protective envelopes of ovule
45	Micropyle	Small opening in the ovule
46	Chalaza	Basal part of the ovule
47	Embryo sac	Female gametophyte
48	Egg apparatus	Three cells at the micropylar end with two synergids and one egg cell
49	Antipodals	Three cells at the chalazal end
50	Cleistogamous flower	Flowers which do not open at all
51	Zygote	Diploid cell resulting out of fertilisation
52	Primary endosperm cell	Central cell after triple fusion becomes PEC
53	Embryogeny	Embryo development
54	Epicotyl	Portion of embryonal axis above the level of cotyledons
55	Hypocotyl	Portion below the level of cotyledons
56	Scutellum	Cotyledon of grass family situated towards one side of embryonal axis
57	Coleorrhiza	Undifferentiated sheath that encloses radical and root cap
58	Coleoptile	Hollow foliar structure that encloses a shoot apex and a few leaf primordia
59	Non-albuminous seed or ex-	albuminous No residual endosperm as it is completely consumed during embryo development
60	Albuminous	Retain a part of endosperm as it is not completely used up during embryo development
61	Perisperm	Residual persistent nucellus
62	Pericarp	Wall of the fruit

**CHAPTER : 2 SEXUAL REPRODUCTION IN FLOWERING PLANTS
(FLOW CHART)**

(1) **Male reproductive structure - Androecium**

Stamen

Anther – bilobed , dithecous

Four microsporangia –Epidermis ,
endothecium , middle layers , tapetum as

Microsporangium - sporogenous tissue
undergoes meiosis

Microspore

Microspore

Exine - Sporopollenin

Pollen grain

Intine - cellulose, pectin

Vegetative cell

Generative cell - male gamees

(2) **Female Reproductive structure -**

Ovary

Ovule - Megasporangium

Nucellus undergo meiosis to form

Embryo Sac - Female gametophyte

Egg apparatus - egg
& synergids at
micropylar end

Antipodals at
chalazal end

Central cell with 2
polar nuclei

BIOLOGY

(3) **Pollination –transfer of pollen grains from anther to stigma**

Autogamy – same flower

Geitonogamy- different flower

Xenogamy – different

(4) **Agents of Pollination & characteristics of flower**

Wind - light , nonsticky,
well exposed samens,

Water - mucilaginous , long
, ribbon - like

Insects - large , colourful,
fragrant, nectar

(5) **Outbreeding devices**

Non-synchronisation
of pollen release and
stigma receptivity

Anther and stigma
in different

Self -
incompatibility

Unisexual flower

(6) **Artificial hybridization**

Emasculation

Bagging

(7) **Double fertilisation**

Male gamete + Egg ---- Zygote — Embryo

Male gamete + two polar nuclei PEN — PEC

(8) **Post - fertilisation**

PEN ---- Endosperm --free
nuclear/nuclear development

ZYGOTE develops into Embryo

Polyembryony - many embryos
in a seed

OVULE develops into

OVARY develops into FRUIT

Albuminous

Non - Albuminous

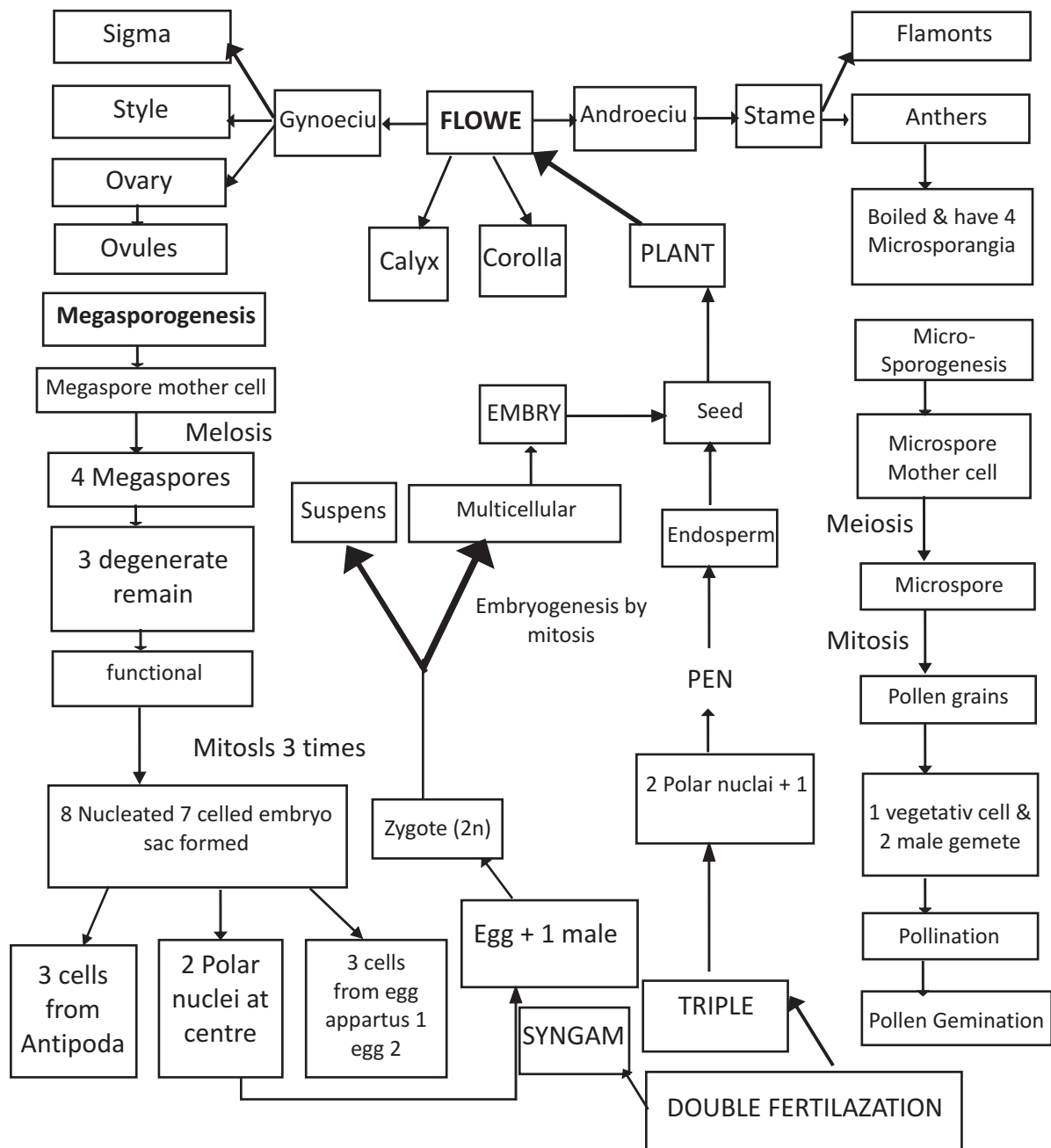
Apomictic

False fruit - thalamus
becomes fruit

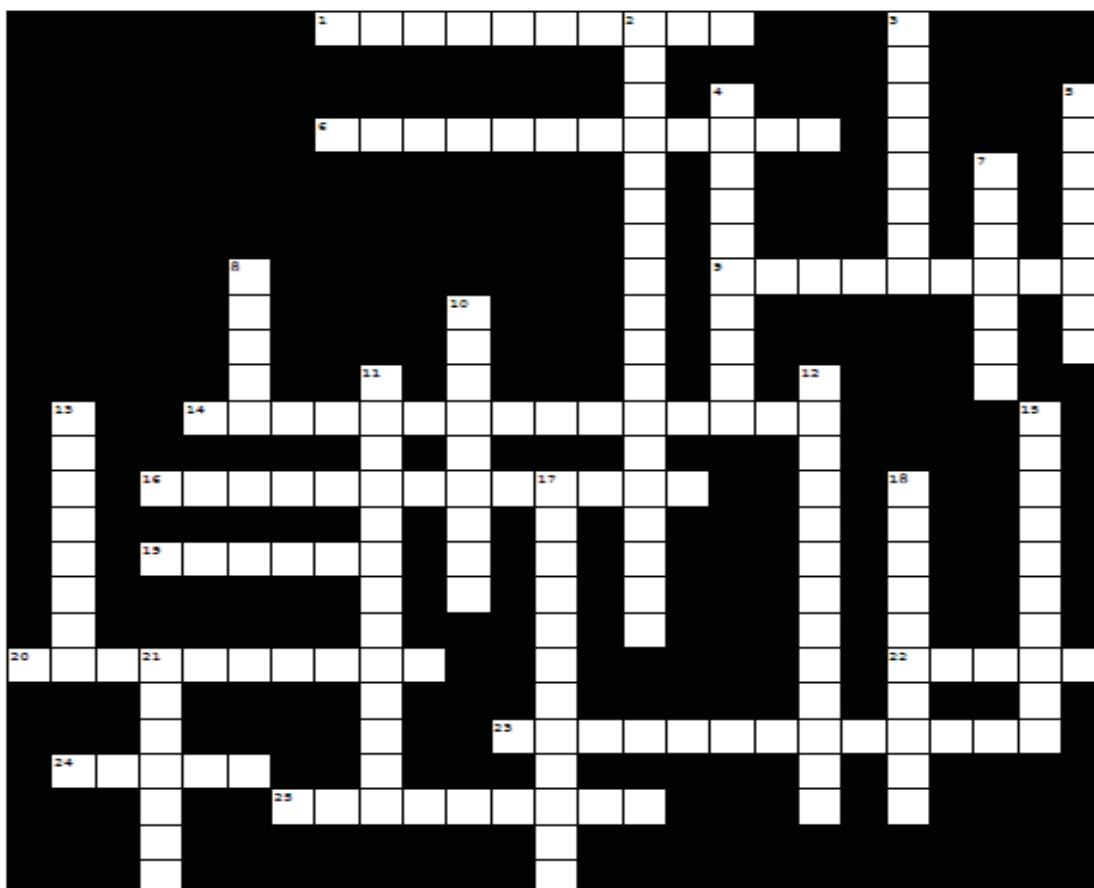
Parthenocarpic fruit - fruit
develop without fertilization

True fruit - ovary develops
into fruit

CHAPTER 2 : SEXUAL REPRODUCTION IN FLOWERING PLANTS



2 SEXUAL REPRODUCTION IN PLANTS (CROSS WORD)



Across

- 1 Female gametophyte
- 6 More than one embryo in a seed
- 9 Residual persistent nucellus
- 14 The cell that floats in the cytoplasm of the vegetative cell
- 16 Most resistant organic material
- 19 Thin and continuous layer made up of cellulose and pectin
- 20 Fused pistils
- 22 Basal bulged part of the postil
- 23 Fruits develop without fertilisation
- 24 The region where the body of the ovule fuses with funicle
- 25 The cells at the micropylar end guiding the entry of pollen tubes

Down

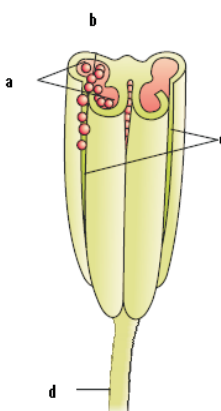
- 2 Tissue that occupies the centre of each microsporangium
- 3 Production of seeds without fertilisation
- 4 Hollow foliar structure enclosing leaf primordia
- 5 The floral part that contribute to fruit formation in apple
- 7 Innermost wall layer of anther
- 8 Megasporangia
- 10 Cotyledon of grass family
- 11 The fusion of three haploid nuclei
- 12 flowers which do not open at all
- 13 Transfer of pollen grains from another to the stigma of a different plant
- 15 Example of a false fruit
- 17 Removal of anthers from the flower bud
- 18 Cells at the chalazal end of the embryo sac
- 21 The region opposite to the micropylar end

CHAPTER. 2 : SEXUAL REPRODUCTION IN FLOWERING PLANTS (QUESTION BANK)
ONE MARK

1. Why are pollen grains produced in enormous quantity in maize?
2. What is the ploidy of the cells in the microspore tetrad?
3. What is the ploidy of PEN?
4. How many eggs are present in an embryo sac?
5. Even though each pollen grain has two male gametes, why are atleast 10 pollen grains and not 5 pollen grains required to fertilize 10 ovules present in a particular carpel?
6. What are parthenocarpic fruits?
7. What is scutellum?
8. What is a pollen bank?

TWO MARKS

9. Identify the given figure and label the parts.



10. Of the eight nuclei of the embryo sac in flowering plants three are at the micropylar end. How many are there at the chalazal end and how many nuclei located in the central cell?
11. How could pollen grains be well preserved as fossils?
12. What are the effects of pollen in some people and how are the pollen grains are being used as food supplements?
13. How many haploid nuclei and haploid cells are present in the female gametophyte of angiosperm?
14. Why is the process of fertilization in flowering plant referred to as double fertilization? Explain.
15. How does geitonogamy differ from xenogamy in plants?
16. What are the stages of embryogeny in a Dicotyledonous embryo?
17. How long do the seeds remain alive after they are dispersed?

THREE MARKS

18. Draw a diagram of the following and label any six / three parts. (i) T.S. of a mature anther. (ii) Mature pollen grain. (iii) A diagrammatic view of a typical anatropous ovule. (iv) A diagrammatic representation of the mature embryo sac . (v) Fertilized embryo sac (vi) Stages in embryo development in a dicot. (vii) Dicot embryo. (viii) L.S. of an embryo of grass (ix) a longitudinal section of a flower showing growth of pollen tube.

BIOLOGY

19. Explain the structure of microsporangium.
20. Explain the structure of pollen grain.
21. Explain artificial hybridization technique.
22. Explain double fertilization schematically.
23. What is pollination and explain its types?
24. Endosperm development precedes embryo development .Why?
25. Explain free nuclear endosperm development.
26. What are advantages of seeds to Angiosperms?
27. What do you mean by seed dormancy?What is its significance?

FIVE MARKS

28. Continued self-pollination result in inbreeding depression.What are the out breeding devices developed in flowering plants to discourage self-pollination ?Which type of pollination seen in Papaya ?
29. What are the characteristics of wind ,water and insect pollinated flowers ?
30. Explain the pollen pistil interaction with a sketch showing entry of pollen tube into a synergid.
31. Define triple fusion. What is the product of this process? What does the product develop into?
32. Trace the development of a mature female gametophyte from a megaspore mother cell.
33. Describe the development of male gametophyte in angiosperms.
34. Explain the following terms : Non-albuminous, Albuminous, Perisperm, Pericarp, seed dormancy.
35. Explain the following terms : False fruit ,True fruit, Parthenocarpic fruit, Apomixis, Polyembryony,.

VALUE BASED QUESTION (4 MARKS)

36. Mr. Y, a farmer has kept heaps of seeds to be packed for future use in a room. His children while playing poured water on to the seeds.
A) As a student of biology suggest the measures to be taken before storage and why?
B) What is the significance of seeds for a farmer?

**CHAPTER. 2 : SEXUAL REPRODUCTION IN FLOWERING PLANTS
(MARKING SCHEME)**

Q. No.	Answer	Mark Allotted
1	Compensate to the losses during transfer of pollens	1
2	Haploid	1
3	Triploid	1
4	One	1
5	Double fertilisation	1
6	Fruits formed without fertilisation	1
7	Cotyledon of monocot	1
8	Stored pollen	1
9	a. Pollen sac b. pollen grains c. line of dehiscence d. filament	$\frac{1}{2} \times 4$
10	Three – chalazal end, two – central cell	1×2
11	Sporopollenin , highly resistant organic material	1×2
12	Cause severe allergies and bronchial afflictions ,tablet and syrups	1×2
13	8-nucleate 7-celled	1×2
14	Syngamy and triple fusion take place in an embryo sac	1×2
15	Transfer of pollen grains from anther to stigma of another flower of same plant, different plant /genetically similar , different	$\frac{1}{2} \times 4$
16	Proembryo , globular , heart-shaped , mature embryo	$\frac{1}{2} \times 4$
17	In a few species lose viability within a few months ,live for several years	1×2
18	Diagram	$6 \times \frac{1}{2}$
19	Wall layers , epidermis , endothecium , middle layers – protection , tapetum-nourishes , sporogenous tissue	$6 \times \frac{1}{2}$
20	Exine- sporopollenin resistant organic material, intine –cellulose and pectin , , generative cell vegetative cell	$1 + 1 \times \frac{1}{2} \times 2$
21	Emasculation- removal of anther, bagging- to prevent contamination , dusting on stigma	1×3
22	Male gamete + egg----- Zygote-----Embryo Syngamy Male gamete + two polar endosperm triple fusion nuclei.....PEN...endosperm triple	$1\frac{1}{2} \times 2$
23	Transfer of pollen grains autogamy- same flower ,geitonogamy- different flower , xenogamy- different plant	1×3

BIOLOGY

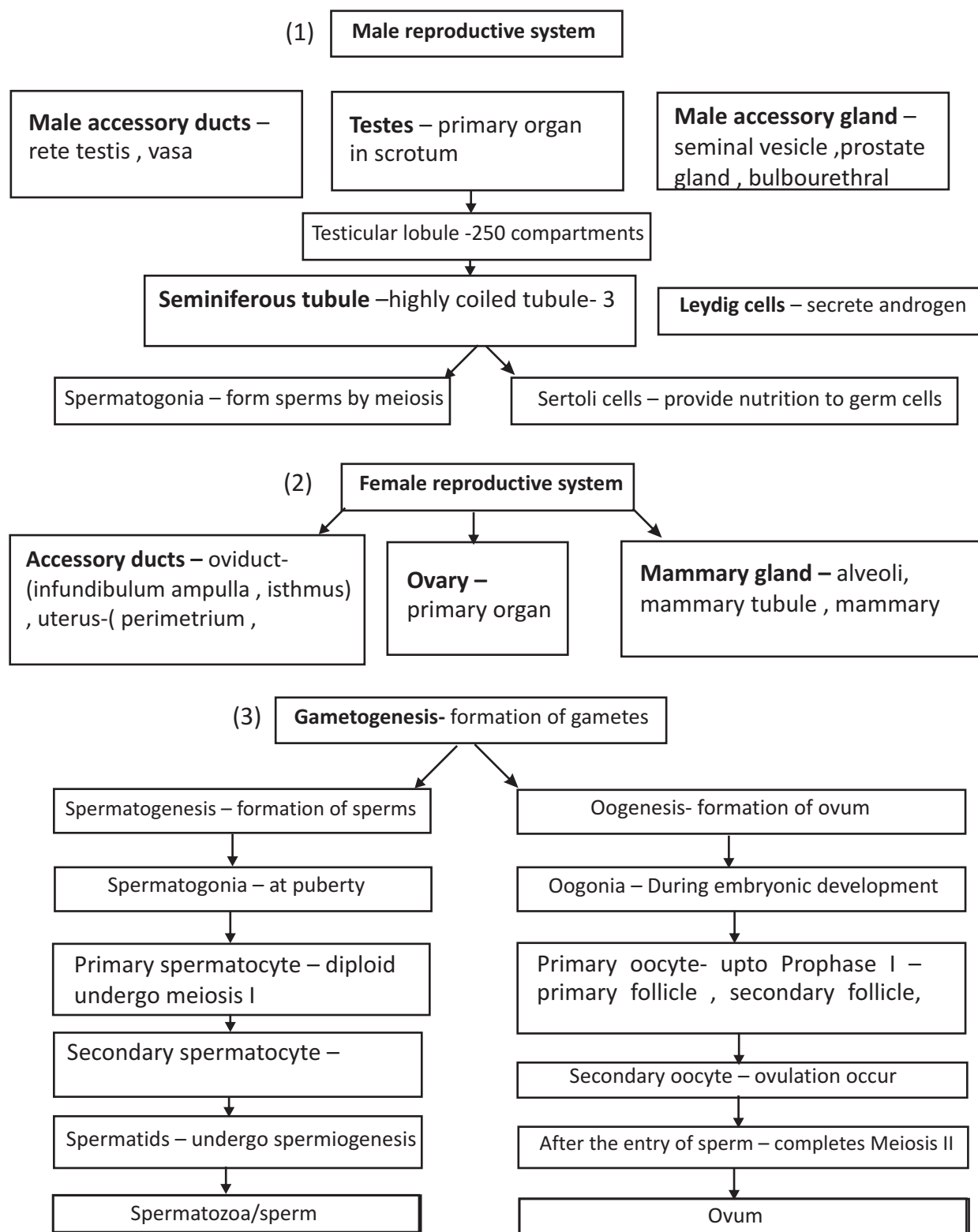


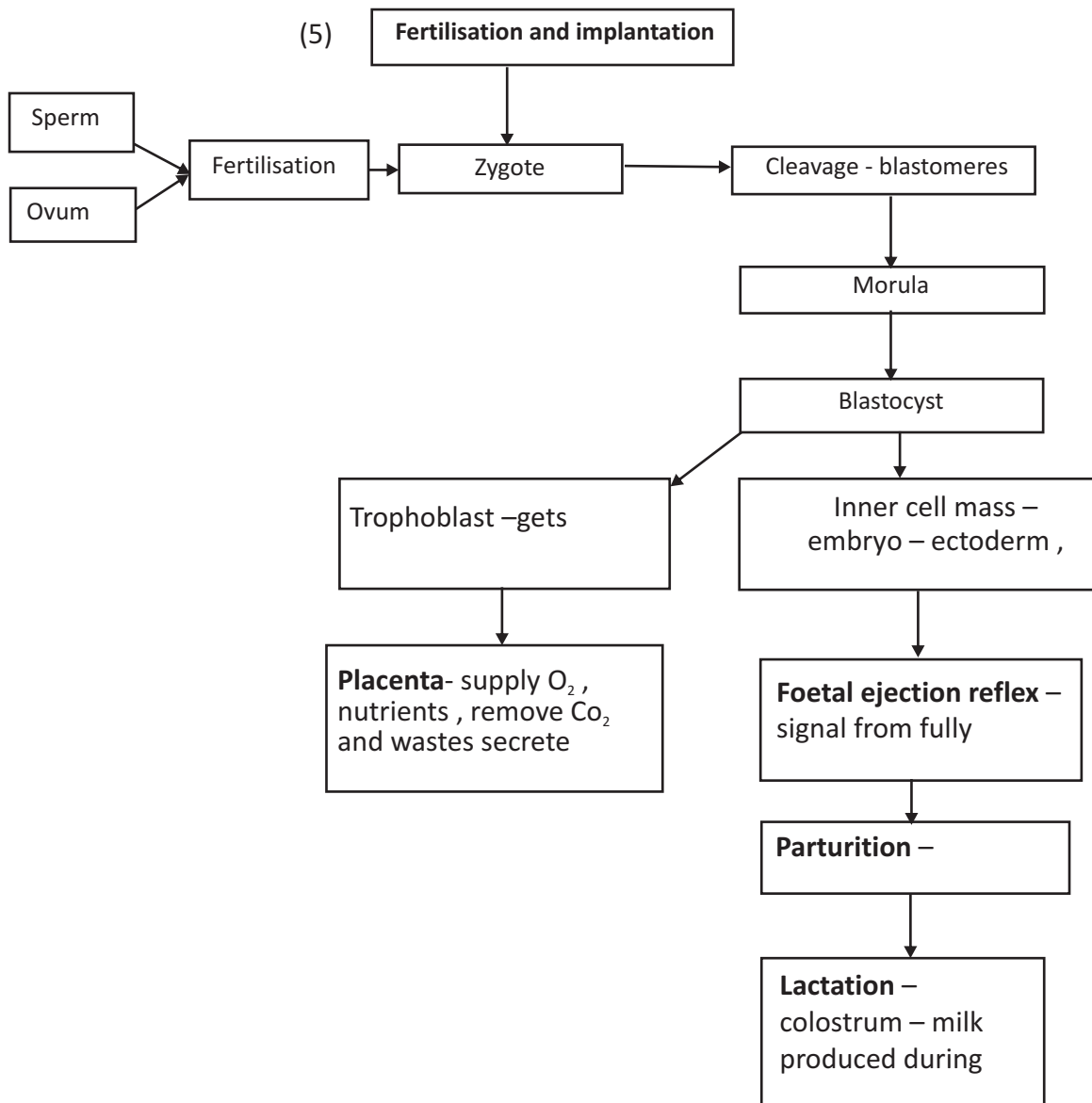
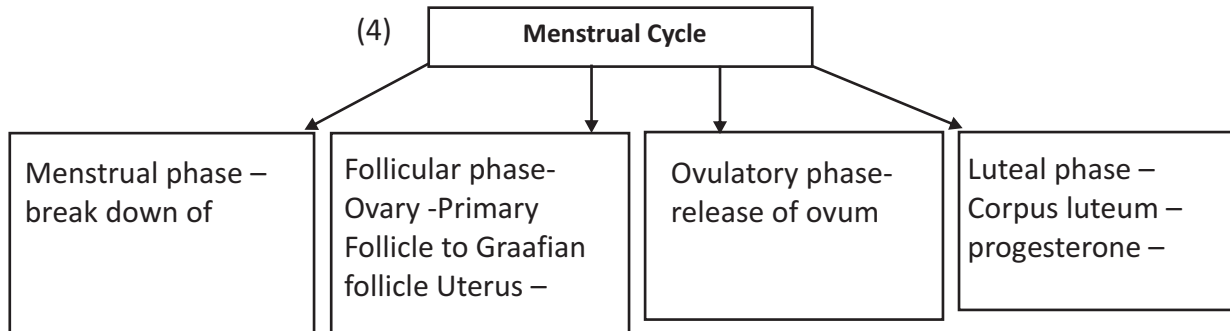
24	PEC divides to form endosperm tissue – filled with reserve food material , nutrition of the developing embryo	1 x 3
25	PEN –successive nuclear divisions , cell wall formation occurs –endosperm	1 x 3
26	Pollination and fertilization are independent of water - seed formation is more dependable ,better strategies for dispersal to new habitats ,hard seed coat provides protection to embryo	1 x 3
27	Water content is reduced seeds become dry , metabolic activity slows down ,state of inactivity ,storage of seeds –food throughout the year / raise crop in next season	½ x 6
28	Non –synchronisation of stigma receptivity and pollen release , different positions , self-incompatibility,unisexual flowers /xenogamy	1 x 5
29	Wind-large amount ,light non-sticky ,well exposed stamens,feathery stigma Water – mucilaginous covering long ribbon –like Insect-large colourful,fragrant , nectar	2+1+1
30	Dialogue by chemical components ,germinates to produce pollen tube ,content move into pollen tube,grows through stigma ,style reaches ovary , generative cell divide into two male gametes enters through micropyle , filiform apparatus guides the entry	8 x½+ 2
31	Male gamete moves towards two polar nuclei located in central cell and fuses to produce triploid primary endosperm nucleus involves fusion of three nuclei – triple fusion , PEN – product , Endosperm	3+1+1
32	MMC – meiosis , four megaspores , three degenerate , one functional develop into embryo sac ,mitosis of nucleus 2- nucleate , one mitosis 4-nucleate one mitosis 8 nucleate egg apparatus polar nuclei in central cell antipodals	10 x ½
33	MMC- meiosis – microspore tetrad , pollen grains exine , sporopollenin , intine , germ pore , vegetative cell , generative cell, two male gametes	10 x ½
34	No residual endosperm, retain endosperm, residual persistent nucellus, fruit wall , state of inactivity	1 x5
35	Thalamus become fruit, ovary becomes fruit , fruit formation without fertilisation, produce seeds without fertilization ,more than one seed in a seed	1 x5
36	(A) Measures to be taken before storage with reason (B) Significance of seeds for a farmers	2 x 2

UNIT VI CHAPTER 3: HUMAN REPRODUCTION (KEY POINTS)

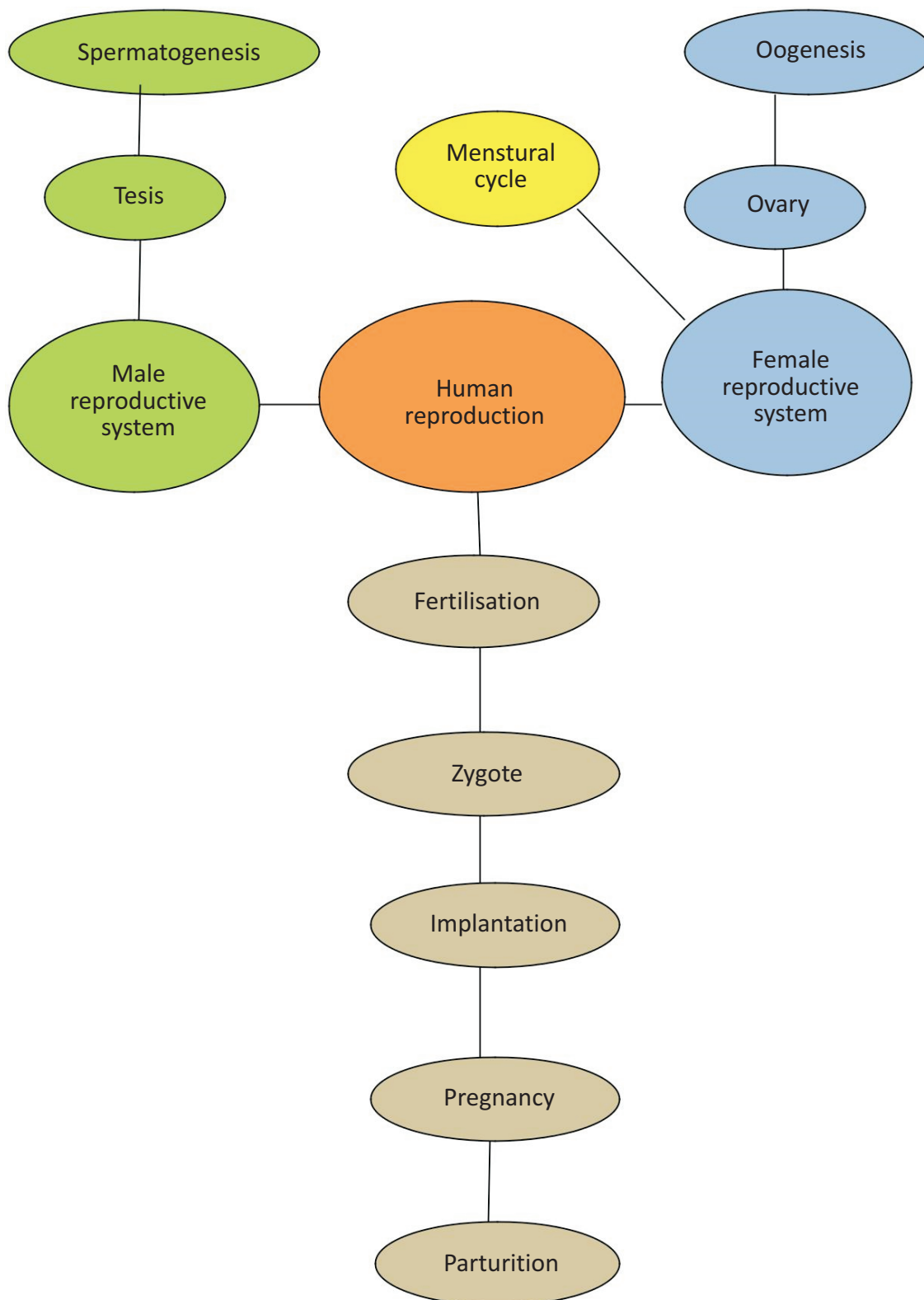
S.NO	Term	Explanation
1	Spermatogenesis	The immature male germ cells produce sperms that begins at puberty (Production of sperm)
2	Spermiogenesis	The process of transformation of spermatids into sperm
3	Spermiation	Release of sperms from seminiferous tubule
4	Oogenesis	Process of formation of a mature female gamete initiated during embryonic development
5	Ovulation	The process during which the Graafian follicle ruptures to release the secondary oocyte (ovum) from the ovary
6	Menarche	The first menstruation that begins at puberty (Starting of first menstrual flow in females)
7	Menstrual cycle	Cycle of events starting from one menstruation till the next one after every 28 / 29 days
8	Menopause	Ceasation of menstrual cycle around 50 years of age
9	Cleavage	The mitotic division the zygote undergoes when it moves toward uterus and forms blastomeres
10	Implantation	Embedding of blastocyst in the endometrium of the uterus leads to pregnancy
11	Parturition	Vigorous contraction of the uterus at the end of pregnancy causing expulsion/delivery of the foetus (child birth)
12	Foetal ejection reflex	Mild uterine contractions induced by the signals for parturition from the fully developed foetus and the placenta
13	Lactation	The process by which the mammary gland start producing milk
14	GnRH	Gonadotropin releasing hormone
15	LH	Luteinising hormone
16	FSH	Follicle stimulating hormone
17	hCG	Human chorionic gonadotropin
18	hPL	Human placental lactogen

**CHAPTER 3: HUMAN REPRODUCTION
(FLOW CHART)**

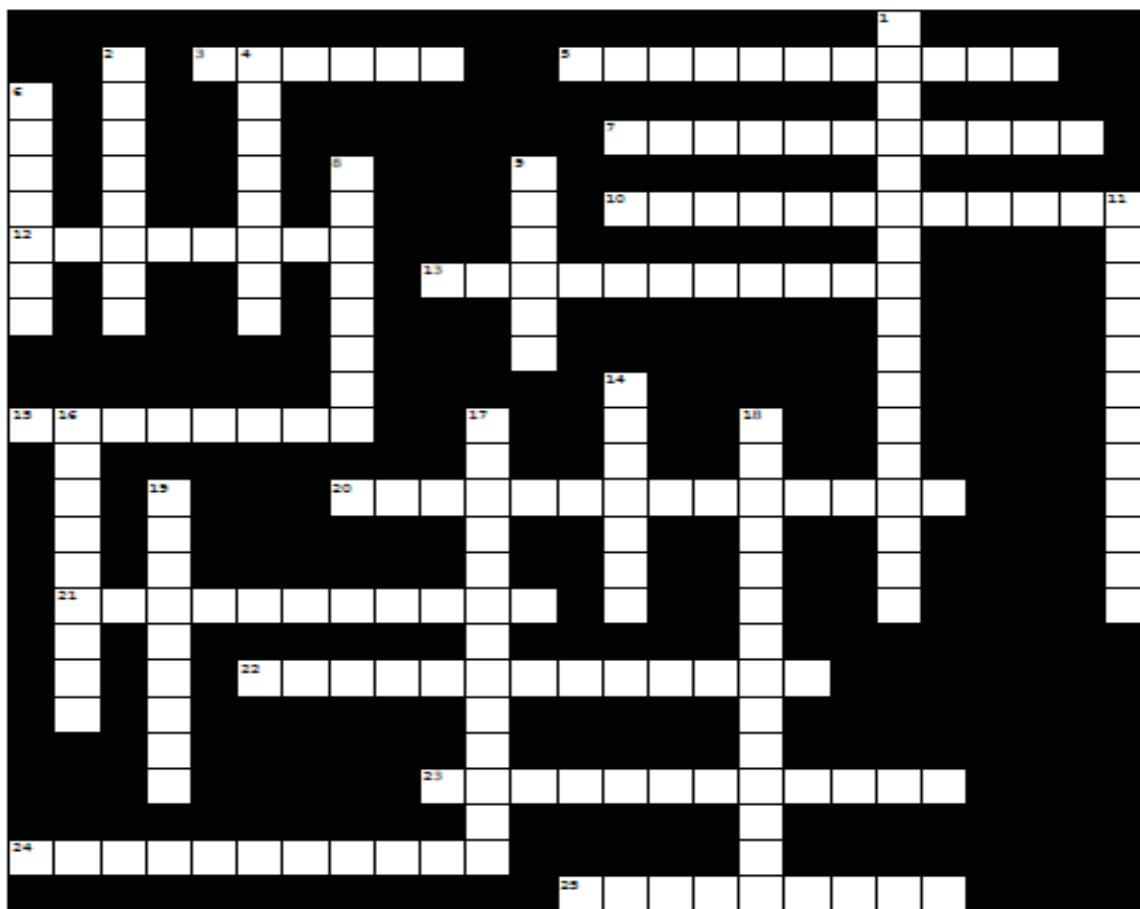




**CHAPTER : 3 HUMAN REPRODUCTION
(CONCEPT MAP)**



**CHAPTER 3 : HUMAN REPRODUCTION
(CROSS WORD)**



Across

- 3 Embryo with eight to sixteen blastomers
- 5 The layer which undergoes cyclical changes during menstrual cycle
- 7 Release of sperm from seminiferous tubule
- 10 The funnel shaped part of fallopian tube
- 12 First menstruation that begins at puberty
- 13 Process of delivery of foetus
- 15 The part of the sperm filled with enzymes that help in fertilisation
- 20 The process of transformation of spermatid to sperm
- 21 Outer layer of the blastocyst
- 22 Provides nutrition to the male germ cells
- 23 Secrete androgens
- 24 External thin membranous layer of uterus
- 25 Release of secondary oocyte from the ovary

Down

- 1 Matured follicle
- 2 The structure which provides vascular connection between foetus and uterus
- 4 Hormone which causes stronger uterine contractions
- 6 The last part of the oviduct that joins the uterus
- 8 Mitotic division the zygote undergoes
- 9 Fluid filled cavity of a tertiary follicle
- 11 Energy source for swimming of the sperm
- 14 Pouch help in maintaining the low temperature of the testes
- 16 Milk produced during the initial few days of lactation
- 17 Secrete progesterone
- 18 The membrane that surrounds the secondary oocyte
- 19 Cessation of menstrual cycle



CHAPTER : 3 HUMAN REPRODUCTION (QUESTION BANK)

1. Name the cells which secrete androgens
2. What does the head of a sperm consists of ?
3. Name the structure which secretes progesterone.
4. Name the structures which secrete estrogen .
5. Name the site of fertilization in human beings .
6. What is the main function of Sertoli cells ?
7. Name the outermost layer of the blastocyst
8. What promotes completion of second meiotic division in oogenesis ?
9. Testes normally remain suspended in scrotum in mammals. Why?
10. How many spermatozoa will be produced from 100 primary spermatocytes and how many ova will be produced from 100 primary oocytes?
11. Name the three layers of embryo that give rise to all tissues and also name the cells which have the potency to give rise to all the tissues and organs.
12. What is oogenesis? Where does it occur?
13. What is ovulation? What happens to Graafian follicle after ovulation?
14. What is colostrum? What is its importance?
15. Draw a labeled diagram of the following and label six parts
i) T.S. of a testes ii) T.S. of an ovary iii) Sperm iv) Ovum .
v) Embryo development (vi) Female reproductive system
16. Mention any three differences between spermatogenesis and oogenesis.
17. Differentiate between Leydig cells and Sertoli cells with reference to their location in the organ and their function
18. What is parturition? How is it induced? Which hormones are involved in induction of parturition?
19. What is seminiferous tubule? Name the various types of cells present in it and explain its function.
20. Explain different phases of spermatogenesis with schematic representation.
21. Explain different phases of oogenesis with schematic representation
22. Name the glands associated with male reproductive organs and state their functions.
23. Explain the various phases of menstrual cycle with reference to changes in ovary and uterus and hormonal cycle.
24. Explain the process of fertilization.
25. Explain the stages of embryo development from fertilization to implantation.
26. Draw a diagrammatic presentation of various events during a menstrual cycle.
27. What is placenta? What is its role? Justify Placenta as an endocrine tissue.
28. What are the main features of embryonic development at various months of pregnancy?
29. Women are being blamed for giving birth to a female child. Is it correct to say that the sex of the child is determined by the woman and not by the man? Explain

CHAPTER. 3 : HUMAN REPRODUCTION IN (MARKING SCHEME)

Q.NO	Answer	Marks Allotted
1	Leydig cells	1
2	Haploid nucleus , acrosome	$\frac{1}{2} \times 2$
3	Corpus luteum	1
4	Ovarian follicles	1
5	Ampullary-isthmic junction of fallopian tube	1
6	Provide nutrition to germ cells	1
7	Trophoblast	1
8	Entry of sperm into cytoplasm of the ovum through zona pellucida membrane and plasma	$\frac{1}{2} \times 2$
9	Scrotum helps in maintaining low temperature , necessary for spermatogenesis`	1 x 2
10	400 spermatozoa , 100 eggs	1 x 2
11	Ectoderm , endoderm , mesoderm , stem cells	$\frac{1}{2} \times 4$
12	Formation of mature female gamete , Ovary	1 x 2
13	The release of secondary oocyte from ovary , transforms into graafian follicle	1 x 2
14	Milk produced during initial days of lactation , antibodies to give resistance	1 x 2
15	Diagram – six parts	6 x $\frac{1}{2}$
16	At puberty / embryonic development ,four sperms / one egg ,equal division / unequal division	1 x 3
17	Leydig – interstitial space , androgen , Sertoli – seminiferous tubule , nutrition to germ cells	$\frac{1}{2} \times 4+1$
18	Delivery of foetus , foetal ejection reflex , oxytocin	1 x 3
19	Highly coiled in testicular lobule ,male germ cells sertoli cells , sperm formation provide nutrition	1 x 5
20	Spermatogonia – primary spermatocyte – secondary spermatocyte – spermatid – sperm	1 x 5

BIOLOGY

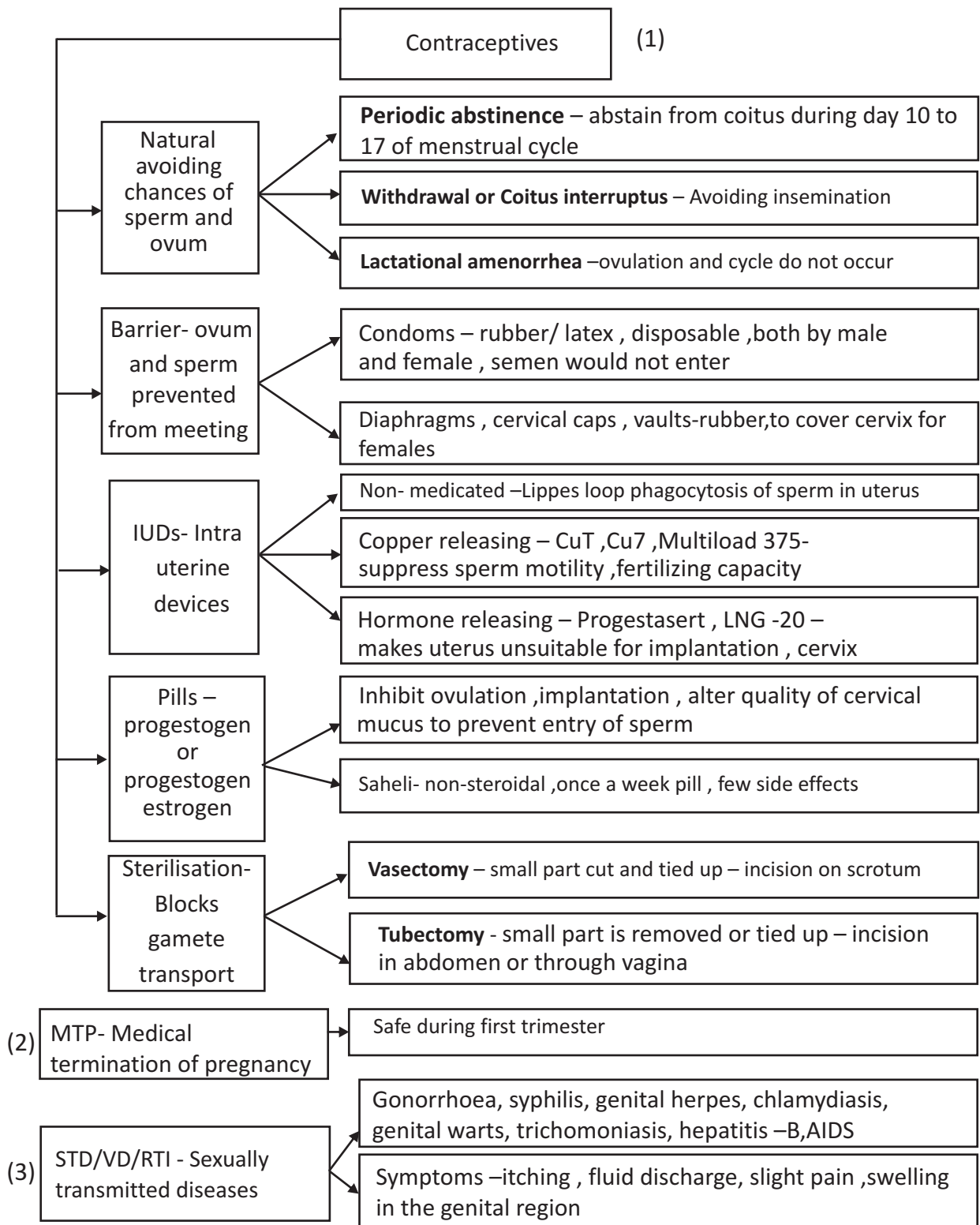


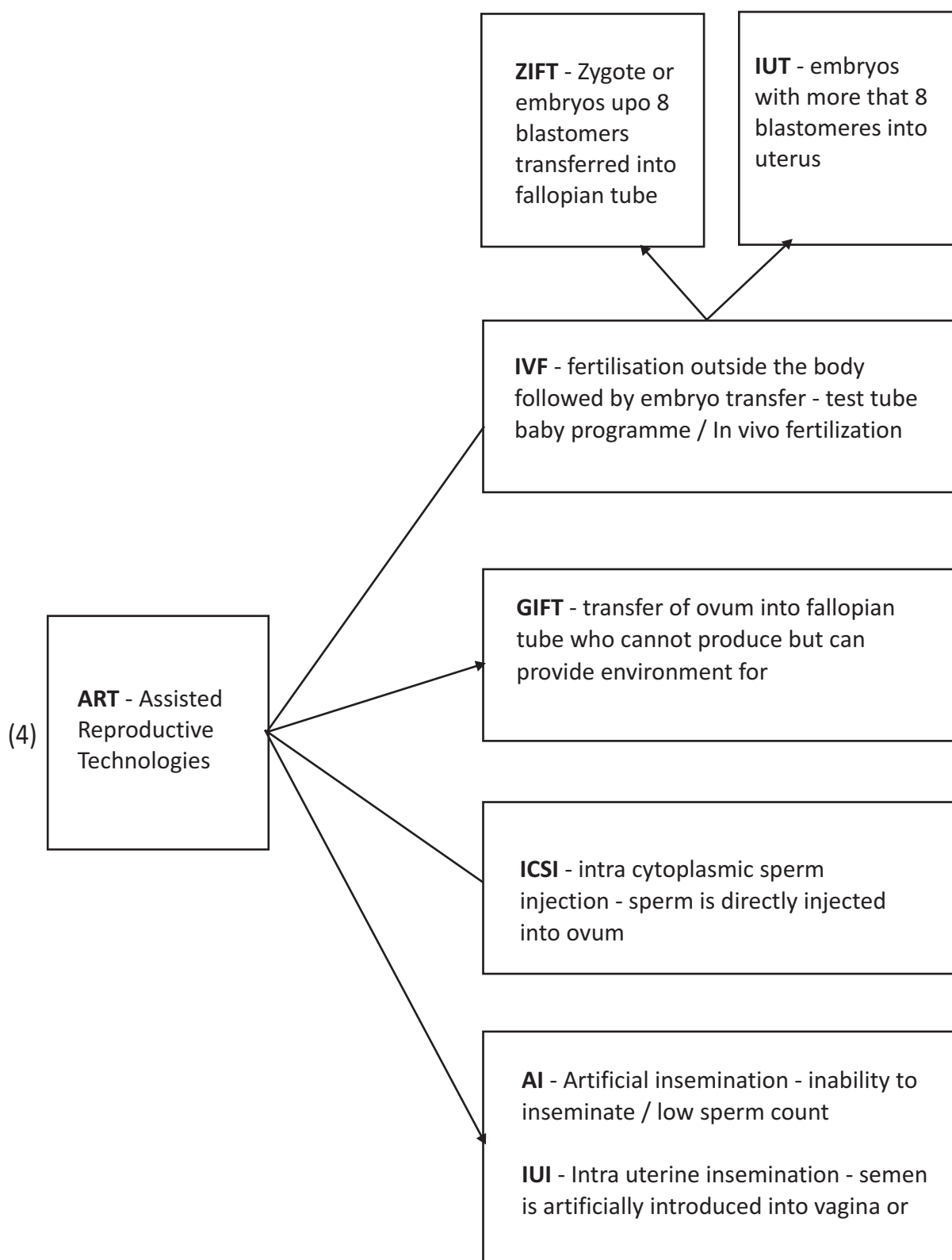
21	Oogonia- primary oocyte , primary secondary tertiary graafian follicles – secondary oocyte – ovum	1 x 5
22	Paired seminal vesicles , a prostate gland paired bulbourethral gland , seminal plasma rich in fructose calcium enzymes , bulbourethral lubrication of penis	1 x 5
23	Menstrual phase – flow follicular phase – follicular growth regeneration of endometrium Ovulation , secretary phase – corpus luteum LH ,FSH role	1 x 5
24	Sperm come s in contact with zona pellucida , block entry of additional sperms , acrosome helps in entry , completion second meiotic division second polar body , ootid , haploid nucleus of sperm fuses with ovum	10 x ½ ,
25	Zygote – cleavage , blastomeres ,morula ,blastocyst ,trophoblast , inner cell mass ,attached to endometrium , diiferentiate as embryo , impalntation	10 x ½
26	Schematic representation of menstrual cycle ovarian events , uterine events , hormones of pituitary , ovarian hormones	1 x 5
27	Structural and functional unit between foetus and mother , supply of nutrients and oxygen removal of wastes, hCG, hPL ,estrogens, progestogens	1 + 1+3
28	One month- heart , end of second month –limbs and digits , end of 12 weeks –major organ system – limbs genital organs fifth month movements ,second trimester fine hair eyelids separate eye lashes	1 x 5
29	Genuine reason	2 x 2

**UNIT VI CHAPTER 4: REPRODUCTIVE HEALTH
(KEY POINTS)**

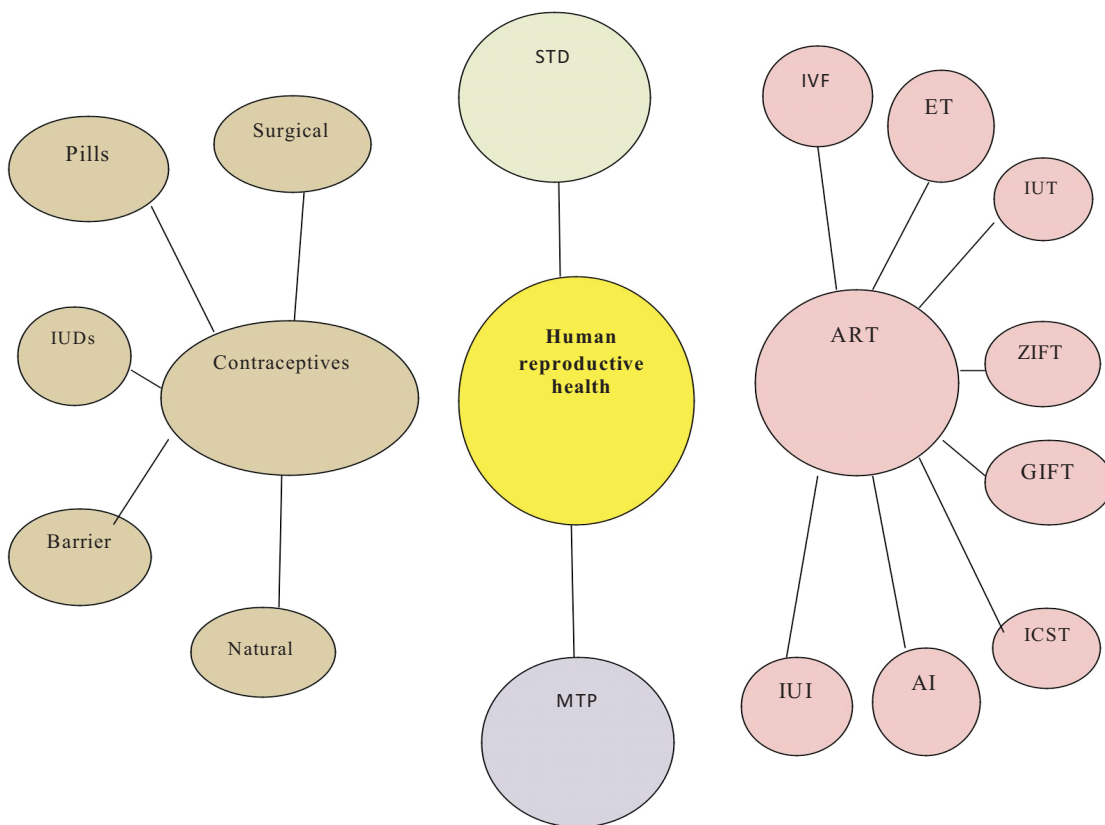
S.NO	Term	Explanation
1	Amniocentesis	A foetal sex determination test based on the chromosomal pattern in the amniotic fluid surrounding the developing embryo
2	Lactational amenorrhea	Absence of Menstruation during extensive breast feeding.
3	Sterilisation	Surgical method to prevent pregnancy-tubectomy in female and vasectomy in males.
4	Artificial insemination	Introduction of semen artificially into female reproductive tract
5	Sexually transmitted diseases	Diseases or infections which are transmitted through sexual intercourse
6	Reproductive health	Physical , emotional , behavioural and social well being
7	Medical termination of pregnancy (MTP)	Intentional or voluntary termination of pregnancy before full term or induced abortion
8	In vitro fertilization	Fertilization outside the body in almost similar conditions as that in the body
9	In -vivo fertilization	Fusion of gametes within the female
10	WHO	World Health Organisation
11	RCH	Reproductive and Child Health Care programmes
12	MMR	Maternal Mortality Rate
13	IMR	Infant Mortality Rate
14	IUD	Intra Uterine Devices
15	MTP	Medical Termination of Pregnancy
16	STD	Sexually Transmitted Diseases
17	VD	Veneral Diseases
18	RTI	Reproductive tract Infection
19	PID	Pelvic Inflammatory Diseases
20	ART	Assisted Reproductive Technology
21	IVF	In Vitro Fertilization / In Vivo Fertilisation
22	ET	Embryo Transfer
23	ZIFT	Zygote Intra Fallopian Transfer
24	IUT	Intra Uterine Transfer
25	GIFT	Gamete Intra Fallopian Transfer
26	ICSI	Intra Cytoplasmic Sperm Injection
27	AI	Artificial Insemination
28	IUI	Intra Uterine Insemination
29	CDRI	Central Drug Research Institute

**UNIT VI CHAPTER 4: REPRODUCTIVE HEALTH
(FLOW CHART)**

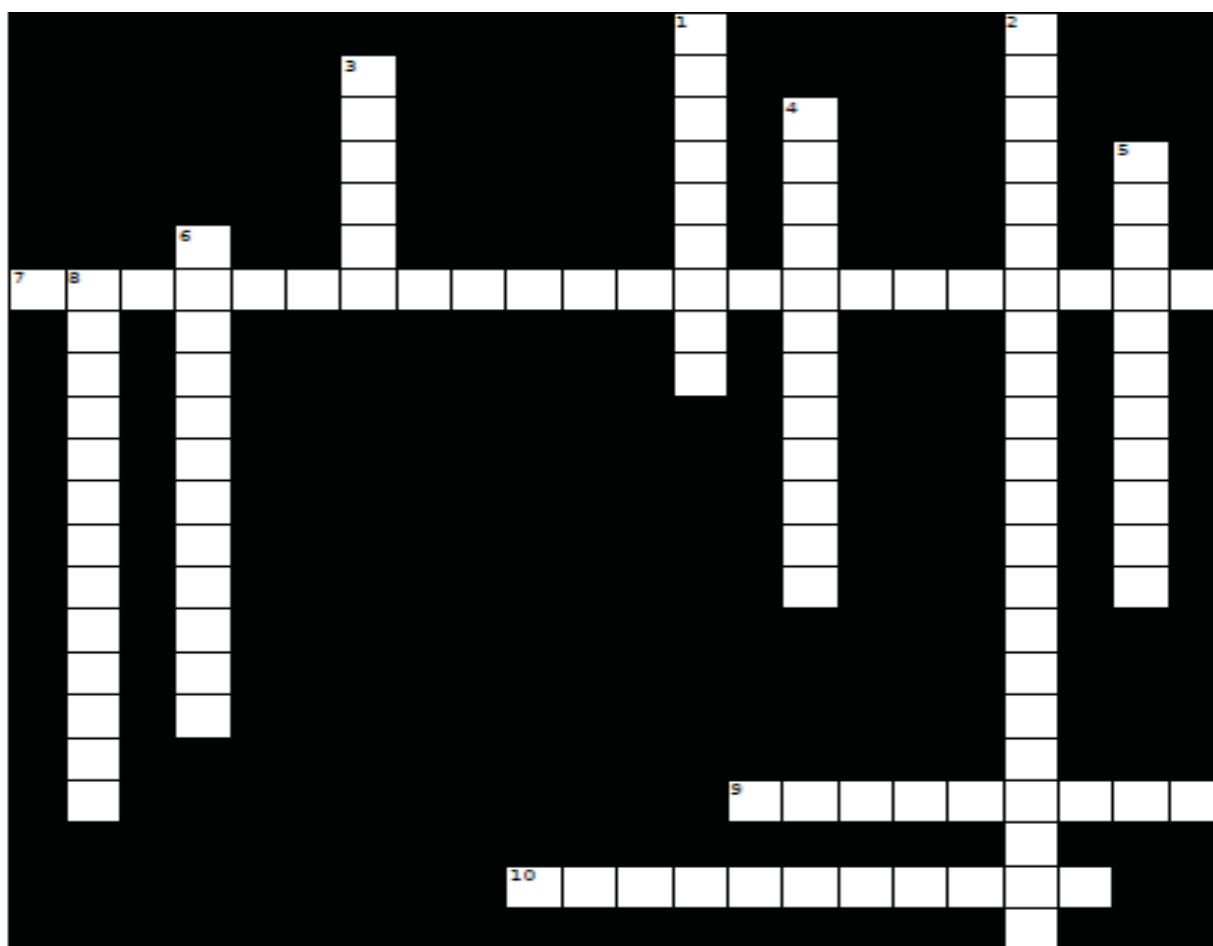




**UNIT VI CHAPTER 4: REPRODUCTive HEALTH
(CONCEPT MAP)**



UNIT VI CHAPTER 4: REPRODUCTIVE HEALTH
(CROSS WORD)



Across

- 7 Absence to menstruation during the period of intense lactation
9 A small part of the fallopian tube is removed and tied up
10 Non medicated IUDs

Down

- 1 Barriers for females
2 Fertilisation outside the body
3 Oral contraceptive for the females developed at CDRI
4 Hormone releasing IUDs
5 Unable to produce children
6 Surgical method
8 A foetal sex determination test based on the chromosomal pattern

**CHAPTER: 4 REPRODUCTIVE HEALTH
(QUESTION BANK)**

1. Name the technique to know the genetic disorders in the foetus .
2. What is MTP?
3. List one drawback of surgical methods of birth control.
4. Which period of pregnancy is safer for MTP?
5. What are the measures one has to take to prevent from contracting STDs?
6. Explain the technique amniocentesis .How is this technique misused?
7. Describe the three different practices under natural methods of birth control.
8. What are barrier methods of birth control? Explain.
9. Expand IUDs. Explain the various methods of IUDs.
10. What is sterilization? Explain the various methods.
11. How do oral contraceptives function? What is the advantage of Saheli?
12. What is an ideal contraceptive for women and explain its contraceptive role?
13. How do the natural, barriers, IUD's, Oral pills and Surgical methods help in Contraception? Explain.
14. What is STD? List out the various STD's .How is it transmitted? What are its symptoms? What are the complications the STD could lead to?
15. Explain the various methods of Assisted Reproductive Technologies.
16. Expand RCH,CDRI,MMR,IMR,AIDS,VD,RTI,IUT,IUI,AI,IVF,STD,MTP,IUD,ZIFT,GIFT,ART,ICSI ,PID.
17. Mrs. X was blamed for being childless though the problem was due to low sperm counts in the ejaculates of her husband. Suggest a technique which could help the couple to have a child.

**CHAPTER. 4 : SEXUAL REPRODUCTION HEALTH
(MARKING SCHEME)**

Q.NO.	Answer	Marks Allotted
1	Amniocentesis	1
2	Medical termination of pregnancy	1
3	Poor reversibility	1
4	First trimester	1
5	Avoid multiple partners , early detection	1x 2
6	Foetal sex determination based on chromosomal pattern in the amniotic fluid surrounding the developing embryo , female foeticide	1x 2
7	Periodic abstinence , withdrawal , lactational amenorrhea	1x 3



BIOLOGY

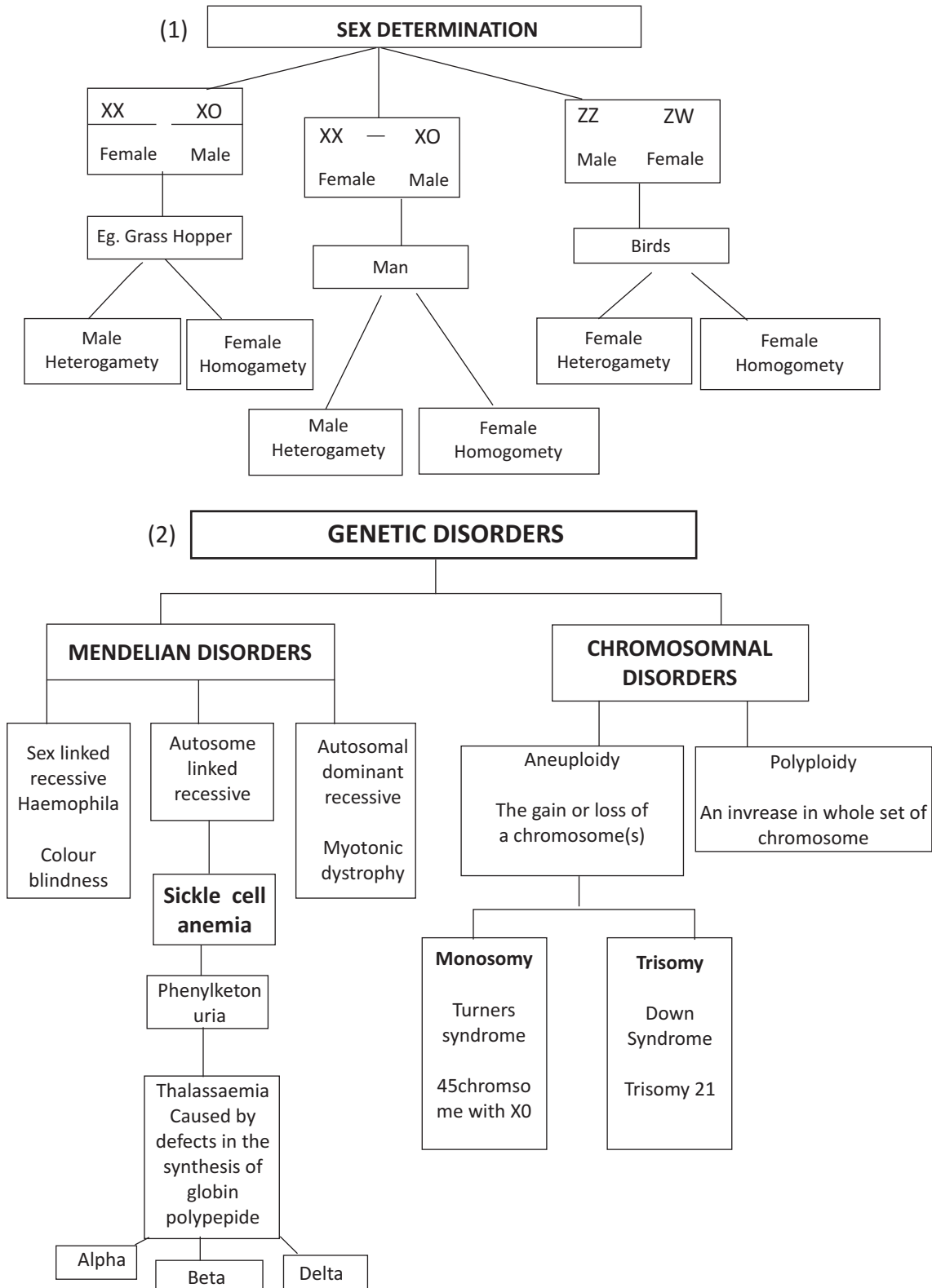
8	Prevent physical meeting of sperm and egg condoms in males , diaphragms, cervical caps vaults in females , spermicidal creams , jellies foams	1 x3
9	Intra uterine devies , non- medicated , Cu releasing , hormone releasing	1 x 3
10	Surgical method , vasectomy in males- vas deferens cut / tied , tubectomy in females fallopian tube cut/ tied	1 x 3
11	Progestogen or progestogen – estrogen combination 21 days ,inhibit ovulation implantation , alter the quality of cervical mucus to prevent/ retard the entry of sperms saheli – non steroidal once a week pill	1+1+1
12	IUDs . increase phagocytosis , suppress sperm motility fertilizing capacity of sperm uterus unsuitable for implantation cervix hostile to sperms	1 x 3
13	Natural -avoiding chances of ovum sperm meeting ,barrier –prevent ovum sperm meeting , IUD – phagocytosis,pills – inhibit ovulation , surgical prevent gamete transfer	1 x 5
14	Sexually transmitted diseases VD RTI Gonorrhoea syphilis genital herpes etc , sharing injection needles trans fusion of blood etc itching fulid discharge slight pain swellings ,PID abortions still births ectopic pregnancy infertility	1 x 5
15	IVF , ET, Test tube baby programme , ZIFT/, IUT/ ,GIFT/, ICSI/,IUI	1 x 5
16	Reproductive and child health care programme ,Central drug research institute , Matrenal mortality rate , infant mortality rate ,Acquired immune deficiency syndrome , veneral disease,Reproductive tract infection ,Intra uterine transfer , intra uterine insemination ,Artificial insemination , in vitro fertilization , Sexually transmitted diseases , medical termination of pregnancy,Intra uterine devices ,Zygote intra fallopian transfer, gamete intra fallopian transfer, assisted reproductive technology , Intra cytoplasmic sperm injection Pelvic inflammatory diseases	Each 1
17	IVF and its detail process and importance	4



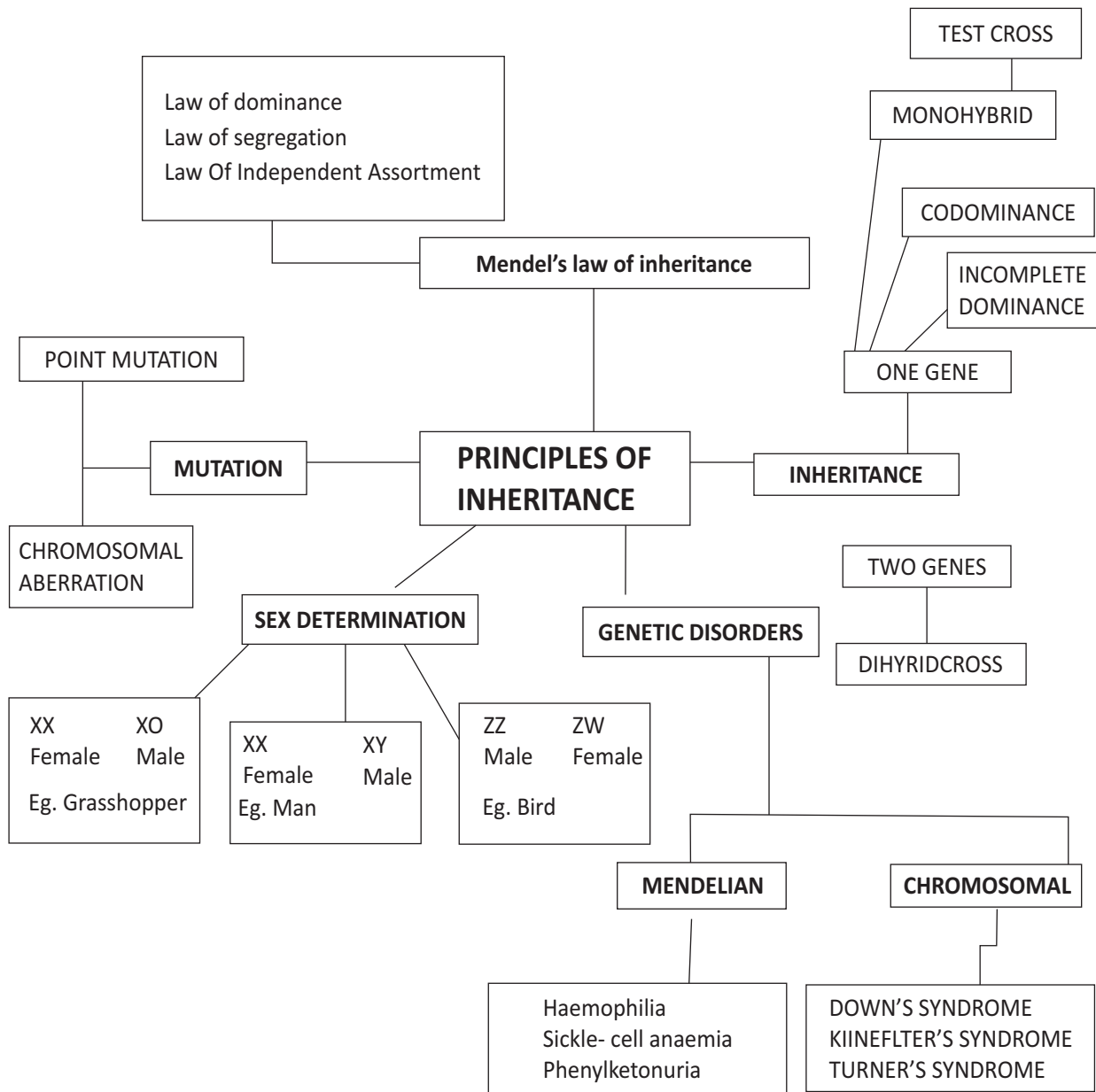
UNIT-VII – GENETICS AND EVOLUTION
CHAPTER – 5 : PRINCIPLES OF INHERITANCE AND VARIATION
(KEY POINTS)

S.No	TERM	Explanation
1.	Heredity:	It can be defined as the transmission of characters from one generation to successive generations of living organisms.
2.	Alleles:	The various forms of a gene are called alleles.
3.	Phenotype:	The external / observable characteristics of an organism constitute its phenotype.
4.	Genotype:	The genetic constitution of an organism is its genotype.
5.	Homozygote:	It is an individual organism in which the members of a pair of alleles for a
6.	Heterozygote:	It is an individual organism in which the members of a pair of alleles of a character are different.
7.	Dominant	The form of the character which is expressed in the F1 hybrid is called dominant character: character.
8.	Recessive	The form of the character which is suppressed in the presence of the dominant character: character in a hybrid is called recessive character.
9.	Monohybrid cross:	It is a cross between individuals of the same species, in which the inheritance of contrasting pairs of a single trait is considered.
10.	Dihybrid cross:	It is a cross between two individuals of the same species, in which the inheritance of contrasting pairs of two traits is considered.
11.	Glu –	glutamic acid
12.	Val-	valine

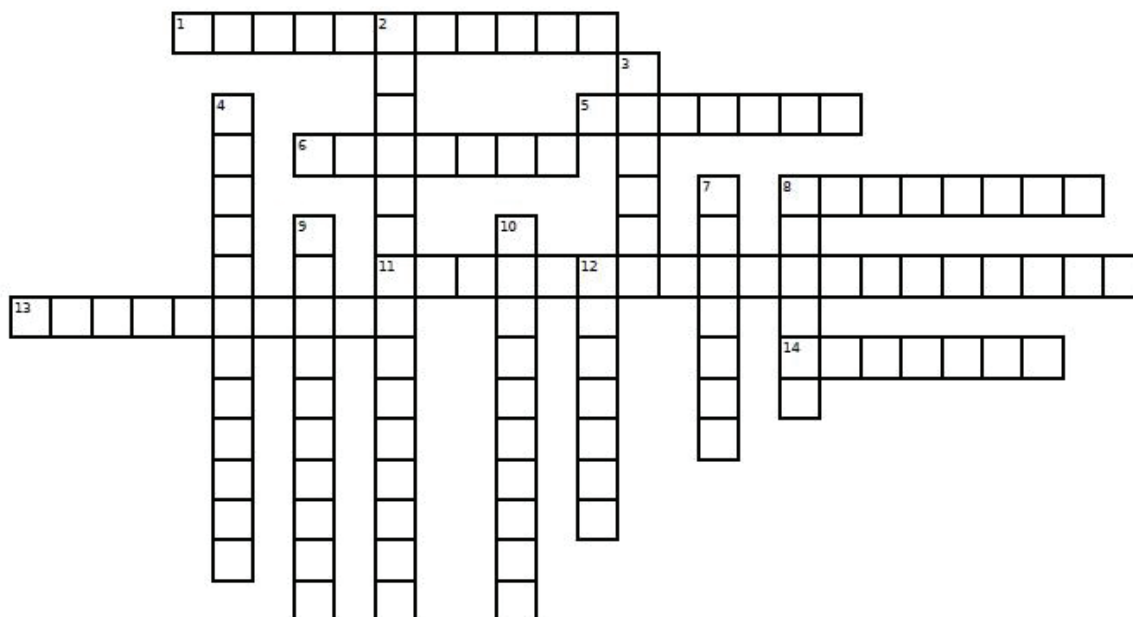
**CHAPTER – 5 : PRINCIPLES OF INHERITANCE AND VARIATION
(FLOW CHART)**



**CHAPTER – 5 : PRINCIPLES OF INHERITANCE AND VARIATION
(CONCEPT MAP)**



**CHAPTER – 5 : PRINCIPLES OF INHERITANCE AND VARIATION
(CROSS WORD)**



Down:

2. Inborn error of metabolism inherited as autosomal recessive trait
3. Which amino acid substitutes Glutamic acid in sickle cell anaemia an autosomal recessive trait disorder
4. Term used for 2 different types of gametes in terms of sex chromosome
7. Specific name of pea plant
8. Scientist who gave the experimental verification of chromosomal theory of inheritance
9. Genetic name of fruit fly
10. Term for segregation of chromatids during cell division cycle results in the gain or loss of chromosome(s)
12. The discrete unit that controls the characters and occurs in pairs

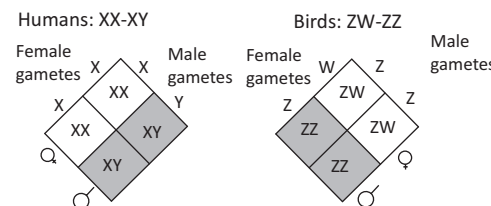
Across:

1. Sex linked recessive disease when in the clotting of blood is affected
5. Well known Indian breed of cows in Punjab
6. Who proposed the graphical representation in a genetic cross
8. Sudden change results in the alteration of DNA sequence
11. Genetic disorder due to the presence of an additional copy of X chromosomes resulting in a karyotype of 47
13. The structure in the nucleus that appeared double and divide just before each cell division
14. Genes which code for a pair of contrasting traits are also known as _____

CHAPTER – 5 : PRINCIPLES OF INHERITANCE AND VARIATION (QUESTION BANK)

1. State the difference between a gene and an allele.
2. Write the possible genotypes Mendel got when he crossed F1 Tall pea plants with a dwarf pea plant.
3. Who had proposed the chromosomal theory of inheritance?
4. Write the scientific name of the organism which T.H. Morgan used in his genetic experiments.
5. List the advantages of selecting pea plant for his experiments by Mendel
6. Briefly mention the contributions of T.H.Morgan in genetics
7. What is a point mutation, give an example
8. What is pedigree analysis, how is it useful?
9. The male fruit fly and female fowl are heterogametic, while the female fruit fly and the Male fowl are homogametic why are they termed so.
10. Define and explain test cross
11. Explain law of dominance with an example.
12. With the help of an example differentiate between incomplete dominance and co- dominance.
13. Explain the mechanism of sex determination in honeybees
14. How does the Mendelian disorder phenylketonuria occur?
15. Why did Mendel select garden pea plant for his experiments?
16. Tabulate the different types of sex determination in organisms.
17. Give the characteristic features of Turner's Syndrome.
18. What will be the genotype and phenotype of the offspring if a colour blind man marries a carrier woman?
19. Anita was happy when she gave birth to her first child. Her in- laws were dissatisfied at her not giving birth to a male child and blamed Anita. Anita tried to convince her in laws that she had no role in the child's gender. They understood the biological reason but were yet to be satisfied. Anita's husband took up the matter and convinced the parents.
 - a) What values did Anita's husband show in the above situation?
 - b) What governs sex determination in humans? How is it different from birds?
 - c) Why can't Anita be blamed for not giving birth to a male child?

**CHAPTER – 5 : PRINCIPLES OF INHERITANCE AND VARIATION
(ANSWER KEY)**

Q No.	HINTS	
1	Alleles are different forms of a gene	1
2	Tall and dwarf	1
3	Sutton & Boveri	1
4	Drosophila melanogaster	1
5	Bisexual, one season breeding, contrasting traits 1	
6	Experiments with Drosophila-linkage & recombination	1
7	Change of a single nitrogen base, Eg. Sickle cell anaemia	1
8	Method of analyzing inheritance of traits in humans. Study inheritance of diseases for genetic counselling	2
9	Produce dissimilar gametes-heterogametic, produce similar gametes-they are homogametic	2
10	Cross between dominant phenotype of unknown genotype with the recessive plant. Ratio 1:1 shows genotype of dominant plant as heterozygous.	2
11	When a pair of heterozygous alleles seen together, the allele which is expressed is the dominant one. Tt Tall plants produced	2
12	Neither of the heterozygous pair expressed completely Eg. Mirabilis sp. Both the alternative forms are expressed when found together Eg. blood groups.	2
13	Haplo-Diploid-unfertilised eggs become males, fertilised eggs become females.	3
14	Inborn error of metabolism-lacks enzyme for converting phenyl alanine to tyrosine. Phenyl pyruvic acid is excreted	3
15	Short life span, only 4 pairs of chromosomes, distinct male & female traits, cultured in the lab	3
16	XX female, XY male, ZZ male, ZW female, XO male, XX female	3
17	Female sterile with rudimentary ovaries, lack other sexual characters. XO	2+1
18	Man with X ^c female with one X ^c and explanation through flow chart	3
19	<p>a) Strong and determined personality with responsibility towards the family and respect for elders.</p> <p>b) Sex chromosomes. In human males it is XY and in female it is XX In birds, male is ZZ while female is ZW</p> <div style="text-align: center;">  <p>Humans: XX-XY Birds: ZW-ZZ</p> <p>Female gametes: X, X Male gametes: X, Y Female gametes: W, Z Male gametes: Z, Z</p> </div> <p>c) Human females are homogametic i.e. produces only one type of gametes containing 22+X chromosome only. Males are heterogametic and produce two types of gametes 22+X and 22+Y. It is the type of the male gamete which determines the sex of the foetus. If X chromosome containing sperm fuses with the egg, it produces a female child whereas if Y chromosome containing sperm fuses with the egg, it produces a male child.</p>	4



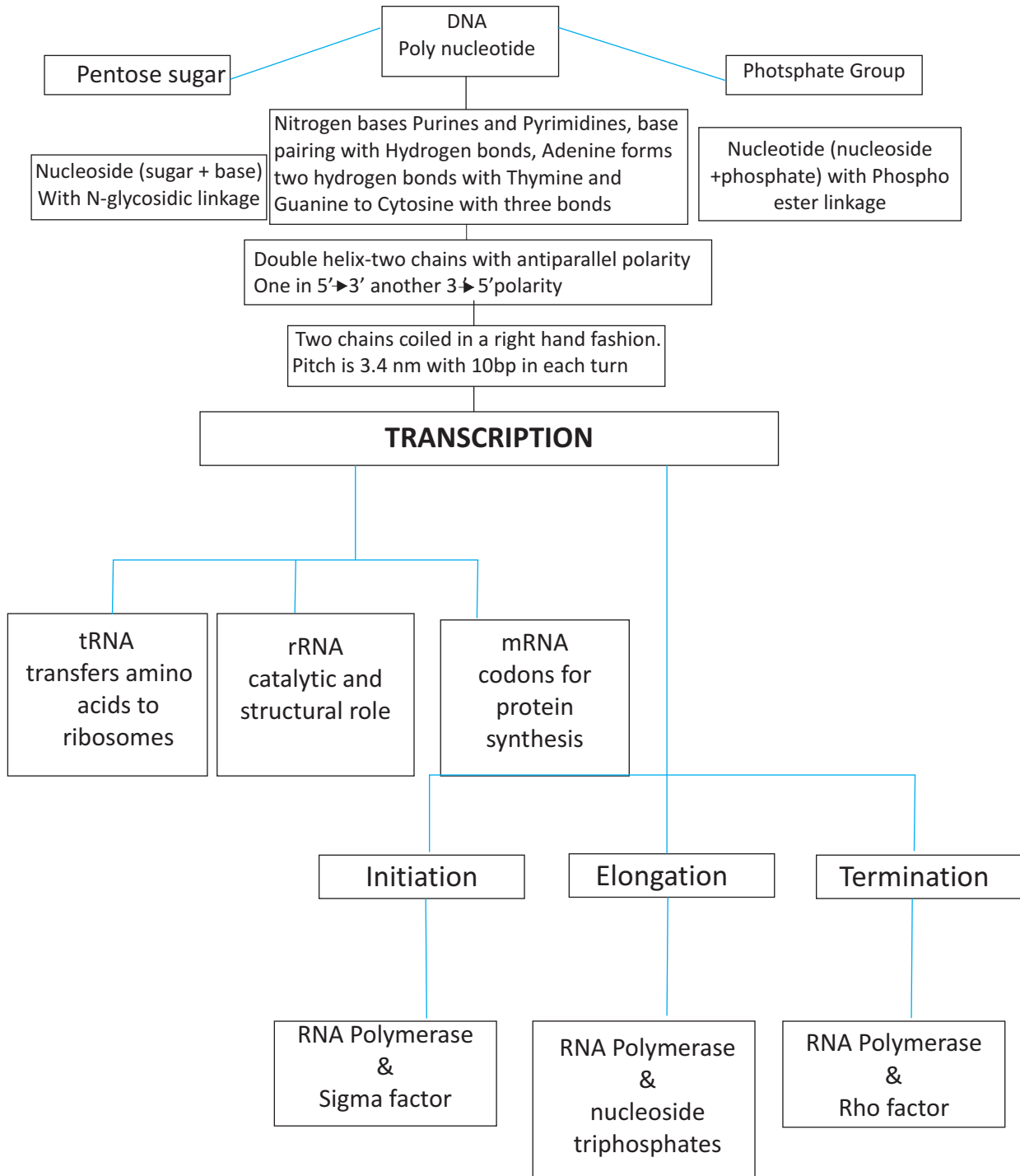
BIOLOGY

CHAPTER: 6 MOLECULAR BASIS OF INHERITANCE (KEY POINTS)

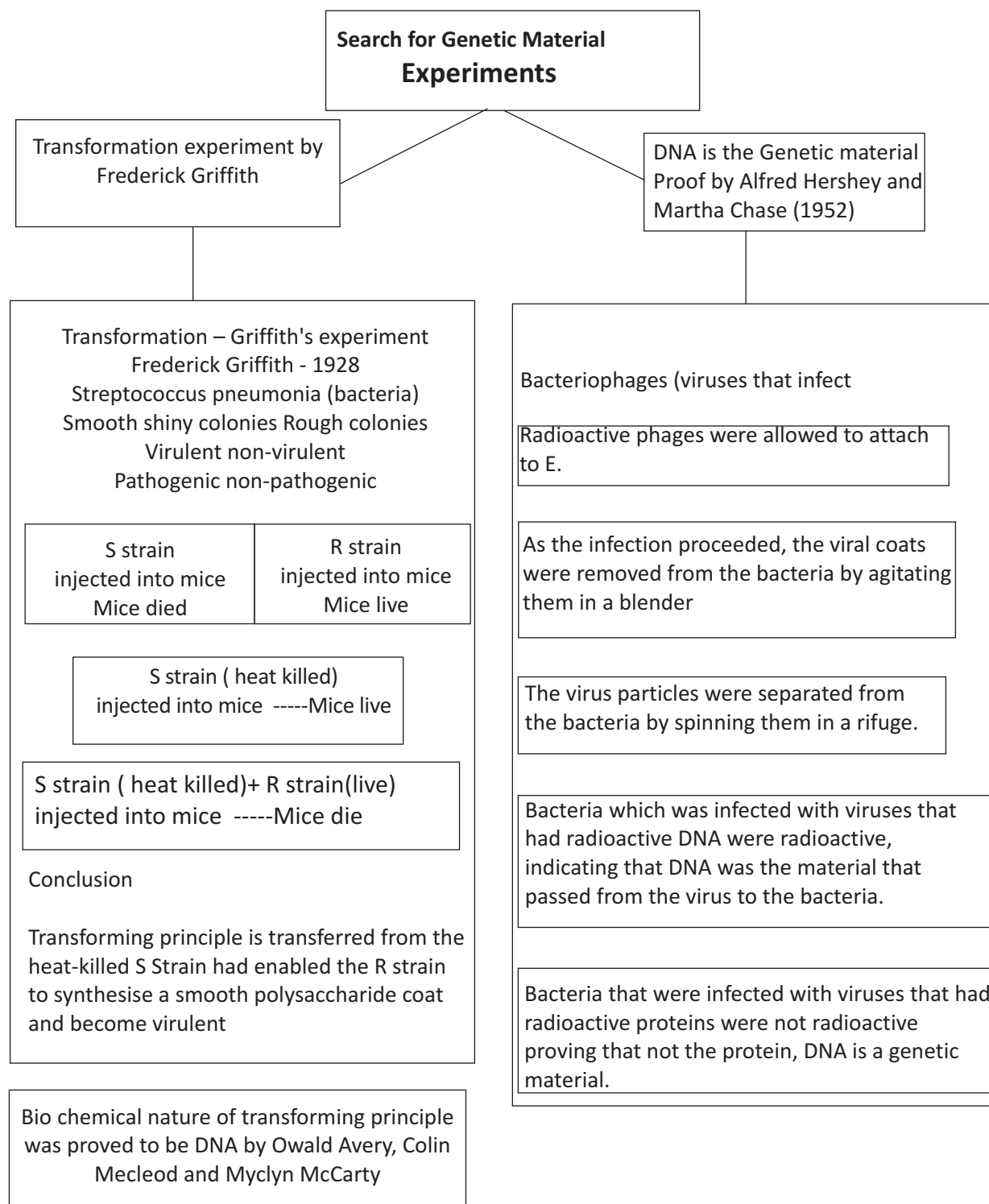
1	Transcription-	copying of genetic material from DNA to RNA
2	Purines –	adenine and guanine
3	Pyrimidine –	cytosine , thymine and uracil
4	Nucleotide –	consists pentose sugar phosphate group and nitrogenous base
5	Nucleoside –	consists of nitrogenous base and pentose sugar
6	DNA ligase -	Join the discontinuoesly, synthesised fragments
7	Exons –	coding sequence
8	Introns –	intervening sequence
9	Polynucleotide chain –	consists sugar and phosphate along with Nitrogenous base
10	Splicing –	introns are removed in this process
11	Capping –	an unusual nucleotide is added to 5' end of the RNA
12	Codon –	formed by 3 nitrogen bases on mRNA that codes an amino acids
13	Anticodon –	has bases complementary to the code
14	Lac operon –	A gene regulation mechanism in E.coli.conversion as per available energy source.
15	Bioinformatics –	associated to Human Genome Programme
16	Polymorphism –	variation at genetic level
17	Repetitive DNA –	small stretches of DNA
18	Satellite DNA –	forms small peaks
19	Translation –	polymerization of amino acid to form a polypeptide
20	Tailing –	adenylate residues are added to the 3' end of hnRNA
21	HGP	Human Genome Project
22	ESTs	Expressed Sequence Tags
23	BAC	Bacterial artificial chromosome
24	YAC	Yeast artificial chromosome
25	SNPs	single nucleotide polymorphism
26	VNTR	variable number of tandem repeats
27	UTR	untranslated regions
28	sRNA	soluble RNA
29	snRNA	heterogeneous nuclear RNA
30	snRNA	small nuclear RNA
31	RNA	ribonucleic acid
32	DNA	deoxyribonucleic acid
33	Proteases	protein digesting enzyme
34	Rnase	RNA digesting enzyme
35	Dnase	DNA digesting enzyme
36	NHC	Non histone chromosome
37	EM	electron microscope

**CHAPTER : 6 MOLECULAR BASIS OF INHERITANCE
(FLOW CHART)**

1 - STRUCTURE OF DNA

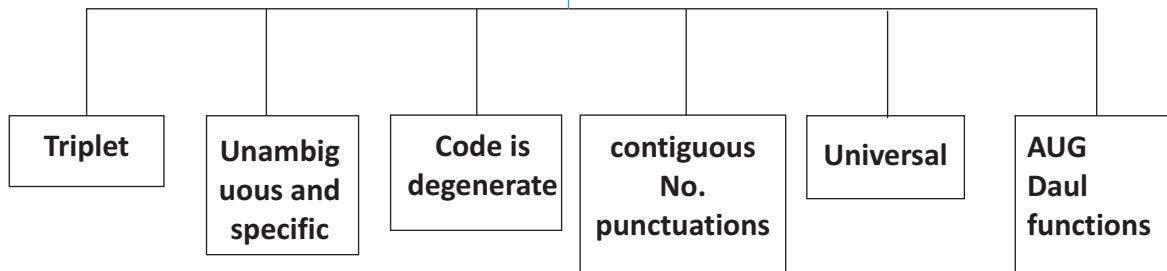


2 - SEARCH FOR GENETIC MATERIAL

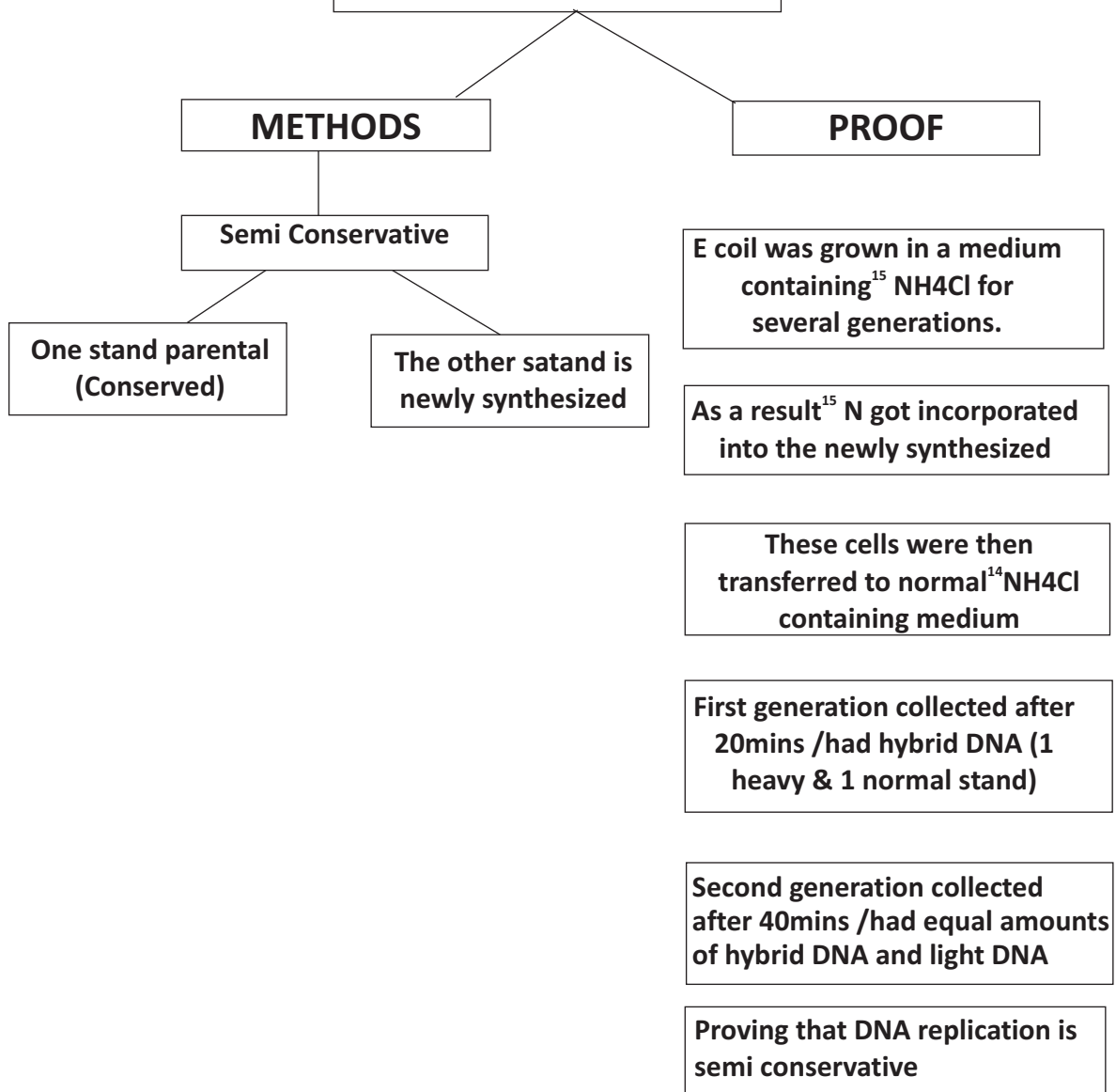


3

SALIENT FEATURES OF GENETIC CODE

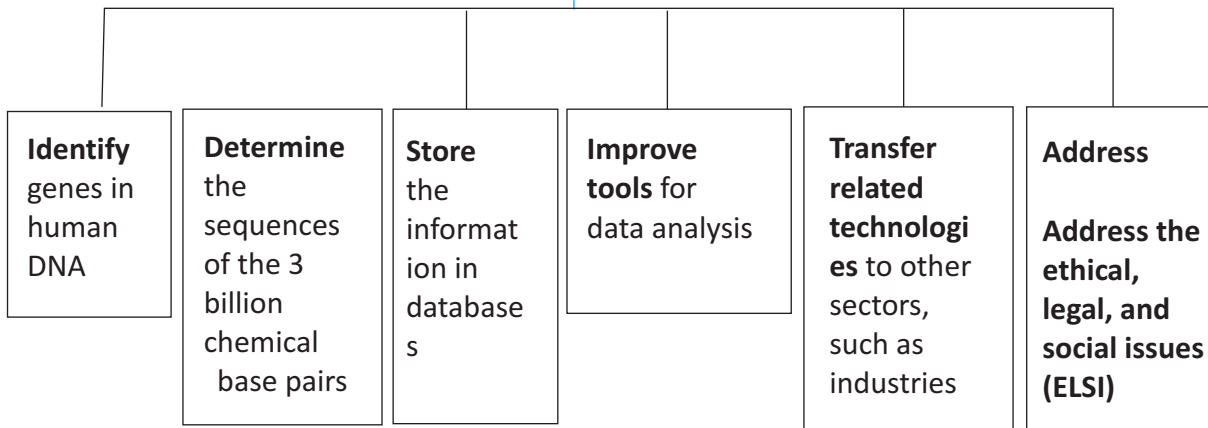


4 - DNA Replication



5

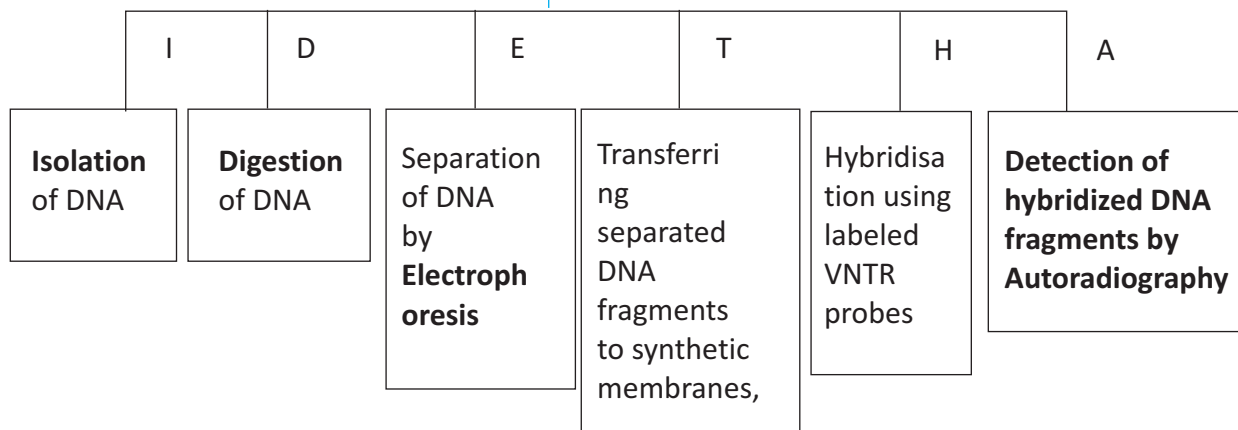
Goals of HGP



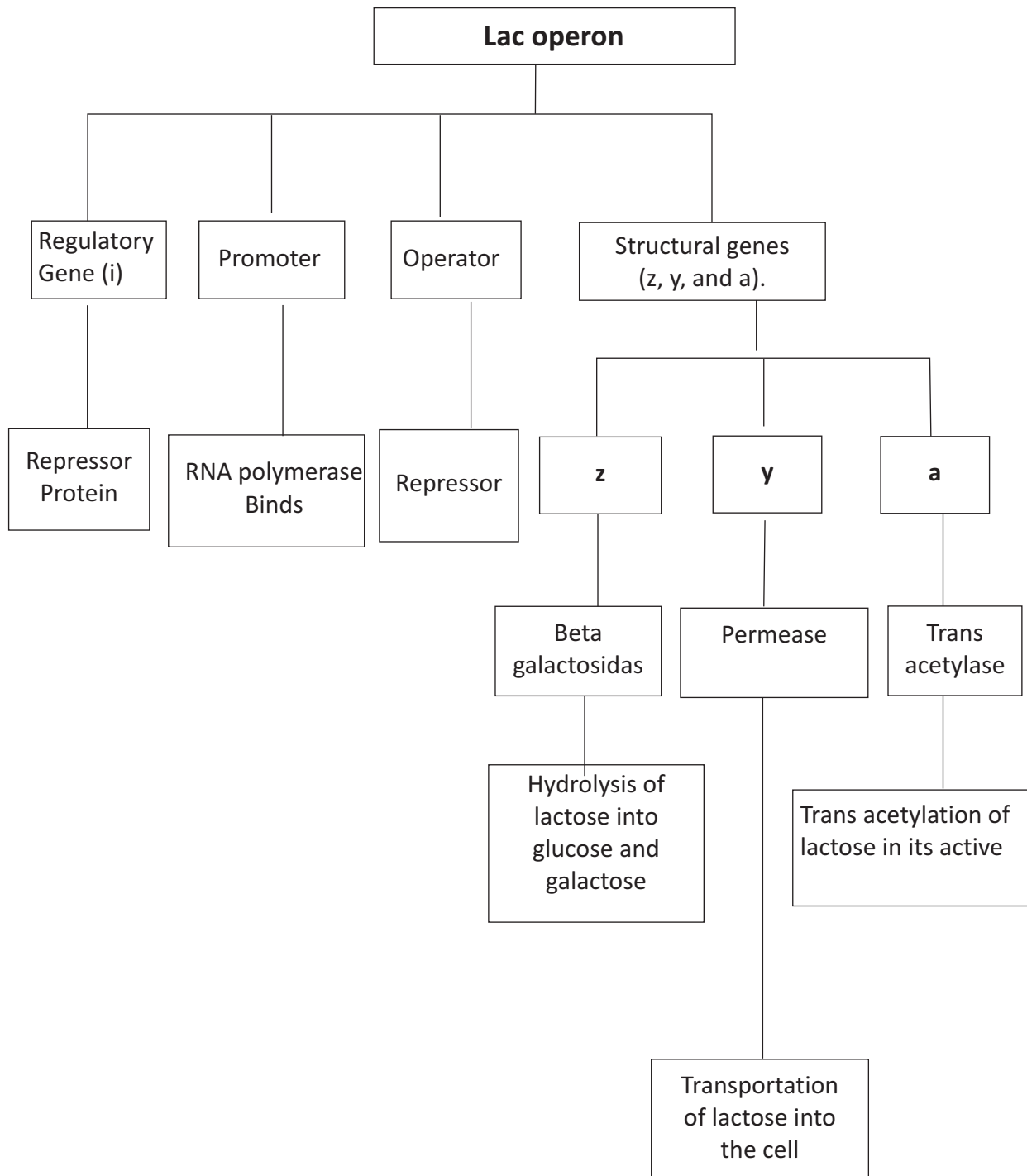
6

DNA Fingerprinting
developed by **Alec Jeffreys**

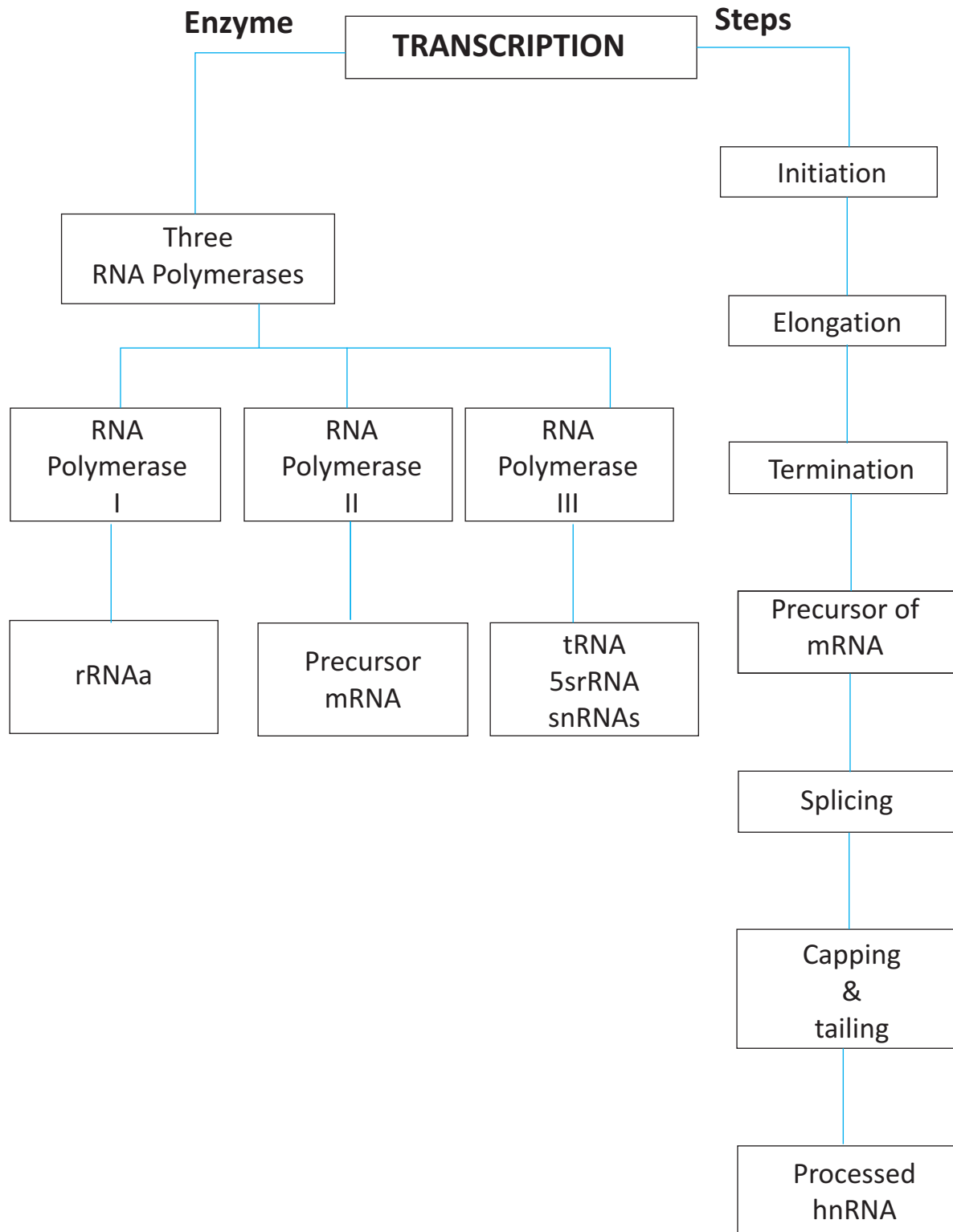
Steps



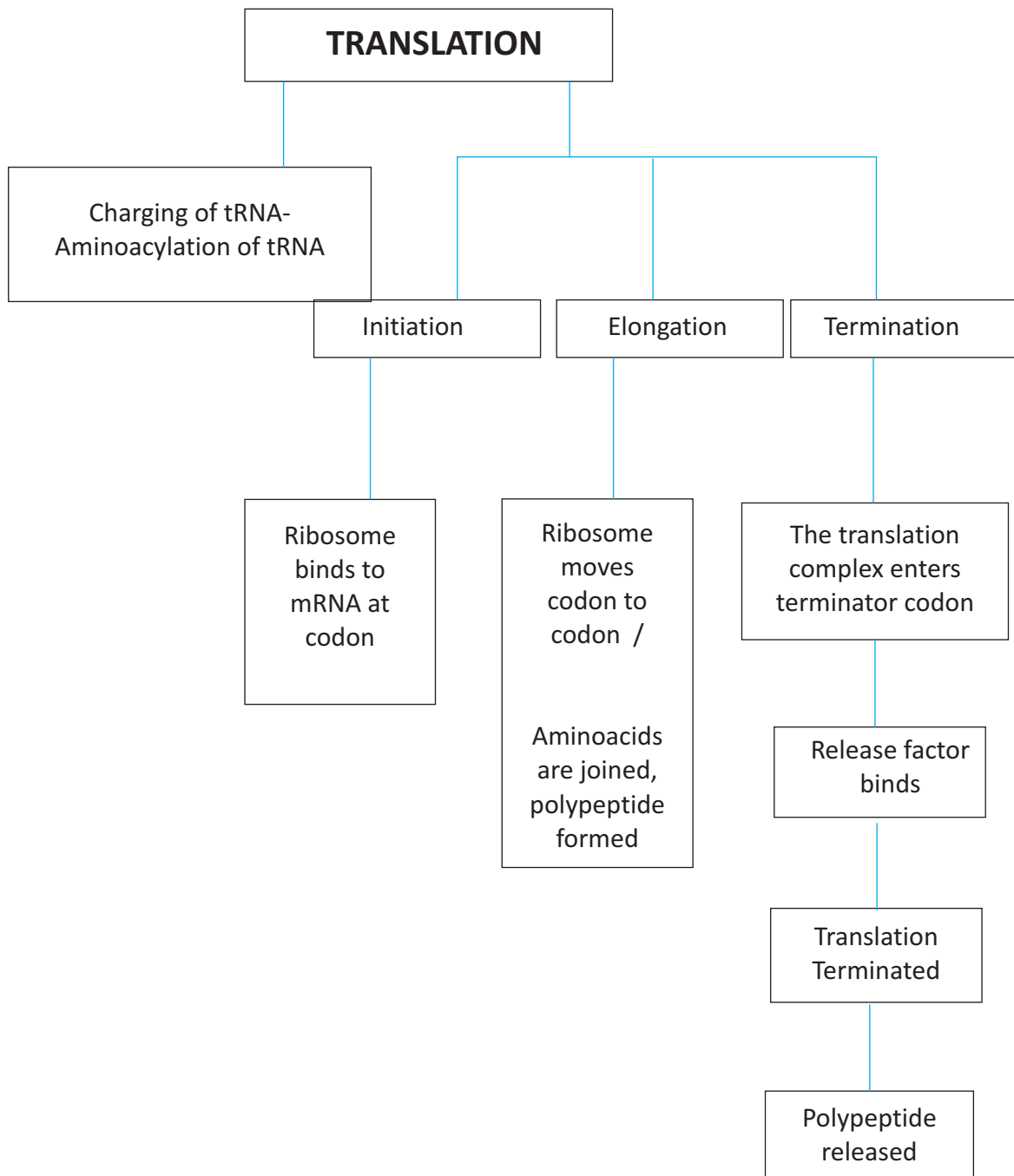
7 GENE REGULATION



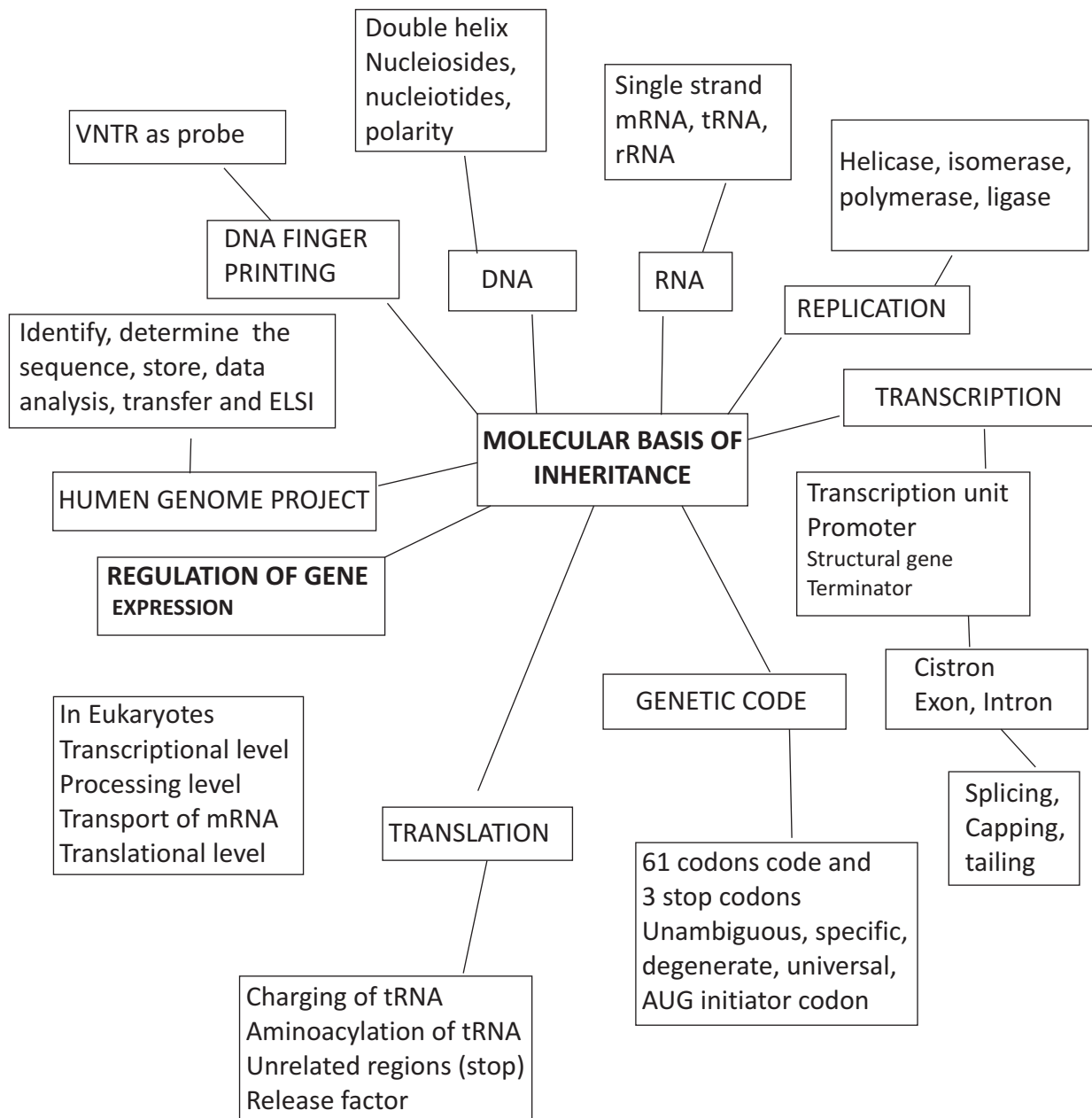
8 TRANSCRIPTION IN EUKARYOTES



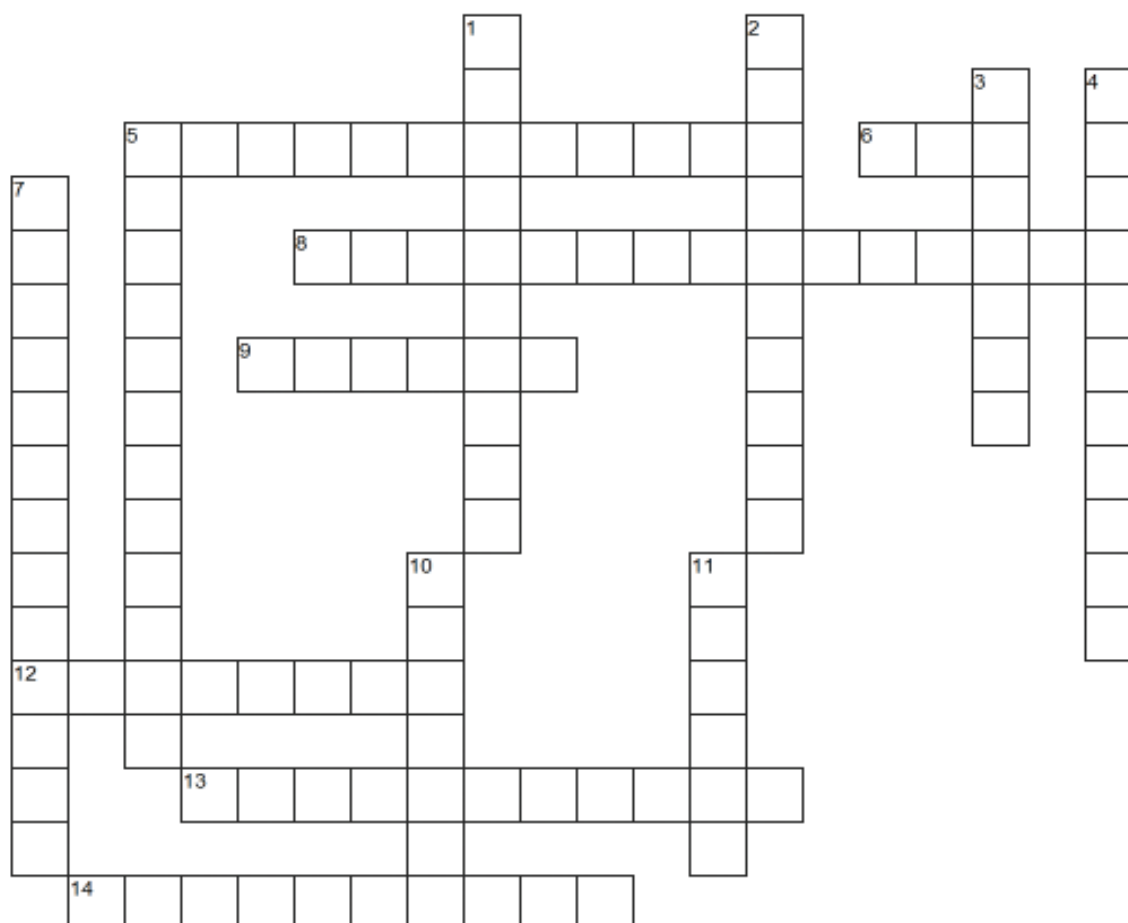
9 PROTEIN SYNTHESIS



**CHAPTER : 6 MOLECULAR BASIS OF INHERITANCE
(CONCEPT MAP)**



**CHAPTER : 6 MOLECULAR BASIS OF INHERITANCE
(CROSS WORD)**



ACROSS:

5. Causative organism of pneumonia
6. An acidic substance present in nucleus
8. Chromatin densely packed and inactive
9. Helps in joining the fragments
12. A set of positively charged base proteins
13. Chromatin loosely packed and active
14. Process of removing introns from processed RNA

DOWN:

1. Formed by N-glycosidic linkage
2. largest known human gene at 2.4 billion bases
3. Substrate of lac-operon
4. Process of protein synthesis from RNA
5. Variation at genetic level
7. Bacteria infected with viruses
10. A segment of DNA coding for polypeptide
11. Present in RNA as the place of Thymine



CHAPTER: 6 MOLECULAR BASIS OF INHERITANCE
(QUESTION BANK)

1. If adenine constitutes 30% of an isolated DNA fragment, then what is the expected % of the base cytosine in it?
2. How does the flow of genetic information in HIV deviate from the central dogma proposed by Francis Crick?
3. How does HIV differ from a bacteriophage?
4. What is a nucleoid?
5. Name two amino acids that provide **+ve** charge to histone proteins.
6. Why do RNA viruses undergo mutation and evolution faster than most of the other viruses?
7. Name the enzyme involved in the continuous replication of DNA strand. Mention the polarity of the template strand.
8. What is a cistron?
9. Which one out of Rho factor and sigma factor, acts as initiation factor during transcription in prokaryote?
10. Write the function of RNA polymerase II.
11. What is meant by hnRNA?
12. (a) Differentiate between euchromatin and heterochromatin.
(b) What is the function of non-histone chromosomal proteins?
13. Why is DNA a better genetic material when compared to RNA?
14. Answer the following questions based on Meselson and Stahl's experiment:
 - a) Write the name of the chemical substance used as a source of nitrogen in the experiment by them.
 - b) Why did the scientists synthesize the light and the heavy DNA molecules in the organism in the experiment?
 - c) How did the scientists synthesize make it possible to distinguish the heavy DNA molecule from the light DNA molecule? Explain.
 - d) Write the conclusion the scientists arrived at, after completing the experiment.
15. Monocistronic structural genes in eukaryotes have interrupted coding sequences, Explain. How are they different in prokaryotes?
16. Describe the initiation process of transcription in bacteria?
17. Explain the elongation process of transcription in bacteria?
18. Describe the termination process of transcription in bacterium?
19. Explain the role of ³⁵S and ³²P in the experiments conducted by Hershey and chase?
20. It is established that RNA is the first genetic material. Explain giving three reasons?
21. (a) What are the transcriptional products of RNA polymerase III?
(b) Differentiate between 'capping' and 'tailing'?
 - (a) Expand hnRNA.
22. DNA is the genetic material in most of the organisms, while RNA is the genetic material in a few viruses/
What are the four general/common functions performed by RNA in other organisms?
23. Write short notes on RNA polymerases of eukaryotic cells?
24. How do histones acquire positive charge?
25. Explain the role of RNA polymerase in transcription in bacteria.
26. Identify giving reasons, the salient features of genetic code by studying the following nucleotide sequences of mRNA strand and the polypeptide translated from it?
27. Ratan was a known sportsman in his school. While returning home he found some unknown miscreants beating a young fellow. He tried to drive them off but by that time the fellow died of injury. The police arrested Ratan and he was put on trial. The judge being convinced by Ratan's plea, ordered for DNA finger printing reports.
 - a) Ratan's fingerprints on the dead body were sufficient to convict him but the judge asked for authentic proof? What values can be observed?
 - b) What is the basis of DNA finger printing?
 - c) Explain the steps in DNA finger printing.



**CHAPTER : 6 MOLECULAR BASIS OF INHERITANCES
(MARKING SCHEME)**

Q.NO.	Value points	Marks						
1	20%	1						
2	HIV shows reverse transcription, i.e., formation of DNA on RNA template.	1						
3	HIV has RNA as its genome, while bacteriophage has double-stranded DNA as its genome.	1						
4	Nucleoid is the region in prokaryotic cells where DNA is held with positively-charged proteins							
5	Lysine and Arginine	1						
6	The 2' OH-group in the nucleotides of RNA is a reactive group, that makes RNA labile and easily degradable	1						
7	DNA polymerase. Template strand has 3'→5' polarity.	1						
8	A cistron is a segment of DNA, coding for a polypeptide.	1						
9	Sigma factor.	1						
10	It transcribes hnRNA, the precursor of mRNA, in eukaryotes.	1						
11	The precursor of mRNA or the primary transcript transcribed by RNA polymerase II is called Heterogenous nuclear RNA.	1						
12a	<table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 50%;">Euchromation</th> <th style="width: 50%;">Heterochroma</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> - These are the regions where chromatin is loosely packed. - It stains lighter. <li style="padding-left: 20px;">This is transcriptionally more active. </td> <td> <ul style="list-style-type: none"> - These are the regions where chromatin is highly packed. - It stains darker. It is transcriptionally less active or inert. </td> </tr> <tr> <td colspan="2"> (b). non-histone chromosomal proteins are involved in the packaging of chromatin fibers at the higher levels. </td> </tr> </tbody> </table>	Euchromation	Heterochroma	<ul style="list-style-type: none"> - These are the regions where chromatin is loosely packed. - It stains lighter. <li style="padding-left: 20px;">This is transcriptionally more active. 	<ul style="list-style-type: none"> - These are the regions where chromatin is highly packed. - It stains darker. It is transcriptionally less active or inert. 	(b). non-histone chromosomal proteins are involved in the packaging of chromatin fibers at the higher levels.		2
Euchromation	Heterochroma							
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(b). non-histone chromosomal proteins are involved in the packaging of chromatin fibers at the higher levels.								
13	DNA is a better genetic material for the following reasons: (i) The genetic material should be stable and should not change with age or change in physiology; this stability is given to DNA by its (b) Double stranded nature, (c) Presence of thymine. (ii) Because the 2'-OH group of RNA nucleotides is a reactive group that makes RNA labile and easily degradable .(iii) RNA (23S RNA) is also catalytic, i.e., it is reactive.	2						
14	a) NH ₄ Cl (ammonium chloride). (b) It was done to show that after one generation of Escherichia coli with ¹⁵ N-DNA, in medium of ¹⁴ N, the DNA was of intermediate density between the lightly and heavy DNAs; it shows that of the two strands, only one strand is synthesized newly, using the ¹⁴ N-nitrogen source in the medium. (c) The heavy and light DNA molecules can be distinguished by centrifugation in a cesium chloride (CsCl) density gradient; the ¹⁵ N-DNA was heavier than ¹⁴ N-DNA and the hybrid ¹⁵ N- ¹⁴ N-DNA was intermediate between the two. (d) They concluded that DNA replication is semiconservative, i.e., of the two strands of DNA, one is the parental strand while the other is synthesized new.	2						



BIOLOGY

15	<p>In eukaryotes, the hnRNA (primary transcript of mRNA) has coding sequences, called exons as well as non-coding sequences, called introns, i.e., the information is split</p> <ul style="list-style-type: none"> - If undergoes a process, called splicing, in which the introns are removed and the exons are joined together in a particular manner, to form the functional mRNA. - In prokaryotes, the mRNA is polycistronic, i.e., codes for more than one polypeptide. - The information is continuous and no splicing is required. 	2				
16	<p>Initiation process of transcription in bacteria</p> <ul style="list-style-type: none"> - The RNA polymerase binds transiently to an initiation factor (sigma σ factor) and binds to a specific sequence on the DNA, called promoter, to initiate transcription. - The DNA strand with 3'→5' polarity acts as the template. 	2				
17	<p>Elongation process of Transcription in bacteria</p> <ul style="list-style-type: none"> - After binding to the promoter, the RNA polymerase facilitates the opening of the DNA. - It uses nucleoside triphosphates as substrate and polymerises the nucleotides in a template-dependent fashion following complementarity of bases in 5'→3' direction <p>The process continues till the RNA polymerase reaches the terminator region on the DNA strand</p>	2				
18	<p>Once the RNA polymerase reaches the terminator sequences of the DNA, it binds transiently to the termination factor (rho ρ)</p> <ul style="list-style-type: none"> - The RNA strand synthesized falls off, followed by the RNA polymerase, i.e. termination has occurred 	2				
19	<ul style="list-style-type: none"> - The viruses/ bacteriophages grown on radioactive Sulphur (35S) contained radio active proteins but not radioactive DNA, because DNA does not contain Sulphur. - When these viruses were allowed to infect bacteria, the bacteria did not contain radioactivity, because proteins did not enter the bacteria; hence protein is not the genetic material. - The viruses grown on radioactive phosphorous (32P) contained radioactive DNA, because DNA contains phosphorus and not proteins. - When these viruses were allowed to infect the bacteria, the bacteria were radioactive, indicating that DNA is the genetic material that has passed from the virus into bacteria. 	3				
20	<p>RNA is the first genetic material because:</p> <p>(i) RNA can directly code for the synthesis of proteins and hence can easily express the character; it is the genetic material in many viruses.</p> <p>(ii) RNA can also act as a catalyst; there are some important biochemical reactions in living systems that are catalyzed by RNAs and not proteins.</p> <p>Many essential life processes like splicing, translation, etc. have evolved around RNA.</p>	3				
21	<p>(a) RNA polymerase III transcribes tRNA, 5S rRNA and SnRNA, i.e., small nuclear RNA</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="text-align: center; padding: 5px;">capping</td> <td style="text-align: center; padding: 5px;">tailing</td> </tr> <tr> <td style="padding: 5px;">It is the process of addition of methyl guanosine triphosphate to the 5' end of hnRNA after splicing.</td> <td style="padding: 5px;">It is the process of addition of adenylate residues to the 3' end of hnRNA after splicing</td> </tr> </table> <p>(b) Heterogenous nuclear ribonucleic acid (hnRNA).</p>	capping	tailing	It is the process of addition of methyl guanosine triphosphate to the 5' end of hnRNA after splicing.	It is the process of addition of adenylate residues to the 3' end of hnRNA after splicing	3
capping	tailing					
It is the process of addition of methyl guanosine triphosphate to the 5' end of hnRNA after splicing.	It is the process of addition of adenylate residues to the 3' end of hnRNA after splicing					



22	<p>Functions of RNA</p> <ul style="list-style-type: none"> - It functions as a messenger. - It is an adapter. - It is a structural component of ribosome - It also acts as a catalysts. 	3
23	<ul style="list-style-type: none"> - In eukaryotes, there are three RNA-polymerases - RNA-polymerase I catalyses transcription of r RNAs (28 S, 18 A and 5.8 S). - RNA-polymerase II catalyses transcription of precursor of mRNA; it is called hnRNA. - RNA-polymerase III catalyses tRNA, 5srRNA and hnRNA. 	3.
24	<ul style="list-style-type: none"> - A proteins acquires a charge depending on the abundance of amino acid residues with charged side chains. - Histones are rich in basic amino acids, lysine's and arginine's, which carry positive charges in their side chains; hence histones are positively charged. 	3
25	<ul style="list-style-type: none"> - A single DNA dependent RNA polymerase catalyses the formation of mRNA, tRNA and rRNA in bacteria. - The enzyme is capable of catalyzing only the elongation step of transcription - It combines transiently to the initiation or sigma factor and binds to the promoter and initiates transcription - It somehow facilitates the opening of the DNA helix and catalyses the polymerisation of ribonucleoside triphosphates in a template-dependent fashion, i.e., elongation. - When it reaches the terminator sequence, the enzyme associates transiently with the termination or rho (ρ) factor and terminates transcription, the RNA and the enzyme fall off the template. 	5
26	<p>Prosperities of genetic code:</p> <ul style="list-style-type: none"> - AUG is the initiation codon and codes for methionine; methionine is the first amino acid in the given polypeptide. - Genetic code is unambiguous and specific, i.e., each codon codes only for one particular amino acid. - Genetic code is degenerate, i.e., more than one codon code for one amino acid. - Each codon is a triplet, i.e., made of three nucleotides e.g., AUG, UUU, etc. - UAG does not code for any amino acid, it is a termination codon. 	5
27	<p>Ans-a) The judge showed wisdom and intention to search for the truth.</p> <p>Ans-b)</p> <ol style="list-style-type: none"> 1. DNA fingerprinting involves identifying differences in some specific regions in DNA sequence called as repetitive DNA. 2. Depending on base composition (A: T rich or G:C rich), length of segment, and number of repetitive units, the satellite DNA is classified into many categories, (Micro-satellites, mini-satellites etc). 3. These sequences normally do not code for any proteins, but they form a large portion of human genome. These sequence show high degree of polymorphism and form the basis of DNA fingerprinting. <p>Ans-c) (i) isolation of DNA, (ii) digestion of DNA by restriction endonucleases, (iii) separation of DNA fragments by electrophoresis, (iv) transferring (blotting) of separated DNA fragments to synthetic membranes, such as nitrocellulose or nylon, (v) hybridisation using labelled VNTR probe, and (vi) detection of hybridised DNA fragments by autoradiography.</p>	1+1+2



BIOLOGY

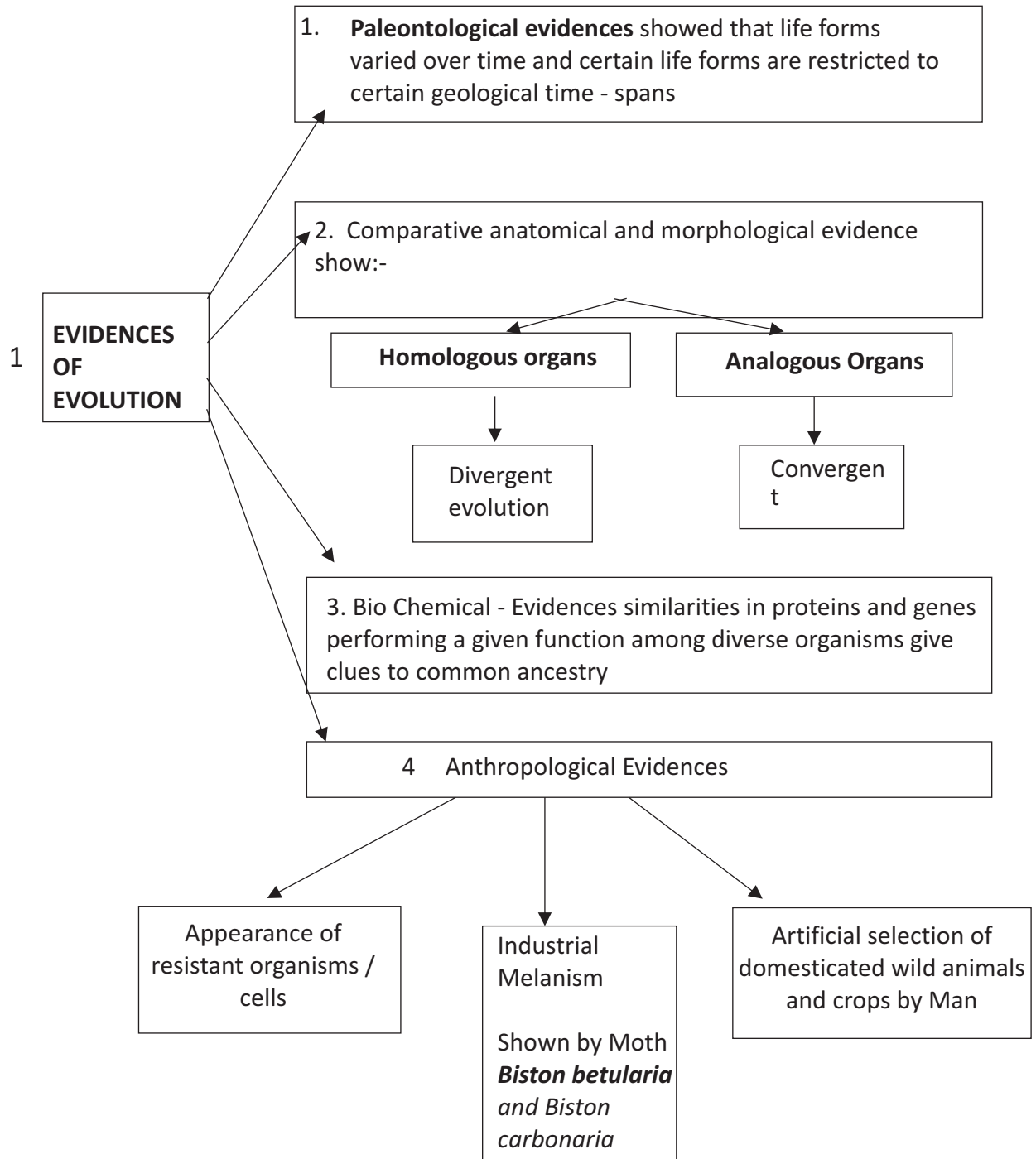
Chapter: 7 Evolution (KEY POINTS)

1	Homologous	Organs with similar origin and structure (SOS)but differ in appearance and function(DAF) Eg. Forelimbs of whale,bats,cheeta,horse
2	Divergent Evolution	Due to different needs some structures developed differently
3	Analogous	Organs with similar appearance and function (SAF)but differ in origin and structure (DOS) Eg. Wings of butterfly and bat
4	Convergent Evolution	Life originates from pre-existing life
5	Biogenesis	Life originates from pre-existing life
6	Adaptive Radiation	Evolution starting from a single point and radiating in different directions
7	Fossil	Preserved remains/imprints of plants and animals that lived millions of years ago
8	Paleontology	Systemic and scientific study of fossils
9	Saltation	Biological term for single step large mutation in a single leap/saltus.
10	Speciation	Process of evolving / formation of new species from the existing one
11	Differential reproduction	Different reproductive rate to the different individuals in a population
12	Biogeography	Study of distribution of various organisms from different parts of the earth
13	Founder effect	Changes in the allele frequencies in a new population due to migration of members
14	Genetic drift	Changes occurring in gene frequencies by chance
15	Gene flow / Gene migration	When individual migrate to another place or population, new genes / alleles are added to new population and are lost from the old population in turn changing the frequencies when gene migration occurs many a times.
16	Stabilization	Large number of individuals acquire mean character value
17	Directional change	Large number of individuals acquire value other than mean value
18	Distribution	Large number of individuals acquire peripheral character value at both ends of the distribution curve

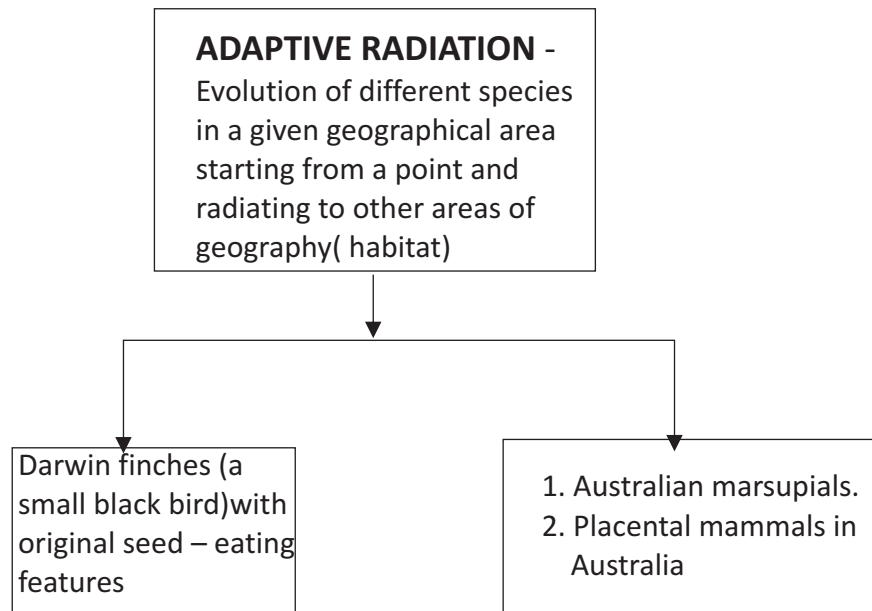
Origin of Life

Scientist	Year	Theory/Experiment	Conclusion
Lemaitre	1927	Big Bang theory	The universe expanded from explosion of a primordial, hot substance
Oparin and Haldane	1924 – 1929	Chemical evolution preceded organic evolution	Simple organic molecules originated from inorganic precursors.
Stanley Miller and Urey	1952	Synthesis of biomolecules by creation of similar conditions as primitive atmosphere on laboratory scale	Amino acids were synthesized from ammonia, methane and carbon dioxide inside specialized apparatus

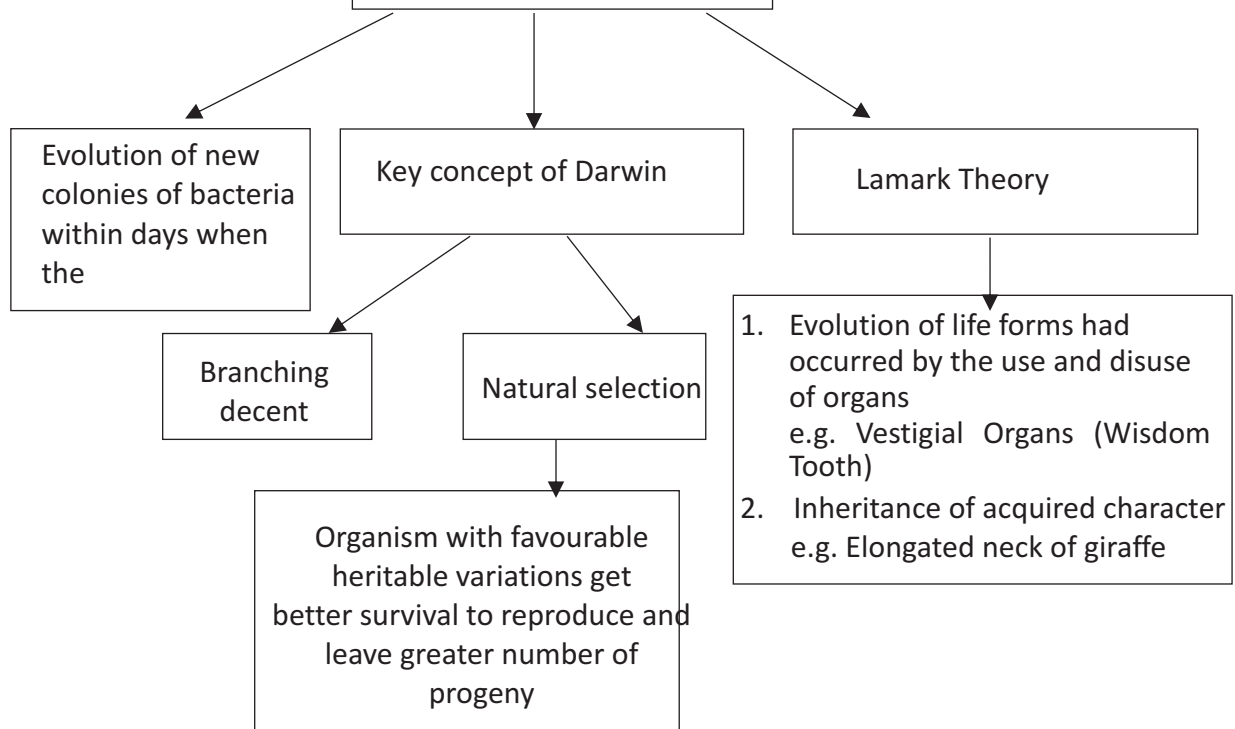
**CHAPTER 7 EVOLUTION
(FLOW CHART)**



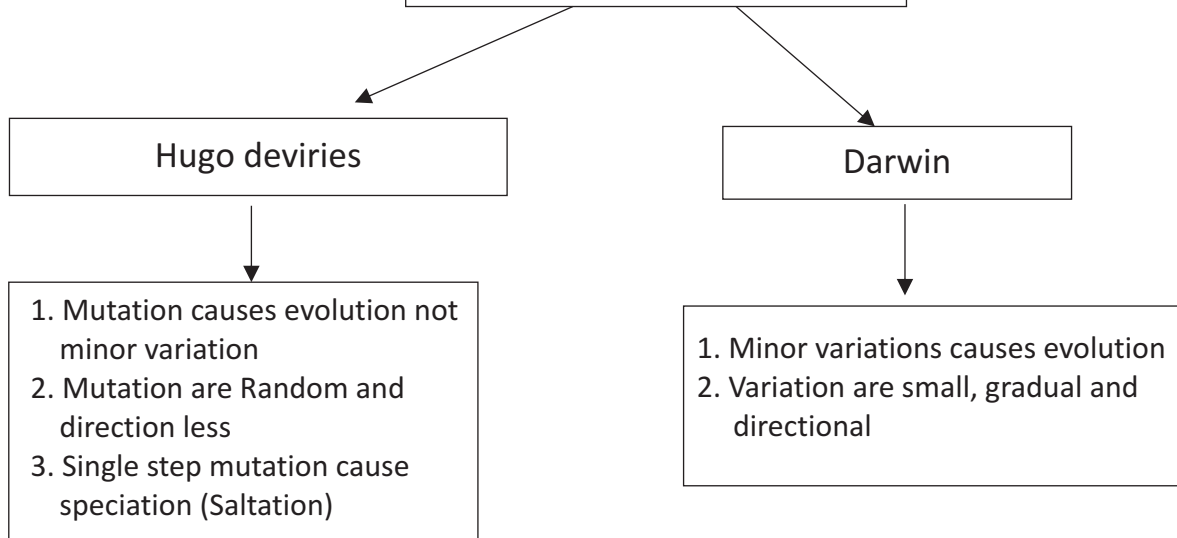
2 ADAPTIVE RADIATION



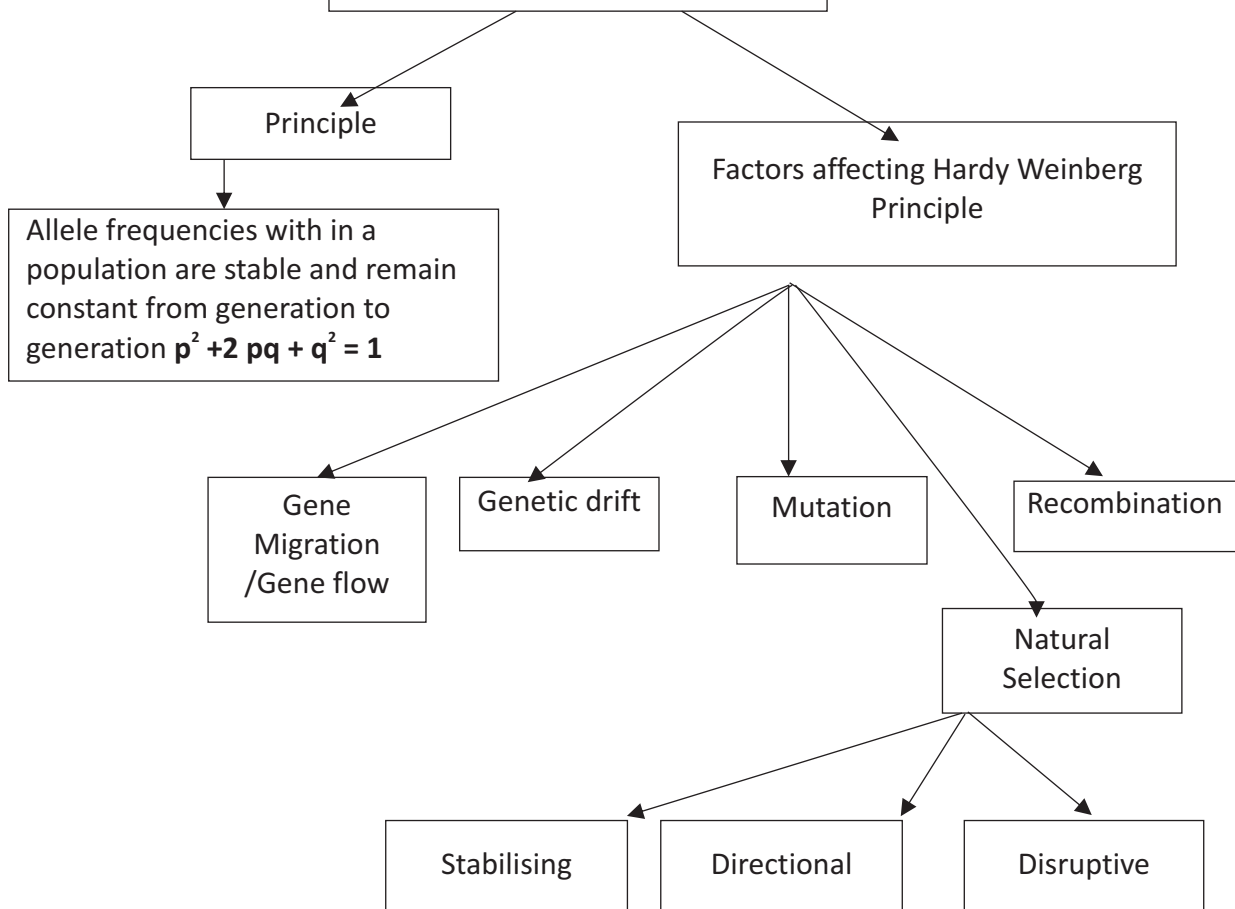
3 BIOLOGICAL EVOLUTION



4 **MECHANISM OF EVOLUTION**



HARDY- WEINBERG CONTRIBUTION

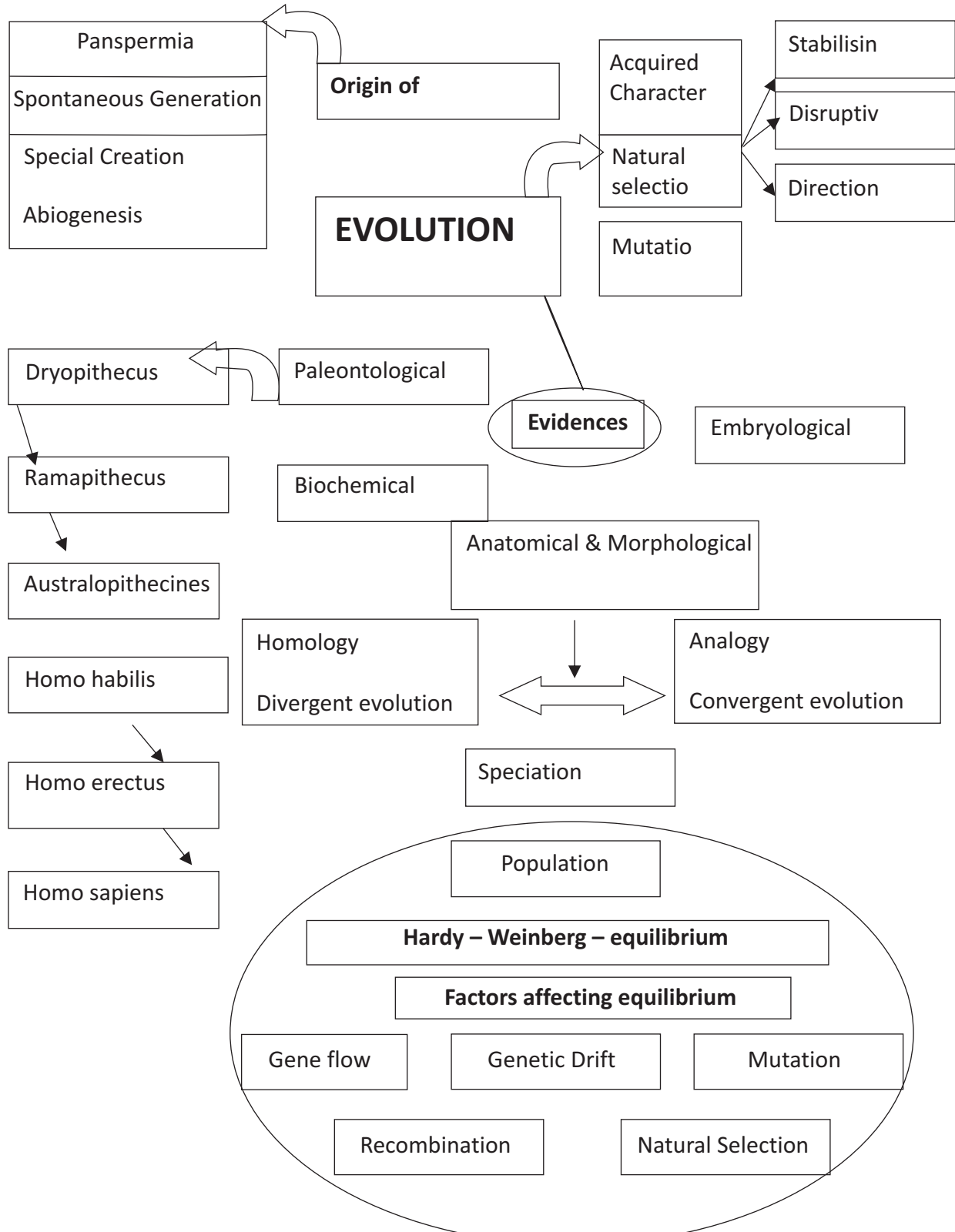


5

Brief account of Evolution

Time	Organism
3 billion years ago	First non cellular form of life
2000 million years	First cellular forms of life appeared
500 million years ago	Invertebrate formed
320 million years ago	Sea weeds and plants exists
350 million years ago	Fishes with stout and strong fins could move on land and go back to water - coelacanth called lobefins – evolved into the first amphibian

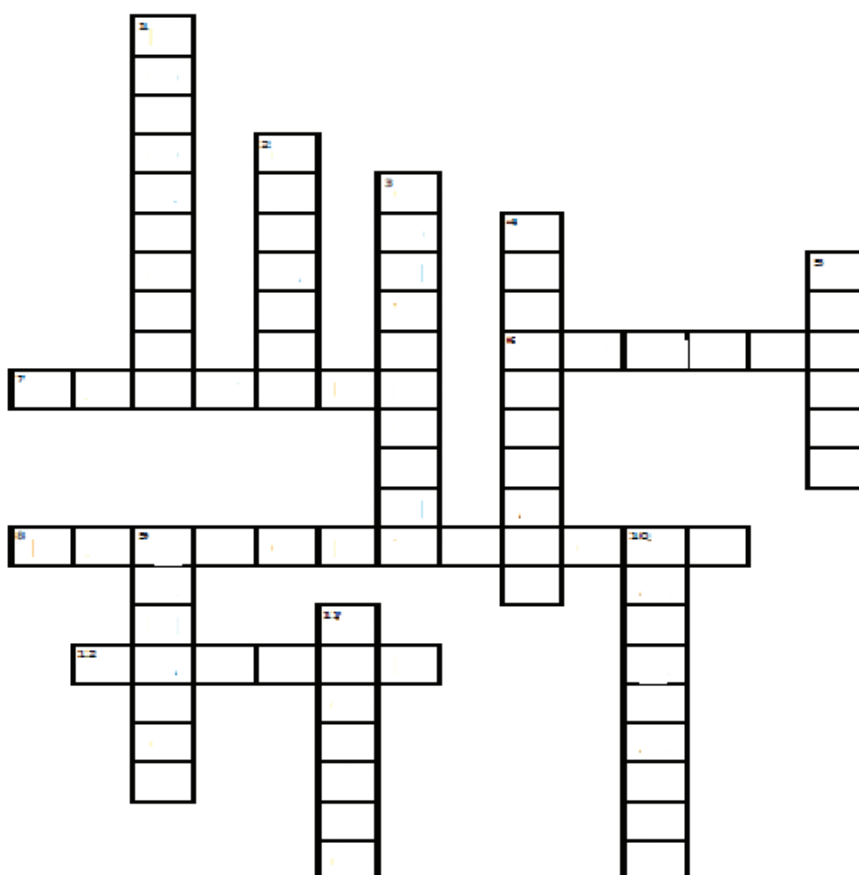
**CHAPTER - 7 - EVOLUTION
(CONCEPT MAP)**





BIOLOGY

**CHAPTER - 7 - EVOLUTION
(CROSS WORD)**



Down:

1. organs that have same structure and origin.
2. well known example for use and disuse of organ.
3. type of evolution shown by analogous struture.
4. well known organism of Australia for adaptive radiation.
5. dead remain of plant.
9. french naturalist gave use and disuse of organ.
10. island where existed Darwin finches.
11. huge explosion unimagable in physical terms.

Across:

6. units of life thought by Greek thinkers.
7. demonstrated that life comes only from Pre-existing life
8. study of fossils.
12. used the word fittest of individual in an environment.



BIOLOGY

CHAPTER - 7 - EVOLUTION (QUESTION BANK)

1 Mark Questions

- Identify the examples of convergent evolution from the following:
(a) Flippers of penguins and dolphins.
(b) Eyes of octopus and mammals
© Vertebrate brains
- What did Louis Pasteur's experiments on 'killed yeast' demonstrate? Name the theory that got disproved on the basis of his experiment.
- Coelacanth* was caught in 1938 in South Africa. Why is it very significant in the evolutionary history of vertebrates?
- List the two characteristics of mutation that help in explaining evolution according to De Vries.
- Why are lichens regarded as pollution indicators?
- Pick out the ancestral line of Angiosperms from the list give below: Conifers, Seed ferns, Cycads, Ferns.
- Mention the type of evolution that has brought the similarity as seen in potato tuber and sweet potato.

2 Marks Questions

- List the two main propositions of Oparin and Haldane
- How does paleontological evidence support evolution of organisms on Earth?
- What does the comparison between the eyes of Octopus and those of mammals say about their ancestry and evolution?
- Categories the following pairs of examples as convergent or divergent evolutions:
(a) Eyes of octopus and mammals.
(b) Wings of butterfly and birds.
(c) Tuber of sweet potatoes and potato.
(d) Thorns in bougainvillea and tendrils in cucurbits.
- How do Darwin's finches illustrate adaptive radiation?
- How does fitness of a population help in evolution?
- How is genetic drift different from gene migration? Explain.

3 Marks Questions

- State the theory of abiogenesis. How does Miller's experiment support this theory?
- Evolution is the change of gene frequencies in a population in response to changes in environment in the time scale of years and not centuries. Justify the statement with reference to DDT. How does the theory of Hugo de Vries support this?
- How did Darwin's theory of natural selection explain the appearance of new forms on the earth?

5 Marks Question

- a) How does Hardy-Weinberg equation explain the genetic equilibrium?
b) Describe how this equilibrium gets disturbed which may lead to founder effect.

Value based Question

- The giant squirrel (*Ratufa indica*) occurs along the west coast. The population living in moist deciduous forests of Maharashtra has light brown fur, the population living in the dry deciduous forests of Gujarat has a yellow fur and of living in the wet evergreen forest of Kerala has chocolate brown fur.
a) Give reasons for the difference in the fur color of the squirrels.
b) How would you justify that despite these differences they all belong to same species?
c) What value is indicated in this?



BIOLOGY

**CHAPTER - 7 - EVOLUTION
(ANSWER KEY)**

Q. No.	Value Points	Marks				
1	(a), and (b)	1				
2	Theory of spontaneous generation was disproved.					
3	- Coelacanth has evolved into the first amphibians; they are fish with stout and strong fins that could move on land and go back to water. - They were thought to be extinct.	1				
4	Mutations are: Radom, Directionless	1				
5	Since, lichens do not frown in polluted areas, they are regarded as pollution indicators.	1				
6	Seed ferns.	1				
7	Sweet potato tuners and potato tubers are analogous structures, evolved for the same function; analogous structures results from convergent evolution.	1				
1	The first form of life could have come from, pre-existing non-living g organic molecules like RNA, proteins, etc. Formation of life was preceded by chemical evolution that resulted in the formation of diverse organic molecules form inorganic constituents.	2				
2	Paleontology is the study of fossils. It indicates The geological time period in which the organisms existed. That life forms varied over time and certain life forms are restricted to certain geological time pans. That new forms of life have appeared at different times in the history of earth.	2				
3	Eyes of octopus and those of mammals are analogous structures, which have resulted from convergent evolution. They have not evolved from common ancestors.	2				
4	(a) Convergent evolution. (b) Divergent evolution. (c) Convergent evolution. (b) Divergent evolution.	2				
5	Adaptive radiation is the process of evolution of different species in a given geographical area starting from a point and literally radiatingto other geographical areas. Darwin's finches were the small black birds, which Darwin observed in Galapagos Islands. Loving in isolation for long, new kinds of finches must have evolved, which could survive in the new habitats.	2				
6	Fitness, according to Darwin, refers ultimately and only to reproductive fitness. Those who are better fit in an environment would outbreed others, who are less fit in that environment; they leave m=ore progeny that others. They will survive better and are selected by nature to reproduce and increase their population size.	2				
7	<table border="1" style="width: 100%;"> <tr> <td>Genetic drift</td> <td>Gene flow</td> </tr> <tr> <td>Random changes in the allele frequencies of a population, occurring only by chance, constitute genetic drift.</td> <td>If refers to the change in allelic frequencies of a given population, when individuals migrate into the population or form the population.</td> </tr> </table>	Genetic drift	Gene flow	Random changes in the allele frequencies of a population, occurring only by chance, constitute genetic drift.	If refers to the change in allelic frequencies of a given population, when individuals migrate into the population or form the population.	2
Genetic drift	Gene flow					
Random changes in the allele frequencies of a population, occurring only by chance, constitute genetic drift.	If refers to the change in allelic frequencies of a given population, when individuals migrate into the population or form the population.					



BIOLOGY

1	<p>Theory of chemical evolution of abiogenesis was proposed by Operon and Haldane. It states that the first form of life could have come from pre-existing non-living organic molecules like RNA's etc., and that and that formation of life was preceded by chemical evolution, i.e. Formation of diverse organic molecules from inorganic constituents.</p>	3
	<p>Miller's experiment:</p> <ul style="list-style-type: none"> - He created conditions similar to the primitive earth in the laboratory. - Electric discharge was produced in a closed flask, containing methane, hydrogen, ammonia, and water vapor. - The temperature was kept at 800 C - After a week, he observed formation of amino acids. - Such molecules must have reacted among themselves to form giant, self-replicating molecules, and the first form of life 	
2.	<p>As the environment changes the organism which are better adapted to the changed environment could survive better and reproduce.</p> <ul style="list-style-type: none"> - When DDT was used, initially most of the mosquitoes died, but a few survived. - These few mosquitoes reproduce and their offspring were also resistant to DDT. - Today, the population of mosquitoes mostly contains DDT resistance mosquitoes. - The DDT resistant mosquitoes have evolved in a time scale of years or months and not centuries. - So, evolution is a direct process but stochastic process based on chance events. - According to Hugo de Vries, evolution occurs due to mutations. Large differences arising suddenly in a population. - According to him large, single-step mutation, called saltation, must have been the cause of DDT- resistance in mosquitoes. 	3
3	<p>Darwin's theory of Natural selection:</p> <p>Any population has built in variation for every character.</p> <p>Individuals with those characters which enable them to survive better would outbreed the others, who are less adapted.</p> <p>Fitness, according to Darwin's is reproductive fitness, i.e., individuals who are better fit in an environment leaves more progeny than others.</p> <p>These progenies now come to possess more fit individuals, i.e., nature selects the better fit individuals and over a long period of time, through a number of generations, the population slowly becomes modified into a different form, or a species, which is called evolution</p>	3
1	<p>a) Hardy-Weinberg Principle:</p> <p>It states that the allele frequencies in a population are stable and remain constant for generation to generation; it is called genetic equilibrium.</p> <p>The sum total of all the allelic frequencies is one.</p> <p>(b) Genetic drift:</p> <ul style="list-style-type: none"> - Genetic drift refers to the changes in allele frequencies that occur only by chance events. - Sometimes the changes in allele frequency is so different in the new sample of population, that they become a different species, - The originally drifted population becomes the founder and such an effect is called founder effect. 	5
	Value based	
2	<p>(a) The differences in the coloration of giant squirrel in different habitats are adaptations for the animals of camouflage with the background and escape predators.</p> <p>(b) Though they are different in their fur coloration, they can interbreed in nature to produce viable/fertile offspring; so they belong to the same species.</p> <p>(c) Nature provides protection to all life forms.</p>	4



UNIT VIII - BIOLOGY IN HUMAN WELFARE
CHAPTER: 8 HUMAN HEALTH & DISEASES
(KEY POINTS)

S.No.	Term	Explanation
1	PMNL	Polymorpho-Nuclear Leukocytes
2	CMI	Cell Mediated Immunity
3	ELISA	Enzyme Linked Immunosorbent Assay
4	MALT	Mucosal Associated Lymphoid Tissue
5	SCID	Severe Combined Immuno Deficiency
6	NACO	National AIDS Control Organisation
7	MRI	Magnetic Resonance Imaging
8	HLA	Human Leukocyte Antigen
9	Carcinogens	Cancer causing agents. e.g., gamma rays. UV rays, dyes and lead.
10	Immunity	Resistance to infection or antigen
11	Immuno Suppressant`	The chemical which suppress the immunity response to antigen.
12	Interferon	The glycoproteins produced by our body cells in response to a viral
13	Incubation Period	The time period between infection and the appearance of symptoms.
14	Metastasis	The property in which the cancer cells spread to different sites through blood and develop secondary tumours.
15	Oncogene	Viral genome which causes cancer
16	Retrovirus	A virus having RNA as genetic material and forms DNA by reverse transcription and then replicate e.g., Human Immunodeficiency Virus (HIV).
17	Syndrome	Collection of disease symptoms responsible for a disorder or a disease.
18	Vaccination:	Inoculation of a vaccine to stimulate production of antibodies and provide immunity for one or more disease

CHAPTER 8
HUMAN HEALTH AND DISEASES
(FLOW CHART)

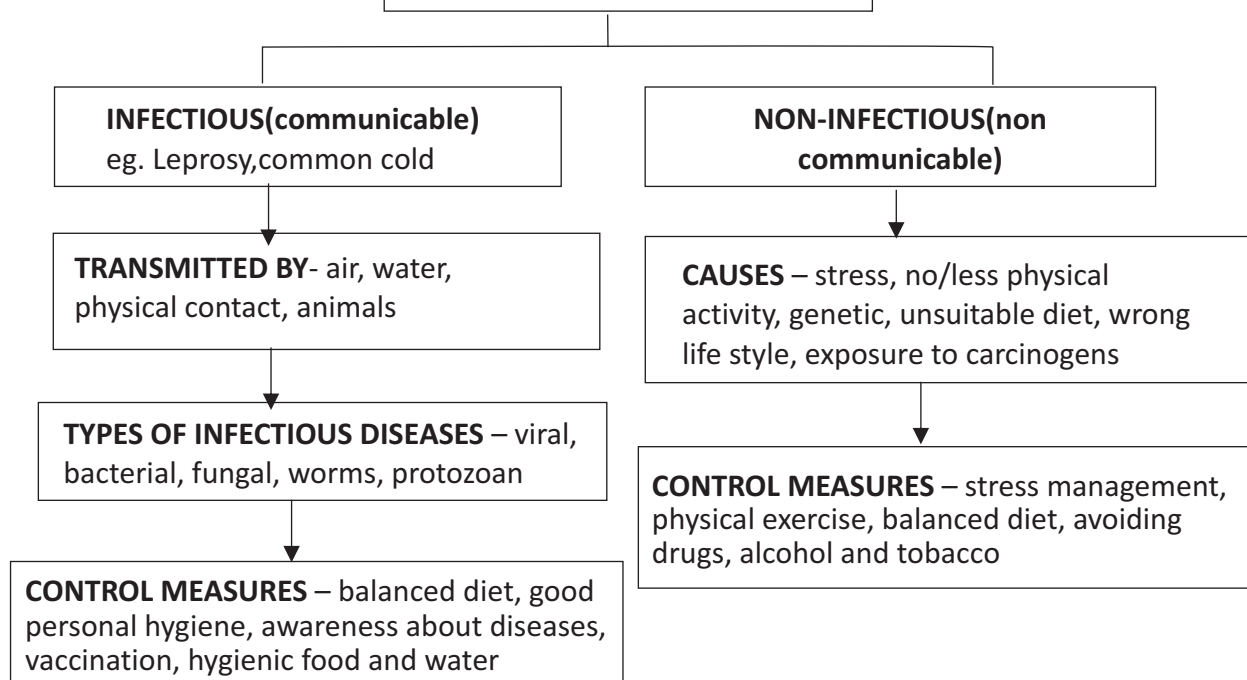
1 HEALTH (Physical, mental, social well being)

2. FACTORS AFFECTING HEALTH



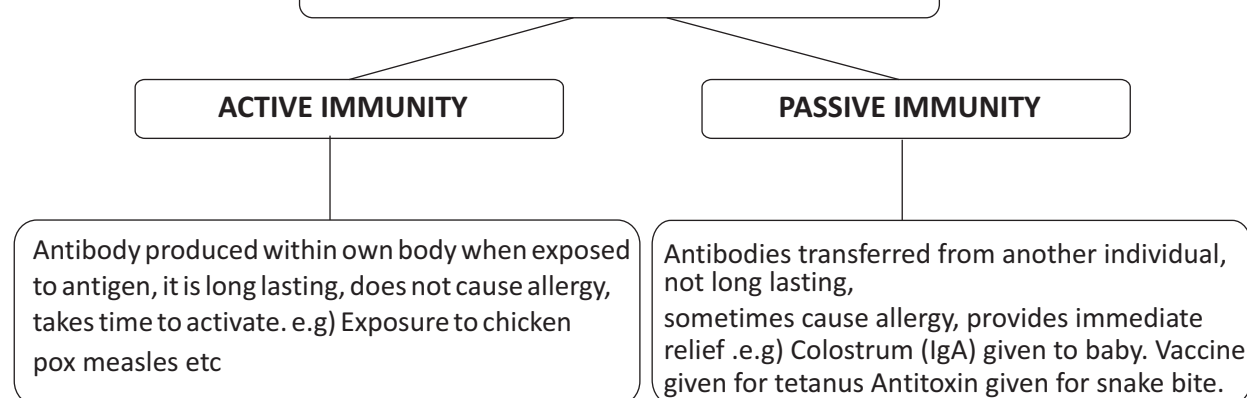
3

TYPES OF DISEASES



4

TYPES OF ACQUIRED IMMUNITY



5

TYPES OF IMMUNE RESPONSES**Humoral immunity**

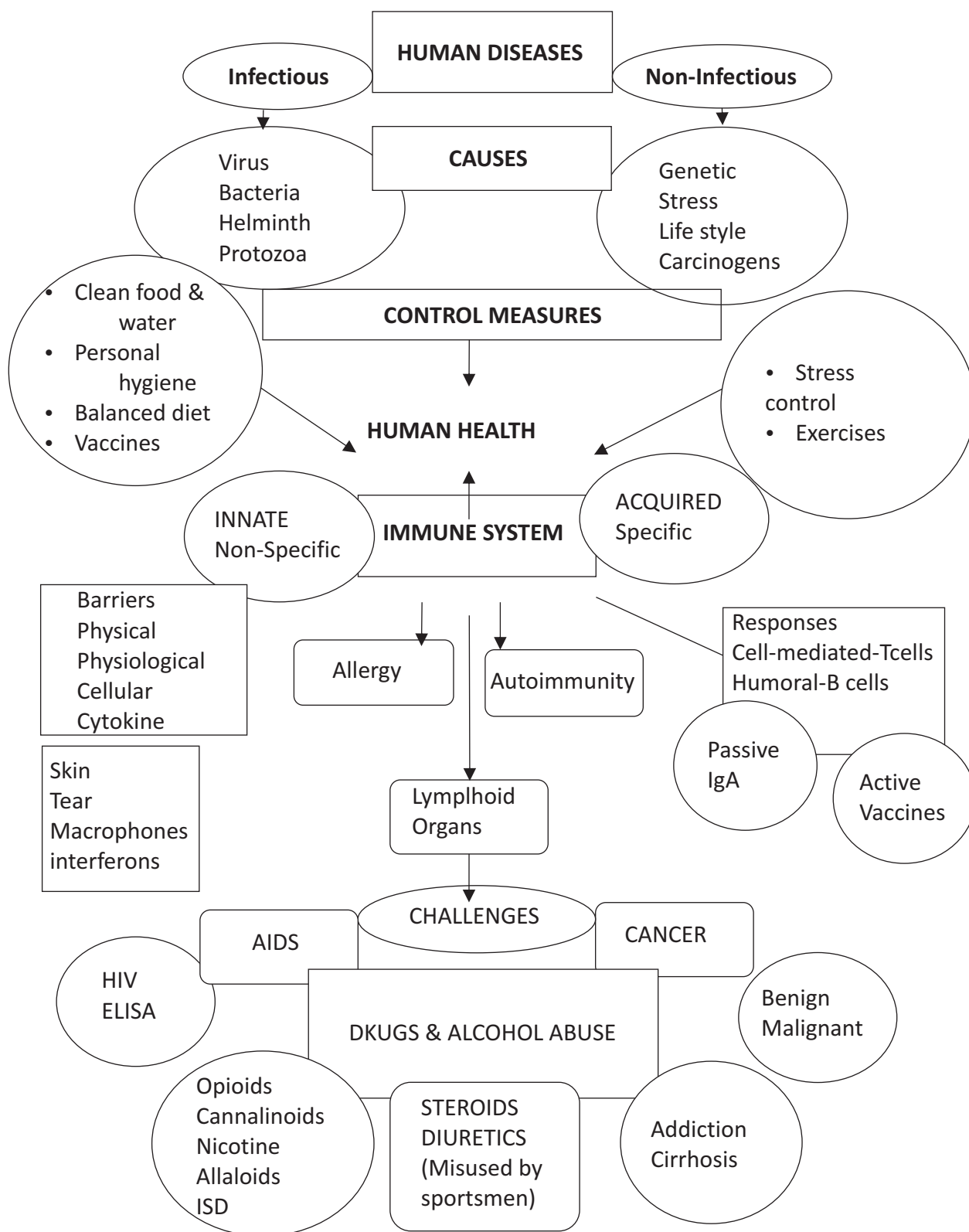
? Response by antibodies produced by B cell. found in Blood/LYMPH
 Ig^A , Ig^M , Ig^E , Ig^G are the types of antibody

--Antibody It has 2 small light chains & 2 longer heavy chains (H_2L_2)

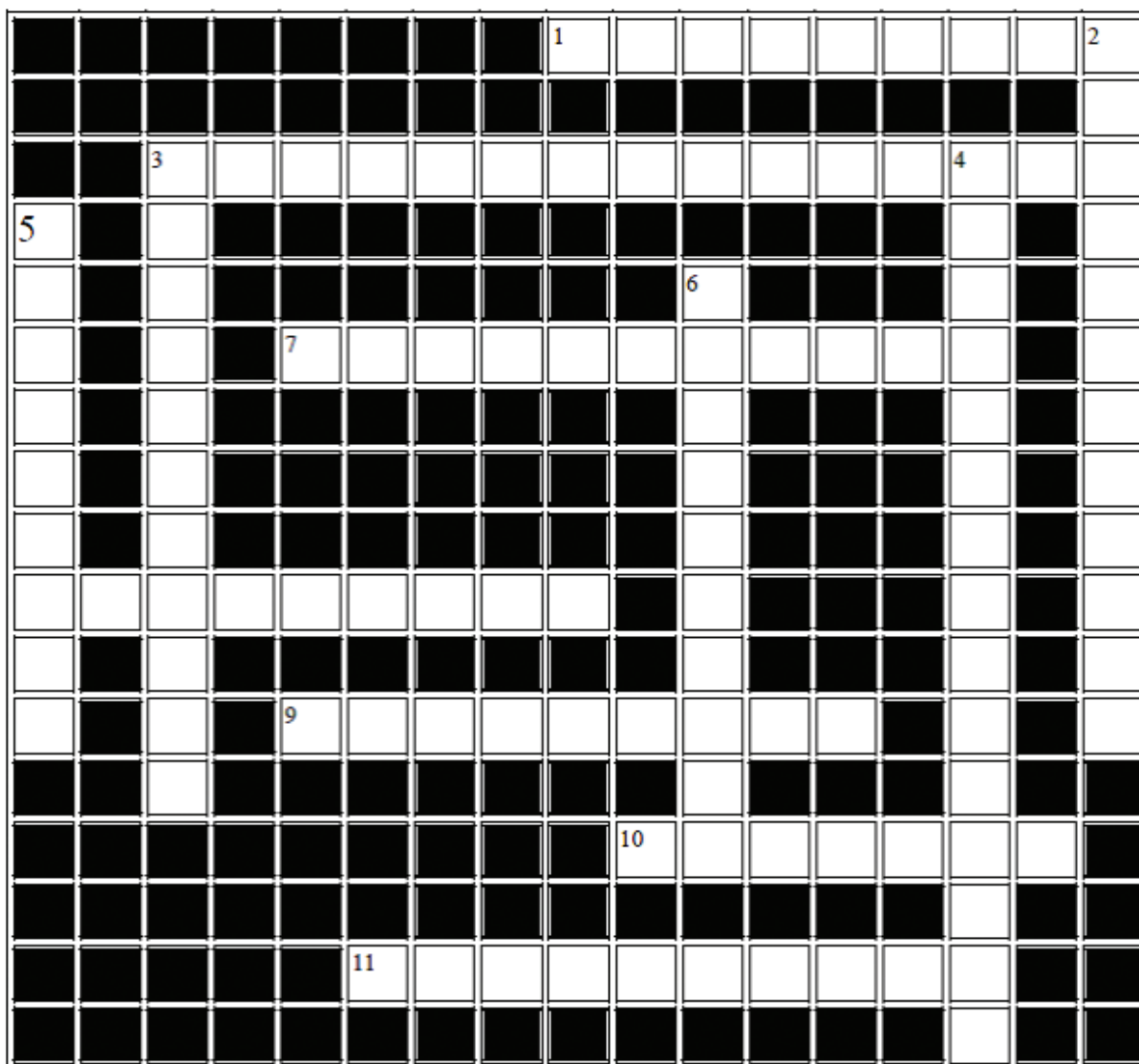
Cell mediator immunity

? Response produced by T-lymphocyte ? Role in organ transplantation

**CHAPTER 8
HUMAN HEALTH AND DISEASES
(CONCEPT MAP)**



CHAPTER 8- HUMAN HEALTH AND DISEASES
(CROSS WORD)



Across

Down

- | | |
|-----------------------------|---|
| 1. typhoid test | 2. ringworm is caused by |
| 3. typhoid is caused by | 3. Infective stage of malarial parasite |
| 7. monocyte | 4. malaria is caused by |
| 8. AIDS test | 5. amoebiasis is caused by |
| 9. natural passive immunity | 6. cold is caused by |
| 10. ascariasis is caused by | |
| 11. filariasis is caused by | |



BIOLOGY

CHAPTER 8- HUMAN HEALTH AND DISEASES (QUESTION BANK)

- Name the diagnostic test which confirms typhoid.
- Name the two major groups of cells required to attain specific immunity.
- You have heard of many incidences of Chickengunya in our country. Name the vector of the disease.
- Breast fed babies are more immune to diseases than the bottle fed babies. Why?
- Name the pathogen which causes malignant malaria.
- Which microorganism is used to produce hepatitis B Vaccine?
- What is the reason of shivering in malarial patient?
- Where are B-cells and T-cells formed? How do they differ from each other?
- Given below are the pathogens and the diseases caused by them. Which out of these pairs is not correct matching pair and why?
 - Wuchereria* . Filariasis
 - Microsporium* . Ringworm
 - Salmonella* . Common Cold
 - Plasmodium* . Malaria
- What would happen to the immune system, if thymus gland is removed from the body of a person?
- Lymph nodes are secondary lymphoid organs. Describe the role of lymph nodes in our immune response.
- What is the role of histamine in inflammatory response? Name few drugs which reduce the symptoms of allergy.
- What are Cannabinoids? From which plant Cannabinoids are obtained? Which part of the body is affected by consuming these substances?
- In the figure, structure of an antibody molecule is shown. Observe it and Give the answer of the following questions.
 - Label the parts A, B and C.
 - Which cells produce these chemicals?
 - State the function of these molecules.
- Mention any three causes of drug abuse. Suggest some measures for the prevention and control of drug abuse.
- A person shows unwelcome immunogenic reactions while exposed to certain substances.
 - Name this condition.
 - What common term is given to the substances responsible for this condition?
 - Name the cells and the chemical substances released which cause such reactions.
- What is innate immunity? List the four types of barriers which protect the body from the entry of the foreign agents.
- Fill the blanks 1,2,3,4,5,6 in the given table.

Name of disease	Causative organism	Symptoms
- Pneumonia	<i>Streptococcus</i>	(1)
-. Typhoid	(2)	High fever, weakness headache, stomach pain
(3)	<i>Rhinoviruses</i>	Nasal Congestion, and discharge sorethroat cough, headache cough, headache
Ascariasis	<i>Ascaris</i>	(4)



BIOLOGY

<i>Ringworm</i>	(5) <i>Dry, Scaly lesions on</i>	<i>various body parts, Intense itching, redness.</i>
(6)	<i>Entamoeba histolytica</i>	<i>Constipation, cramps, abdominal pain, Stools with excess mucous and</i>

- 19 Answer the following with respect to Cancer.
- How does a cancerous cell differ from a normal cell
 - Benign tumour is less dangerous than malignant tumour. Why
 - Describe causes of cancer.
 - Mention two methods of treatment of the disease.
20. The pathogen of a disease depends on RBCs of human for growth and reproduction. The person with this pathogen suffers with chill and high fever.
- Identify the disease.
 - Name the pathogen.
 - What is the cause of fever?
 - Represent the life cycle of the pathogen diagrammatically.
21. The immune system of a person is suppressed. He was found positive for a pathogen in the diagnostic test ELISA.
- Name the disease, the patient is suffering from.
 - Which pathogen is identified by ELISA test?
 - Which cells of the body are attacked by the pathogen?
 - Suggest preventive measure of the infection.
22. Municipal corporation has deputed personnel to check for mosquito in your school.
- Which are the places they should check for mosquitoes & their larvae?
 - Name two disease which are spread by mosquitoes and their larvae?
 - What values are promoted by MC?
23. Shashi, a 15 year old boy thinks that smoking makes him more active and energetic and feels like adult and thus a more responsible citizen. He tries to smoke when he is with peer group. As a friend you want to educate him:
- Why he feels more energetic while smoking?
 - What are the effects of CO in smoking?
 - What are the values shown by you, as a friend?



BIOLOGY

**CHAPTER 8 -HUMAN HEALTH AND DISEASES
(ANSWER KEY)**

. s.no	Value points	Marks
1	Widal test	1
2	B-lymphocytes and T-lymphocytes	1
3	<i>Aedes</i> mosquitoes	1
4	The mother's milk consists of antibodies (Ig A) such antibodies are not available to bottle fed babies	1
5	<i>Plasmodium falciparum</i>	1
6	Yeast	1
7	After sporozoite infection, when RBC ruptures, a toxic substance haemozoin is released which cause chilling and high fever.	1
8	B-cells and T-cells are formed in bone marrow. B-cells produce antibodies but T cells do not produce antibodies but help B-cells to produce them	1+1=2
9	- <i>Salmonella</i> : Common cold is not a matching pair.	1+1=2
10	T-lymphocytes are developed and matured in thymus gland, Immune system will become weak on removal of thymus gland	1+1=2
11	Lymph nodes provide the sites for interaction of lymphocytes with the antigen. When the microorganisms enter the lymph nodes, lymphocytes present there are activated and cause the immune response.	1+1=2
12	Histamine acts as allergy-mediator which cause blood vessels to dilate. It is released by mast cells. Antihistamine steroids and adrenaline quickly reduce the symptoms of allerg	1+1=2
13	Cannabinoids are a group of chemicals which interact with Cannabinoid receptors present . Principally in the brain Cannabinoids are obtained from the inflorescences of the plant <i>Cannabis sativa</i> . The substances affect the cardiovascular system adversely	1+1+1=3
14	. (a) A-Antigen binding site B-Light chain (b)B-lymphocytes. (c) Heavy Chain (d) Antibodies provide acquired immune response	1/2+1/2 1/2+1/2 1=3
15	Reasons to attract towards drug abuse : Curiosity, peer pressure, escape from frustration and failure, family problems, false belief of enhanced performance. Preventive measures : Avoid undue peer pressure Education and Counselling Seeking help from parents and peers. Looking for danger signs Seeking professional and medical help	1+2=3

BIOLOGY

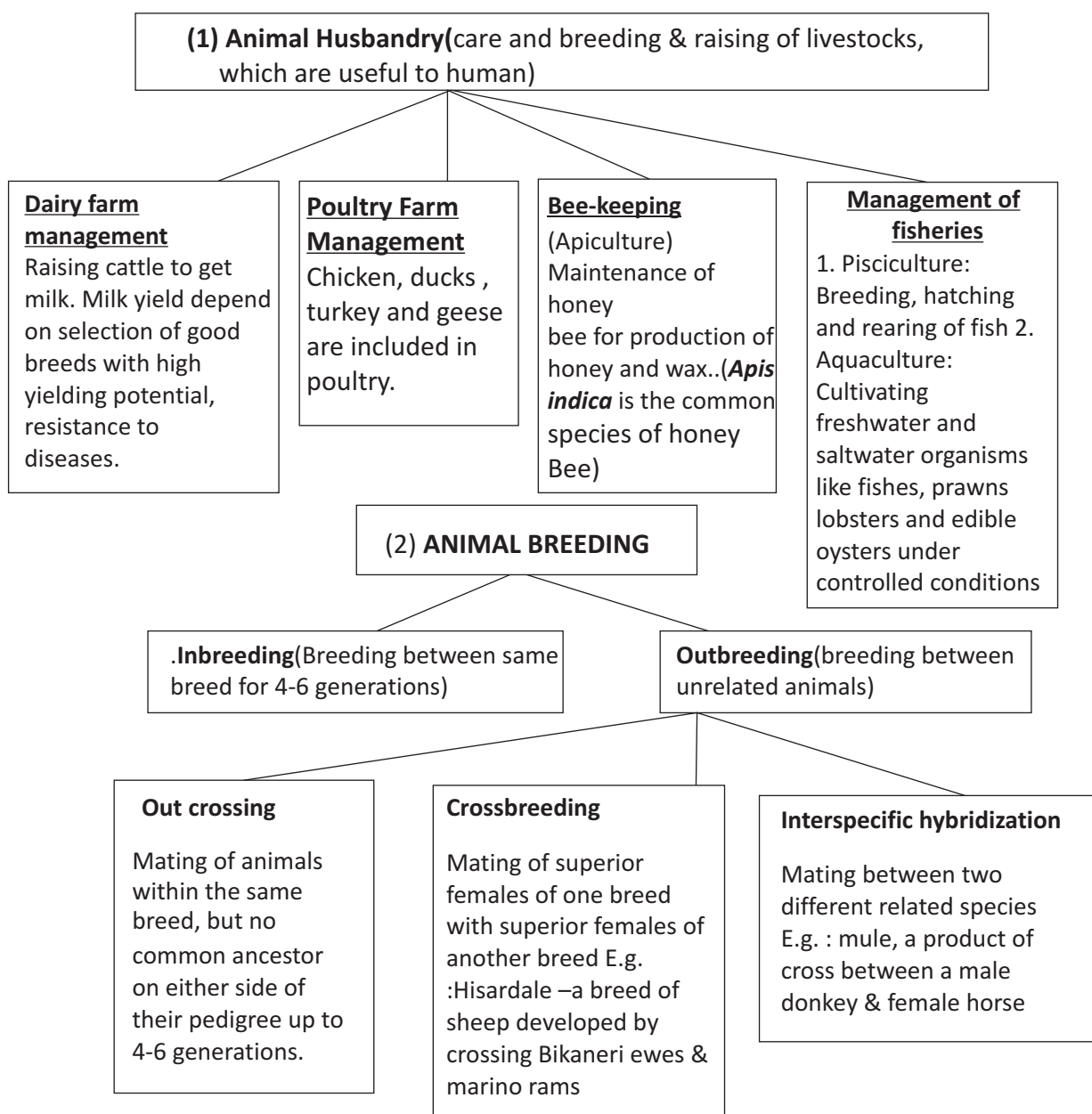


16	(a) Allergy (b) Allergens (c) Mast Cells. Histamine, Serotonin	1+1+1=3
17	Innate Immunity is non-specific type of defence that is present at the time of birth. (i) Physical Barriers: Skin, mucous-coated epithelium or respiratory, digestive and urinogenital tract. (ii) Physiological Barriers: Acidity of Stomach, lysozyme in saliva, tears, sweat. (iii) Cellular Barrier: Macrophages, neutrophils, monocytes and natural killer lymphocytes.(iv) Cytokine Barriers : Interferons produced by Viral infected cells, protect the non-infected cells from further Viral infection	1+ (4x1/2)=2
18	i) Alveoli filled with fluid, reduced breathing, fever, chills, cough and headache. (ii) <i>Salmonella typhi</i> (iii) Common Cold(iv) Internal bleeding, muscular pain, anaemia, fever and blockage of the intestinal passage.(v) Microsporium species/Trichophyton species/Epidermophyton Species.(vi) Amoebiasis/amoebic dysentery.	6x1/2=3
19	(a) In normal cells, growth and differentiation is highly controlled and regulated (contact inhibition). The cancerous cells have lost the property of contact inhibition,hence continue to divide giving rise to masses of cells (tumors). (b) The benign tumor remains confined in the organ affected as it is enclosed in a connective tissue sheath and does not enter themetastatic stage.(c) Cancer may be caused due to carcinogens which are physical(radiations), chemicals (Nicotine, Aflatoxin, Cadmium oxide, Asbestos) and biological (viral oncogens)(d) Surgery, radiothera]py, Chemotherapy	2+1+1+1=5
20	(a) Malaria(b) Different species of Plasmodium viz P. vivax, P. Malariae and P.falciparum.(c) Malaria is caused by the toxins (haemozoin) produced in the human body by the malarial parasite. This toxin is released by the rupturing of RBCs. (d) Life cycle of Plasmodium	1+1+1+2=5
21	(i) AIDS (Acquired Immuno Deficiency Syndrome) (ii) HIV (Human Immunodeficiency Virus) (iii) Helper T-cells, macrophages, B-lymphocytes. (iv) Preventive measures : (a) People should be educated about AIDS transmission. (b) Disposable needles and syringes should be used (c) Sexual habits should be changed immediately (d) High-risk groups should be discouraged from donating blood. (e) Routine screening may be done	1+1+1+2=5
22	i) Places like water tanks, flower pots, stagnant water. ii)Dengue,malaria,filariasis,chikungunya iii)sensitivity towards health,observation	1+2+1=4
23	The nicotine causes the releases adrenalin and raises blood pressure & increases heartbeat It binds to haemoglobin & reduces concentration of oxygen & oxygen carrying capacity of blood and the other effects include cancer of lung, throat, emphysema, infertility in males Empathy, awareness about health, consciousness ,critical thinking	1+2+1=4

UNIT VIII-BIOLOGY IN HUMAN WELFARE
CHAPTER: 9 - STRATEGIES FOR ENHANCEMENT IN FOOD
PRODUCTION (KEY POINTS)

S.No.	Term	Explanation
1	ET	Embryo Transfer
2	IARI	Indian Agricultural Research Institute
3	IRRI	International Rice Research Institute
4	ICAR	Indian Council of Agriculture Research
5	MOET	Multiple Ovulation Embryo Transfer
6	NDRI	National Dairy Research Institute
7	Apiculture	Rearing of honeybees for the production of honey, bee wax
8	Explant	A part of plant used for tissue culture
9	Germplasm Collection	The entire collection having all the diverse alleles for all the genes in the given organism.
10	Totipotency	The ability to generate a whole plant from any cell/explant.
11	Breed	Group of animals similar in most of the characters and related in descent
12	Green revolution	Crop production
13	White revolution	Milk production
14	Blue revolution	Fish production
15	SCP	Single cell protein
16	Micro propagation	Method of production of many plants through tissue culture
17	Inbreeding	Reduced fertility & productivity due to continued Depression inbreeding

**CHAPTER: 9 - STRATEGIES FOR ENHANCEMENT IN FOOD PRODUCTION
(FLOW CHART)**



BIOLOGY

(3) CONTROLLED ANIMAL BREEDING

Artificial insemination: semen of superior male is collected and injected into the reproductive tract of selected female by breeder.

MOET- Multiple ovulation embryo transfer. (Technique for herd improvement by successful production of hybrid) Done in cattle, sheep, rabbits, buffalo, mare etc.

(4) PLANT BREEDING

Plant breeding for disease resistance

i) Viral - Tobacco mosaic, turnip mosaic
 (ii) Bacterial - Black rot of crucifers, Blight of rice
 (iii) Fungal - Rust of wheat, red rot of sugarcane, late blight of potato.

1. Conventional breeding

screening germplasm for resistance sources,
 .(Eg. Parbhankranti (b. hindi) resistant to yellow mosaic virus

2. Mutational breeding

inducing mutation artificially through chemicals or radiations,
 Eg. mung bean resistant to yellow mosaic virus and powdery mildew

Plant breeding for resistance to Insect pests.

Hairy leaves, Solid stem, Smooth leaved & nectarless. High aspartic acid, low nitrogen and sugar content

(5) OTHER PLANT BREEDING METHODS

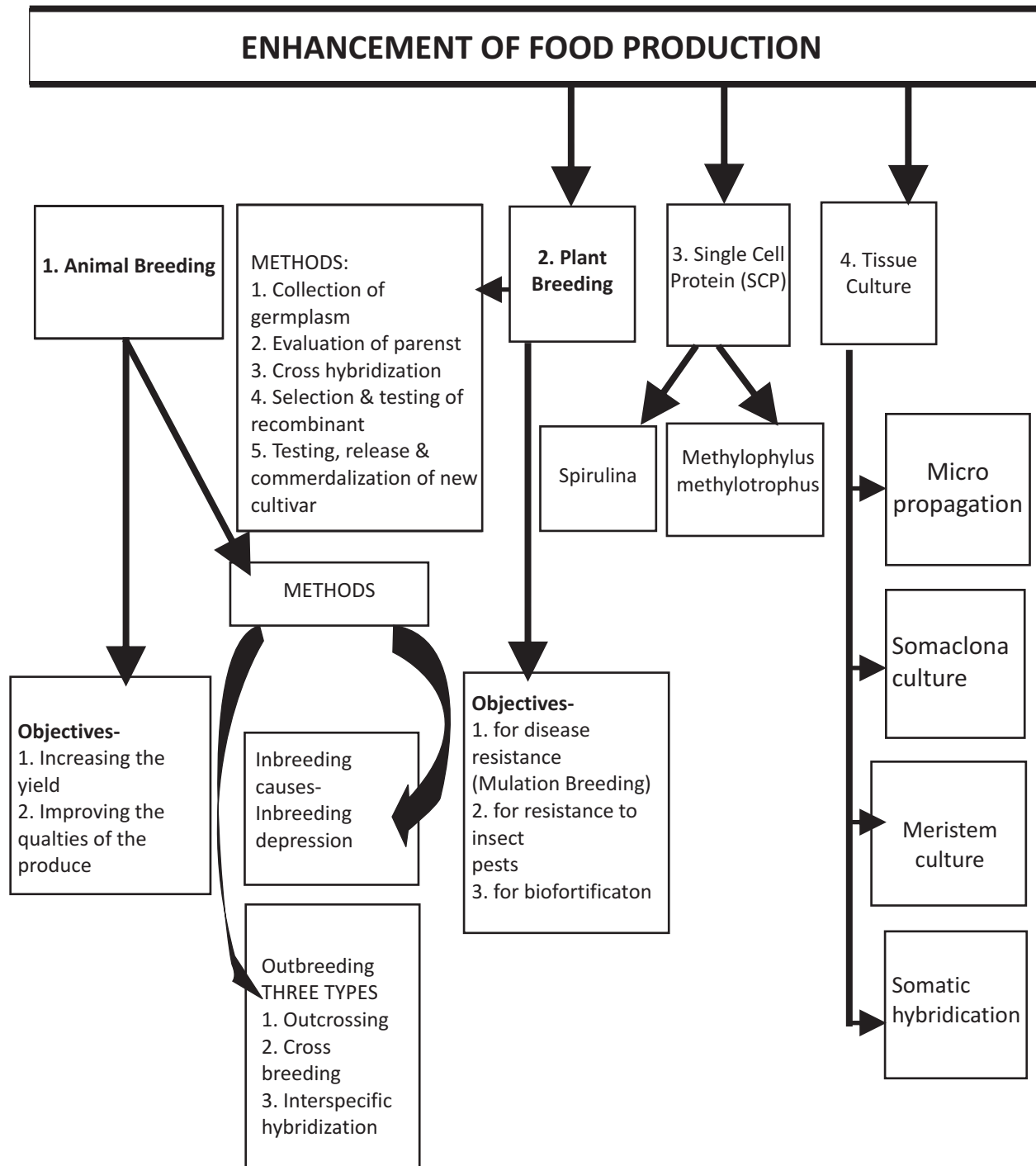
Bio fortification- Breeding crops with higher levels of proteins, vitamins and minerals
 eg. Vit C rich bitter gourd, . Atlas 66 Maize with high protein content
 Iron fortified rice, Vit- A enriched carrots, spinach, pumpkin, Vit-C enriched bitter gourd, tomato, iron & calcium rich spinach, protein enriched beans, peas.

SCP (Single cell protein)-
 Eg- Spirulina, (algae)
Methylophilus
methylophilus
 (bacterium)

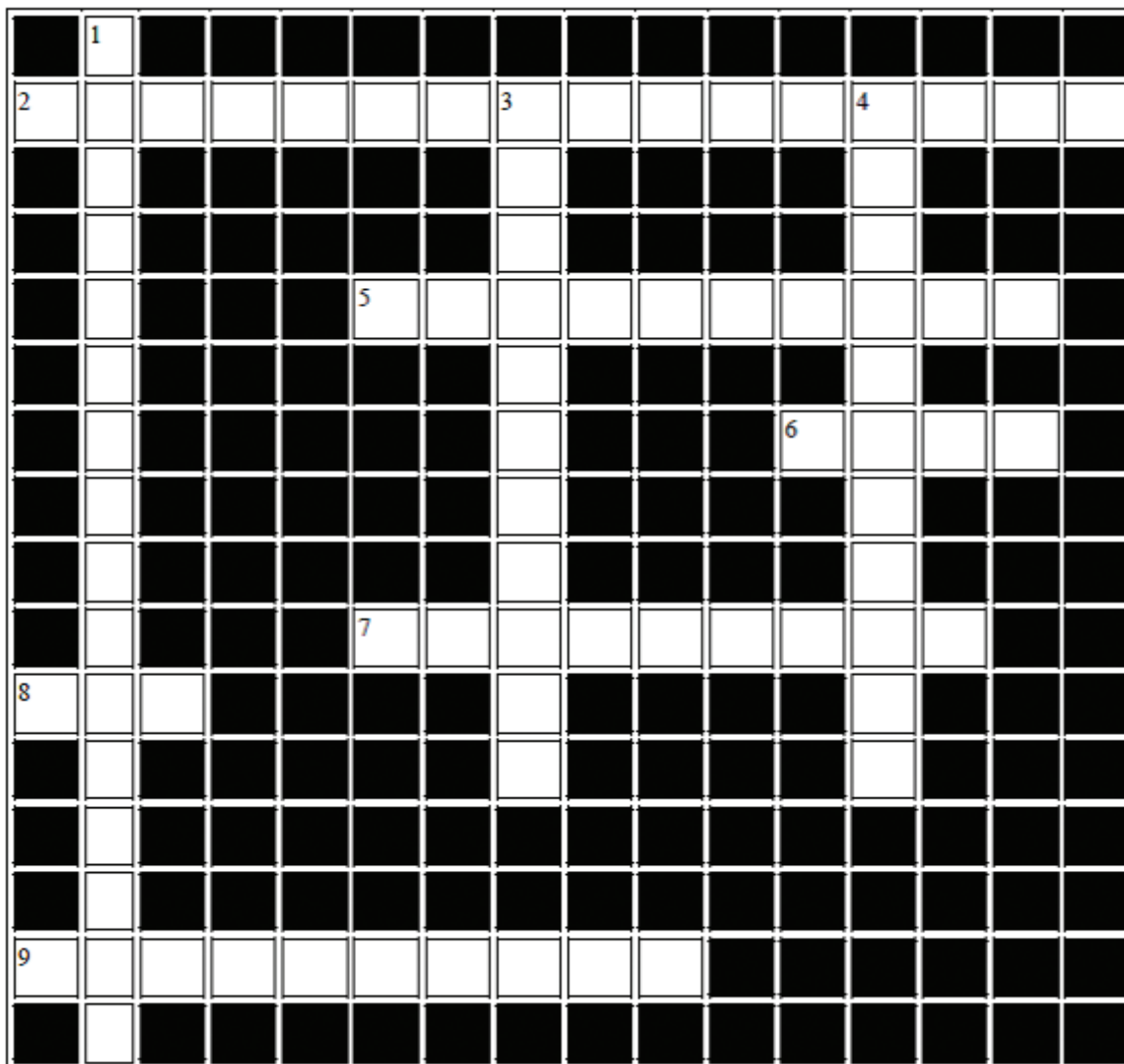
Tissue culture- /Micropropagation.
 Regeneration of whole from explant in culture medium (sucrose as carbon source, inorganic salts, vitamins, amino acids, auxin, cytokinin)

Somatic hybridization-
 Fusion of protoplast of somatic cells of two different species. eg. Pomato is obtained by somatic hybridization of potato and tomato

**CHAPTER: 9 - STRATEGIES FOR ENHANCEMENT IN FOOD PRODUCTION
(CONCEPT MAP)**



**CHAPTER: 9 - STRATEGIES FOR ENHANCEMENT IN FOOD PRODUCTION
(CROSS WORD)**



Across

2. method of producing thousands of plants through tissue culture
5. breeding between animals of same breed
6. technique to improve herd size
7. a microbe rich in SCP
8. alternative sources of proteins for human nutrition
9. plants which have genetically identical to parent

Down

1. breeding crops with high level nutrients
3. breeding of unrelated animals
4. the capacity to generate a whole plant from any cell



**CHAPTER: 9 STRATEGIES FOR ENHANCEMENT IN FOOD PRODUCTION
(QUESTION BANK)**

1. Why is inbreeding necessary in animal husbandry?
2. Name two fungal diseases of Crop plants.
3. Which product of Apiculture is used in cosmetics and polishes?
4. Semi-dwarf varieties of a crop plant were derived from IR-8. Name that crop.
5. Write two qualities of *Saccharum officinarum* (Sugarcane) grown in South India.
6. A new breed of sheep was developed in Punjab by crossing two different breeds of Sheep. Name the two breeds which were crossed and the new breed developed.
7. Study the table given below and fill in the blanks marked A, B, C and D

CROP	VARITY	Resistant to diseases
Wheat	Himgiri	(A)
Brassica	(B)	White rust
©	Pusa Komal	Bacterial blight
Chilli	(D)	Chilly mosaic Virus, Tobacco mosaic Virus and leaf curl

8. Why are proteins synthesized from *Spirulina* called Single celled Proteins? What is the significance of such a protein?
9. Differentiate between inbreeding and outbreeding in animals.
10. Explain the process of Somatic hybridisation .
11. What is micro propagation? Why are plants produced by this technique called somaclones? Name any two food plants which are produced on commercial scale using this method.
12. What is mutation? Explain the significance of mutation in plant breeding. Give an example of a disease resistant variety of cultivated plant induced by mutation.
13. How can we improve the success rate of fertilisation during artificial insemination in animal husbandry programmes?
14. Bio fortification is the most practical means to improve public health. Justify the statement with examples.
15. What is meant by germplasm Collection? Describe its significance in plant breeding programmes.
16. To which product, following products are related (a) Blue revolution (b) white revolution (c) Green revolution
17. Does apiculture offer multiple advantages to farmers? List its advantages, if it is located near a place of commercial flower cultivation. Name the most common species of bee which is reared in India.
18. What is somatic hybridisation? Describe the various steps in producing somatic hybrids from protoplasts. Mention any two uses of somatic hybridisation.
19. Nowadays capsules of *spirulina* are used as food supplements:-
 - i) Do you recommend the use of these capsules? Why?
 - ii) What values are expressed in the above statement?
20. Dalip has dairy farm. One day his friend Dev advises him to use artificial insemination to overcome several problems in developing better breeds of cow. Earlier his neighbour, Devinder had advised him MOET for herd improvement. Dalip is ignorant and not able to decide.
 - i) Which technique should Dalip adopt?
 - ii) What is the advantage of this technique?
 - iii) What values are not exhibited by Dalip

**CHAPTER: 9 STRATEGIES FOR ENHANCEMENT IN FOOD PRODUCTION
(ANSWER KEY)**

Q.No	Value points	Marks
1	Inbreeding increases homozygosity	1
2	Brown rust of wheat, Smut of wheat, red rot of Sugar cane, Late blight of potato	1
3	Beewax	1
4	Paddy crop (rice)	1
5	Thicker stem and higher sugar content	1
6	By crossing Bikaneri ewes and Marino rams, the new breed Hisardale was developed	1+1=2
7	A. Leaf and Stripe rust, hill bunt. B. Pusa swarnim (Karan rai). C. Cowpea D. Pusa Sadabahar	4x1/2=2
8	The protein rich food produced by microbes is called as single called protein (SCP) Spirulina is a microorganisms which has more protein. It is a quick method of protein production because the growth rate of microbes is enormous. Hence, it provides a protein rich diet for human beings	1+1=2
9	When breeding is between animals of the same breed, it is called inbreeding, while cross between different breeds in called out breeding	1+1=2
10	(i) Isolation of protoplast of Tomato cell and Potato cell. (ii) Somatic hybridisation. (iii) Pomato (iv) Somatic hybrid	4x1/2=2
11	*The method of producing many plants through tissue culture is called micropropagation. * The plants produced through micropropagation will be genetically identical to the original plant from which they were grown, hence are called somaclones. *Tomato, banana, apple are produced on commercial scale using this method	3x1=2
12	Mutation : Sudden inheritable change in the characters of an organism due to change in the sequence of bases in the gene(s). Mutation results in a new character or trait, not found in the parental type. It can also be induced by using mutagens like gamma radiations. Such plant materials are used as such or used for breeding new	3
13	The Multiple Ovulation Embryo Transfer (MOET) technology can improve the success rate of fertilisation. In the procedure, a cow is given hormonal treatment (FSH), so that more than one ova/eggs (6-8) are produced per cycle. After mating or artificial insemination the embryos at 8-32 celled stage, are transferred to different surrogate mother cows. This technology has been successfully used for cattle sheep, rabbit, mares and buffaloes	1+2=3

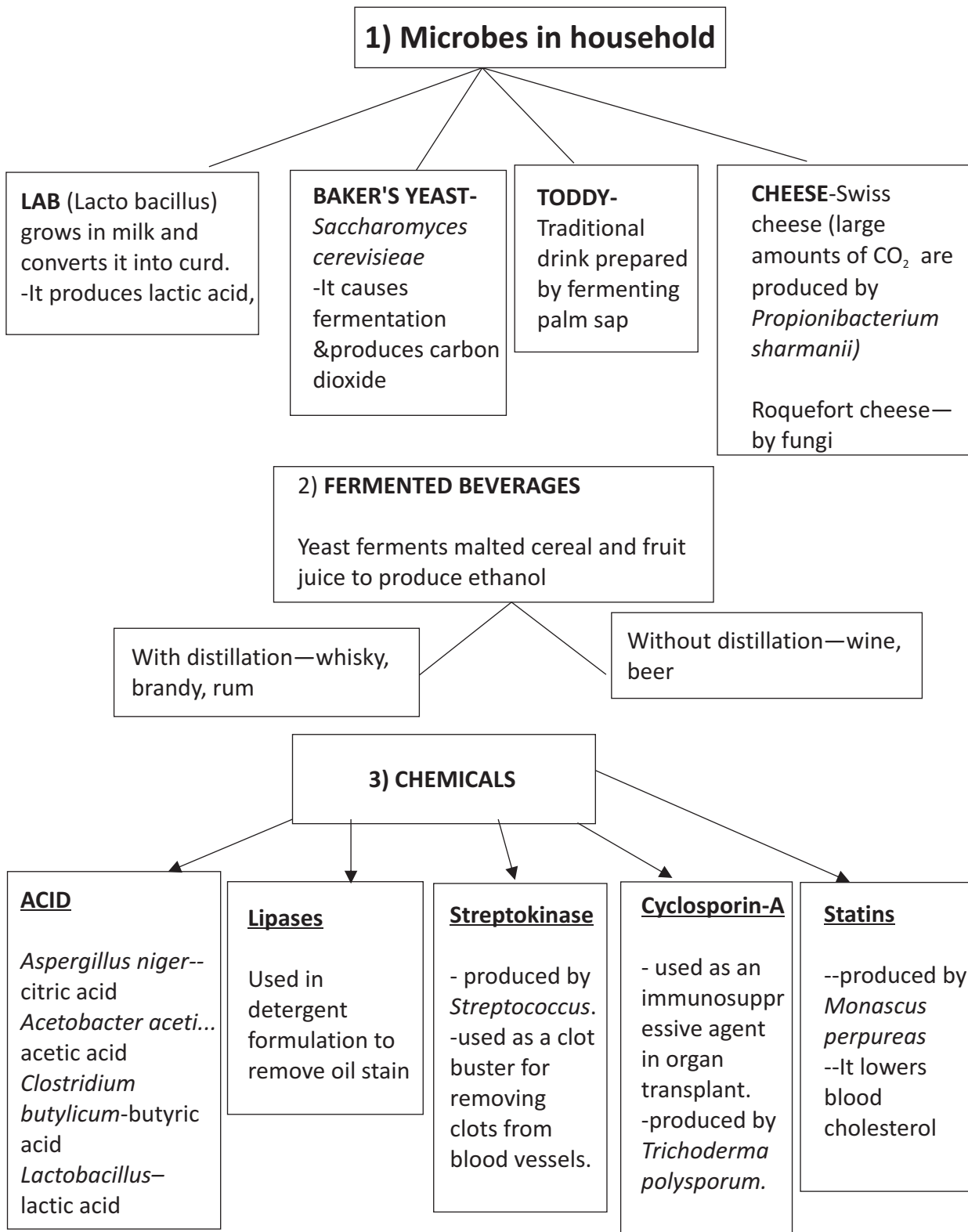
14	<p>Biofortification is the plant breeding programme designed to increase Vitamins, minerals, heigher proteins and healthier fat content in crops. This programme improves the quality of food products. It is required to prevent hidden hunger. Some of the examples of fortified crops are:</p> <p>(i) New hybrid of maize : has twice the amount of amino acid lysine and tryptophan.</p> <p>(ii) Wheat : Atlas 66, having a high protein content.</p> <p>(iii) Rice : 5 times iron than the normal amount. IARI Delhi has released several crops which are rich in vitamins and minerals. Consumption of such biofortified food will astly improve the public health.</p>	1+1+1=3
15	<p>The collection of all the diverse alleles of all the genes of crop plant is called germ plasm collection In plant breeding programmes, the germplasm provides the entire of genes and alleles, and the characterstics which they express. The plant breeders select the most favourable characters of a particular gene and manipulate its transfer to a desirable parent.</p>	1+2=3
16	<p>(a) Fish production (b) Milk production (c) Crop production</p>	1+1+1=3
17	<p>Apiculture or Bee-Keeping is the maintenance of hives of honeybees for the production f honey. Apiculture is beneficial for farmers in many ways. Honey bee also produces beewax which is used in industries, such as in preparation of cosmetics and polishes of various kinds. If Bee keeping is practiced in any area the commercial flowers are cultivated, it will be beneficial in the following ways.</p> <p>(i) Bees are pollinators of many crop species including flowering crops such as sunflower.</p> <p>(ii) It improves the honey yield, because honeybees collect the nectar from flowers formaking honey.</p> <p>Apis indica is the msot common species which is reared in India</p>	1+2+1+1=5
18	<p>Somatic Hybridisation : The process of fusing protoplasts of Somatic cells different varieties or species of plants to produce a hybrid. derived from</p> <p>Steps :</p> <p>(i) Removal of cell wall of fusing cells by digestion with a combination of pectinase and cellulase to form protoplasts.</p> <p>(ii) Fusion between protoplasts of selected parents is induced by the use of poly ethylene glycol (PEG).</p> <p>(iii) The resulted product is cultured on a suitable medium to regenerate cell walls.</p> <p>(iv) The cells obtained begin to divide to produce plantlets called somatic hybrids.</p>	1+2+2=5

	<p>Uses/Applications :</p> <p>(i) Somaclonal variations can be created</p> <p>(ii) Lines or varieties/species of plants which can not be sexually hybridised, they can be hybridised.</p> <p>(iii) Allopolyploids can be raised by the method.</p>	
19	<p>i) Yes, these capsules are rich in proteins & can be produced in large quantities in less time, on waste water from potato processing plants, straw molasses etc, & minimising environmental pollution</p> <p>ii) problem solving, awareness on environmental pollution, knowledge about recycle of wastes</p>	2+2=4
20	<p>i) MOET, as success rate of this technique is high</p> <p>ii) Herd size is increased in short time. Genetic mother is available for another round of super ovulation.</p> <p>iii) critical thinking, problem solving, decision making.</p>	1+3=4

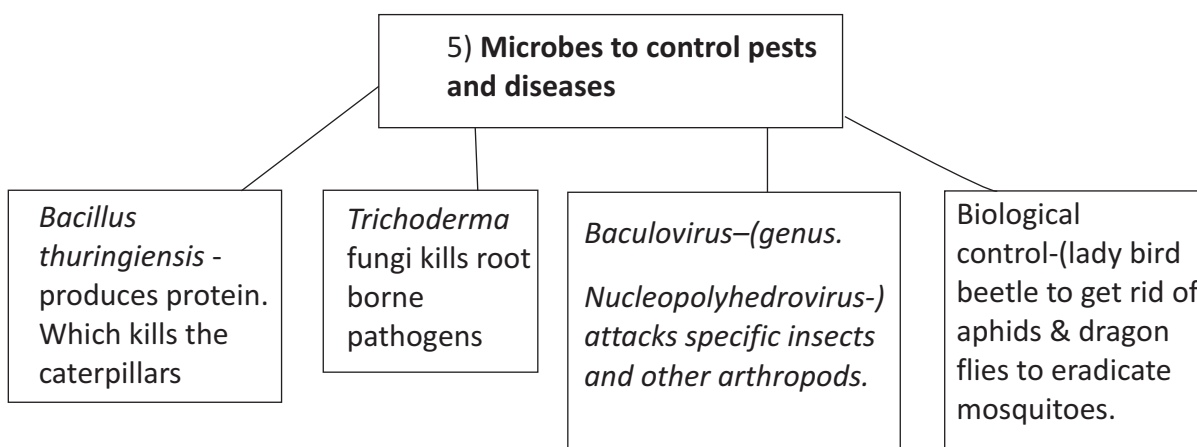
CHAPTER: 10 MICROBES IN HUMAN WELFARE (KEY POINTS)

S.No.	Term	Explanation
1	BOD	Biochemical Oxygen Demand
2	GAP	Ganga Action Plan
3	YAP	Yamuna Action Plan
4	KVIC	Khadi and Village Industries Commission
5	LAB	Lactic Acid Bacteria
6	Baculovirus	Pathogens that attack insects and other arthropods
7	Effluent	The product of primary treatment of sewage
8	Fermentors	A very large vessel where microbes are grown on an industrial scale.
9	Flocs	mass of mesh like structure formed by Bacteria and fungi
10	Prions.	The proteinaceous infectious agent
11	Methanogens -	Bacteria producing methane
12	STPs	Sewage Treatment Plants
13	IARI	Indian Agricultural Research Institute
14	IPM	Integrated Pest Management

**CHAPTER: 10 MICROBES IN HUMAN WELFARE
(FLOW CHART)**



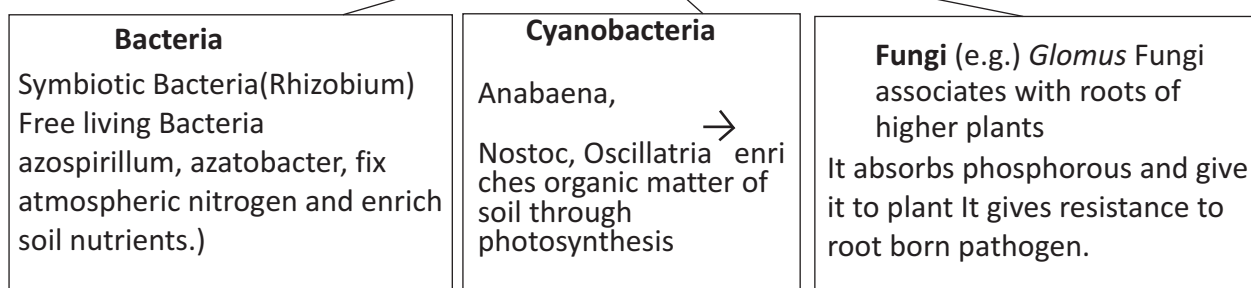
4) **ANTIBIOTICS (Penicillin -It is produced by *Penicillium notatum*)**



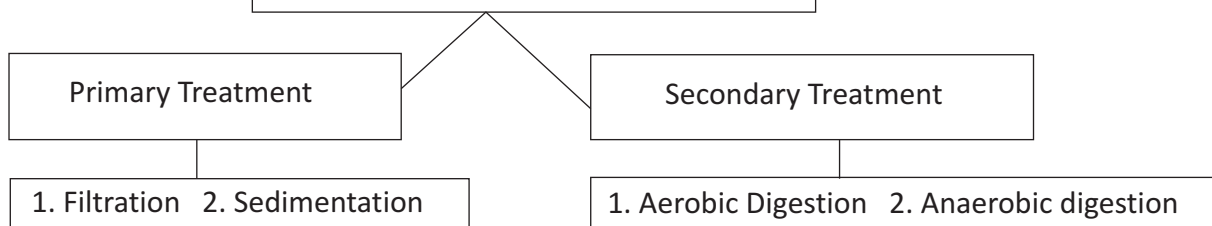
6) Microbes -- production of Bio-Gas

methanogens (e.g.) Methanobacterium.
Act on cellular material to produce methane, seen in anaerobic sludge digesters, rumen of cattle, flooded rice field & in cattle dung.

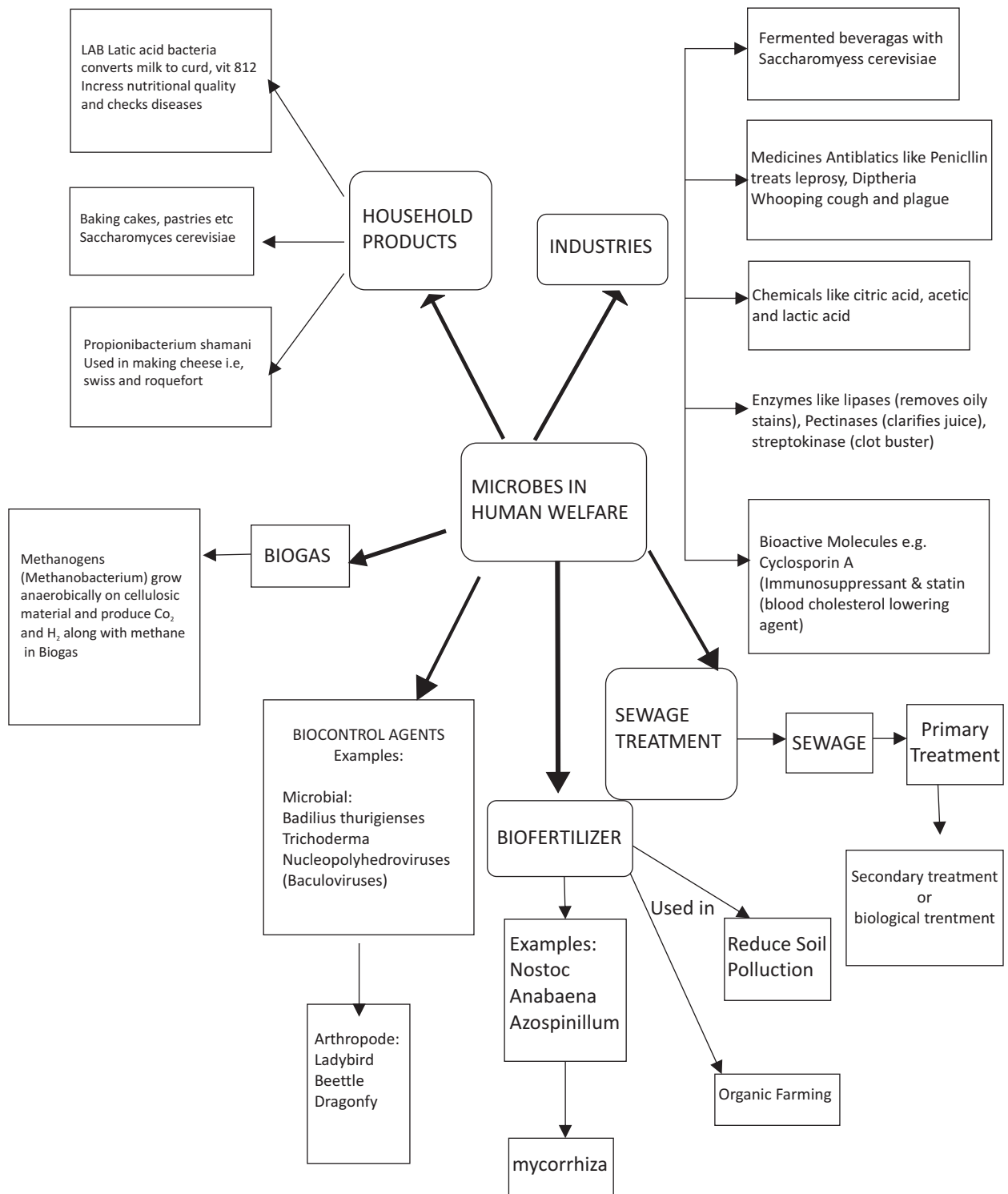
7) Microbes as bio fertilizers



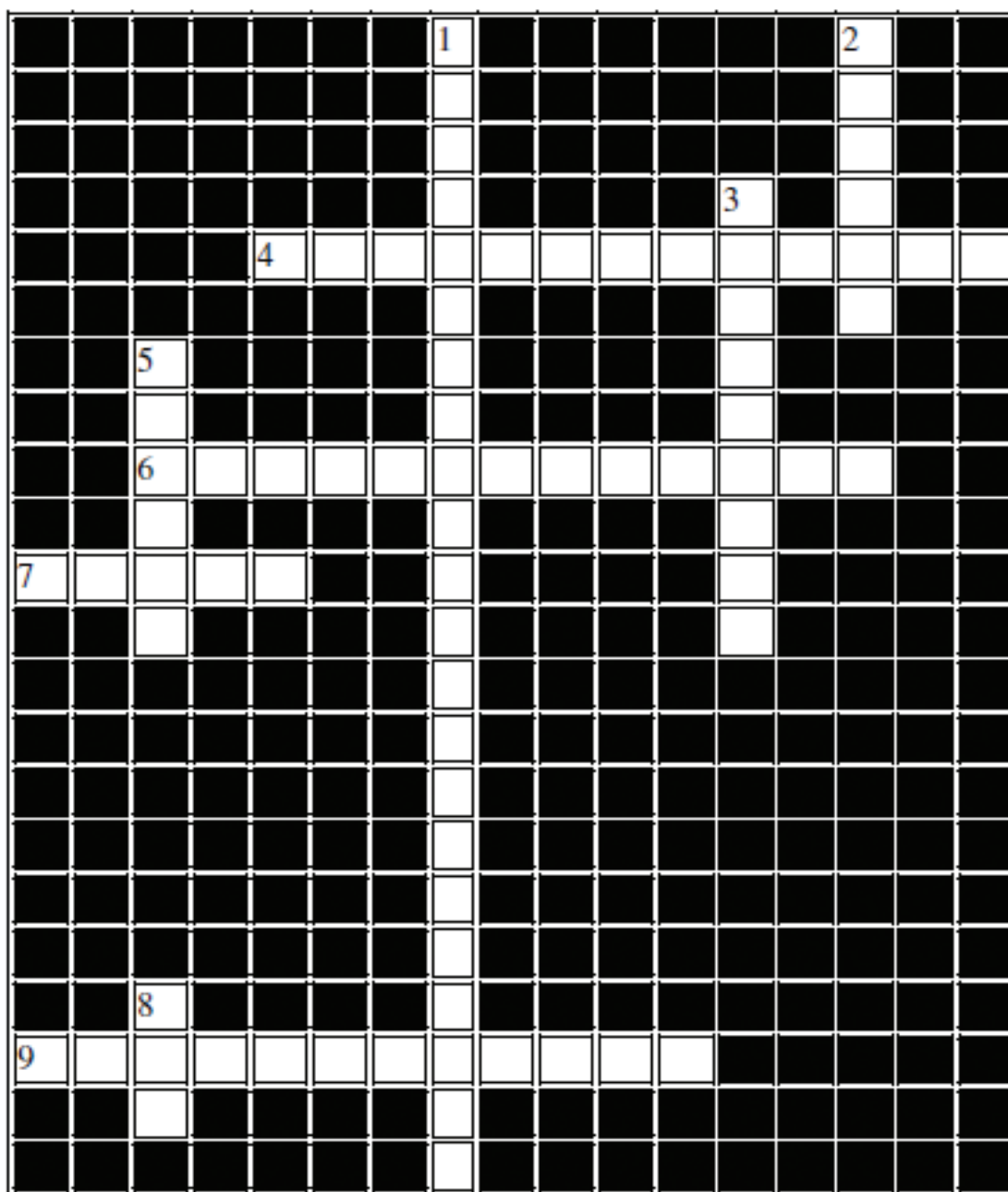
8) Microbes used in sewage treatment



**CHAPTER: 10 MICROBES IN HUMAN WELFARE
(CONCEPT MAP)**



**CHAPTER: 10 MICROBES IN HUMAN WELFARE
(CROSS WORD)**



Across

Down

4. produced by trichoderma polysporum
6. clot buster
7. mass of bacteria and fungalfilaments
9. free living biofertilisers

1. first biological pesticide
2. proteinaceous infecting agent
3. to clarify bottled fruit juices
5. biofertiliser
8. impurity of waste water

CHAPTER: 10 MICROBES IN HUMAN WELFARE

(QUESTION BANK)

1. How does a small amount of curd added to fresh milk convert it into curd? Mention a nutritional quality that gets added to the curd.
2. Why is secondary treatment of water in sewage treatment plant called biological treatment?
3. An antibiotic called .Wonder Drug. was used to treat the wounded soldiers of America during World War-II. Name the drug and the scientist who discovered it.
4. You have observed that fruit juice in bottles bought from the market is clearer as compared to those made at home. Give reason.
5. Alexander Fleming discovered .Penicillin, but its full potential as an effective antibiotic was established by other scientists. Name the two scientists.
6. Name the plant whose sap is used in making .Toddy.. Mention the process involved in it.
7. Name two alcoholic drinks produced in each of the following ways. (i) by distillation and (ii) without distillation.
8. Lactic Acid Bacteria (LAB) is commonly used in the conversion of milk into curd. Mention any two other functions of LAB that are useful to humans.
9. How do mycorrhizae function as biofertilisers? Explain with example.
10. Cyanobacteria (Nostoc, Anabaena) are used as bio fertilisers in certain crop fields. Name such one crop. Also, mention the names of two other microorganisms which perform the same function.
11. Which Ministry of Govt. of India had initiated Ganga Action Plan and Yamuna Action Plan? What are the objectives of these plans?
12. Fill in the blanks spaces a, b, c, d, e, and f, given in the following table

S. No.	Name of Organism	Commercial Product	Application
1	<i>Penicillium notatum</i>	Penicillium	(a)
2	(b)	Lactic acid	Making Curd
3	<i>Streptococcus</i>	Clot buster enzyme	(c)
4	<i>Trichoderma polysporum</i>	(d)	Immuno suppressive agent
5	<i>Saccharomyces cerevisiae</i>	Ethanol	(e)
6	(f)	Swiss cheese	Food Product

13. What is biochemical oxygen demand (BOD) test? At what stage of Sewage treatment this test is performed? BOD level of three samples of water labelled as A, B and C are 30 mg/ L, 10mg/L and 500 mg/L respectively. Which sample of water is most polluted?

14. Given below is the Flow chart of Sewage treatment. Fill in the blank spaces marked .a. to .f..
15. What are biofertilisers? A farmer is advised to add a culture of bacterium in the soil before sowing the crop. Name the bacterium in the culture. How is this bacterium useful to the crop?
16. What are statins? Name the microorganism that produces this substance. How is it medically important?
17. How does primary sludge differ from activated sludge? What type of changes in the sludge is carried out in anaerobic sludge digester? Give the composition of biogas produced in the sewage treatment plant.
18. Tina went to a supermarket with her mother to buy rice. They saw that two types of products are available. one is organically grown & second is conventionally grown. The organically grown crops are costlier so Tina's mother does not want to purchase it.
- (I) Which rice should be purchased? Why/
(ii) What values are exhibited by Tina?
19. After a rainy day Shruti found many dragonflies flying over stagnant water. She thinks these flies come to drink water.
- i) Is Shruti's explanation correct? Give your views.
ii) What values are shown by Shruti?
20. Manoj was going home from school. On his way he saw a 'panipuri' vendor cleaning the dishes with bare hands & then serving the customers with the same hands without washing hands with a soap or wearing plastic gloves. Manoj went to the vendor & told him the need for washing hands before touching any eatables. The vendor hushes him away & tells him there is no harm as he has rinsed his hands with water
- (a) In the given solution, whom do you think has the correct perspective? Justify your answer by giving reasons
- Suggest few ways by which cleanliness can be promoted.

**CHAPTER: 10 MICROBES IN HUMAN WELFARE
(ANSWER KEY)**

Q.No	Value points	Marks
1	A large number of lactic acid bacteria are found in small amount of curd which multiply and convert the milk into curd by producing the lactic acid, The nutritional quality improves by increasing Vitamin B12	1
2	In this treatment Organic wastes of sewage water are decomposed by certain microorganisms in presence of water	1
3	Penicillin, Alexander Fleming	1
4	Bottle juices are clarified by the use of pectinase and proteases	1
5	Ernest chain and Howard Florey	1
6	Palm tree, by fermentation	1
7	(i) Whisky, brandy, rum . by distillation (ii) Wine, beer . without distillation	1+1=2
8	(i) LAB in human intestine synthesizes Vitamin B12. (ii) LAB in human stomach checks the growth of harmful microbes	1+1=2
9	Mycorrhiza are fungi associated with the roots of plants. Many members of genus Glomus form mycorrhiza. These fungal symbiont absorbs water and minerals like phosphorus from the soil and provide them to the plant	4x1/2=4
10	Paddy (Rice Crop), Rhizobium and Azotobacter	1+1=2
11	The Ministry of Environment and Forests. The objective of Ganga Action Plan and Yamuna Action Plan is to save these rivers from pollution. It was proposed to build a large number of sewage treatment plants. So that only treated sewage may be discharged into these rivers	1+1+1=3
12	a) to kill disease causing bacteria (b) Lactobacillus (c) remove clots from blood vessels (d) Cyclosporin A (e) Beverage/medicines (f) Propionibacterium sharmanii	6x1/2=3
13	The BOD test measures the rate of uptake of oxygen by microorganisms in a sample of water. Biological treatment or Secondary treatment Sample . C. is most polluted because it has highest BOD level among the three samples of water.	1+1+1=3
14	a) Primary treatment (b) Aeration (c) Floccs (d) Biochemical Oxygen Demand (BOD) (e) Activated sludge (f) Water bodies like river stream.	6x1/2=3

BIOLOGY



15	Biofertilisers are organisms that enrich the nutrient quality of the soil. Azotobacter/Azospirillum (free living) This bacterium fixes atmospheric nitrogen into organic forms, which is used by the plants as nutrient.	1+1+1=3
16	Statins are cholesterol reducing agents. They are produced by Monascus purpureus (Yeast) They act by Competitively inhibiting the enzymes responsible for synthesis of cholesterol and are used as blood cholesterol lowering agents.	1/2+1/2+ 1+1+=3
17	Primary sludge is all solids like soil, small pebbles that settle down in settling tank during primary treatment of sewage. Activated sludge is the sediment of bacterial .flocs. in settling tank during biological treatment. Flocs are masses of bacteria held together by slime and fungal filaments. A part of activated sludge is used as inoculum in aeration tank and remaining is passed into a large tank called anaerobic sludge digester. In this tank, other kind of bacteria which grow anaerobically, digest the bacteria, fungi and biomass in the sludge. Biogas that produced in Sewage treatment plant is a mixture of methane, hydrogen and Carbon dioxide	2+1+2=5
18	Organically grown rice, since bio fertilisers & bio pesticide are used, which are not harmful to health. sensitivity & awareness about use of harmful chemicals, Decision making, c) critical thinking	1+1+2=4
19	No, dragonflies come to eat mosquito larvae & act as bio control agents Awareness about environment, critical thinking	1+1+2=4
20	(a) Concern for everyone's health is correct. Tiny microbes do not get cleaned up by just water & most of the microbes are disease causing. (b) By pasting posters in public places regarding importance of cleanliness. Educating people about the harms of uncleanliness, With advertisements in media like television, newspapers etc.	1=1=2



BIOLOGY

**CHAPTER:11 BIO TECHNOLOGY PRINCIPLES & PROCESSES
(KEY POINT)**

S.No	Term	Explanation
1	rDNA	Recombinant DNA
2	Gene cloning	DNA technology used to produce multiple, exact copies of a single gene or other gene to obtain enough material for further study
3	Gene transfer	Incorporation of new DNA into an organism's cells, usually by a vector such as modified virus. Used in gene therapy See also: mutation, gene therapy, vector
4	Genetic Engineering	Altering the genetic material of cells or organisms to enable them to make new substances or perform new functions
5	ORI	The specific sequence of bases in a DNA which initiates replication.
6	Restriction enzymes	They are molecular scissors capable of cutting DNA at specific sites. These are enzymes present in bacteria which prevent the multiplication of bacteriophages in their cells
7	Plasmid	Autonomously replicating extra chromosomal circular DNA molecules, distinct from the normal bacterial genome and non essential for cell survival under non selective conditions. Some plasmids are capable of integrating into the host genome. A number of artificially constructed plasmids are used as cloning vectors
8	Cloning Vectors	Vectors that introduce foreign DNA into host cells, where the DNA can be reproduced in large quantities. Examples are plasmids, cosmids, and yeast artificial chromosomes
9	Endonuclease	Protein that recognizes specific, short nucleotide sequences and cuts DNA at those sites within the molecule
10	Nucleases	Enzymes that are specific to nucleic acids
11	Exo nucleases	An enzyme that cleaves nucleotides sequentially from free ends of a linear nucleic acid substrate.
12	Palindromic sequences	The sequence of base pairs that reads the same on both the strands when read in the same orientation (ie 5' to 3' in both the strands)
13	Gel Electrophoresis	A method of separating large molecules (such as DNA fragments or



BIOLOGY

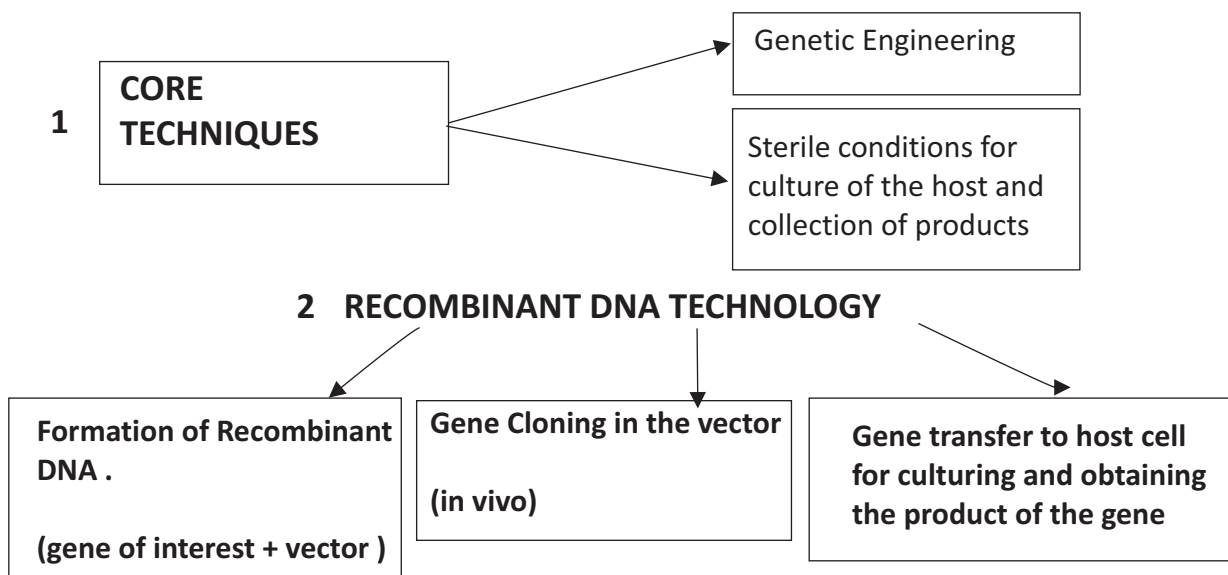
		proteins)from a mixture of similar molecules. An electric current is passed through a medium containing the mixture, and each kind of molecule travels through the medium at different rate, depending on its electrical charge and size Agarose and acrylamide gels are the media commonly used for electrophoresis of proteins and nucleic acids
14	Elution	The extraction of separated fragments of DNA from the electrophoresis gel
15	Auto radiography	A technique that uses X-Ray film to visualize radioactively labeled molecules or fragments of molecules, used in analyzing length and number of DNA fragments after they are separated by gel electrophoresis.
16	Transformation	Most common method to introduce DNA into living cells.In this procedure,bacterial cells take up DNA from the surrounding environment. Many host cell organisms such as, E.coli,yeast and mammalian cells do not readily take up foreign DNA and have to be chemically treated to become competent to do so
17	Selectable markers	A gene or other identifiable portion of DNA whose inheritance can be followed and used in the process of selection of transformed cells from non transformed ones
18	Insertional Inactivation	The process by which a gene encoding a protein is inactivated by the insertion of a foreign DNA within the coding sequence of the protein
19	Ti Plasmid	Tumour inducing Plasmid in Agrobacteriumsp.causingtumour in plant cells
20	Tumour	Uncontrolled growth of cells in the body of plants or animals.
21	Microinjection	The process of introducing rDNA into animal cells using a micropipette
22	Biolistics/gene gun	A direct genetransfer method for delivering foreign genes into any tissues and cells or even seedlings. * The foreign DNA is coated or precipitated onto the surface of minute gold or tung stenp articles * It is bombardedors hotontothetargettissueorcellsusingthegenegun.
23	Embryonic stem(ES)cells	An embryonic cell having totipotency that can replicate indefinitely,transform into other types of cells ,and serve as a continuous source of new cells.These cells are derived from inner cell mass of the blastocyst or the 4-8cell stage of embryo



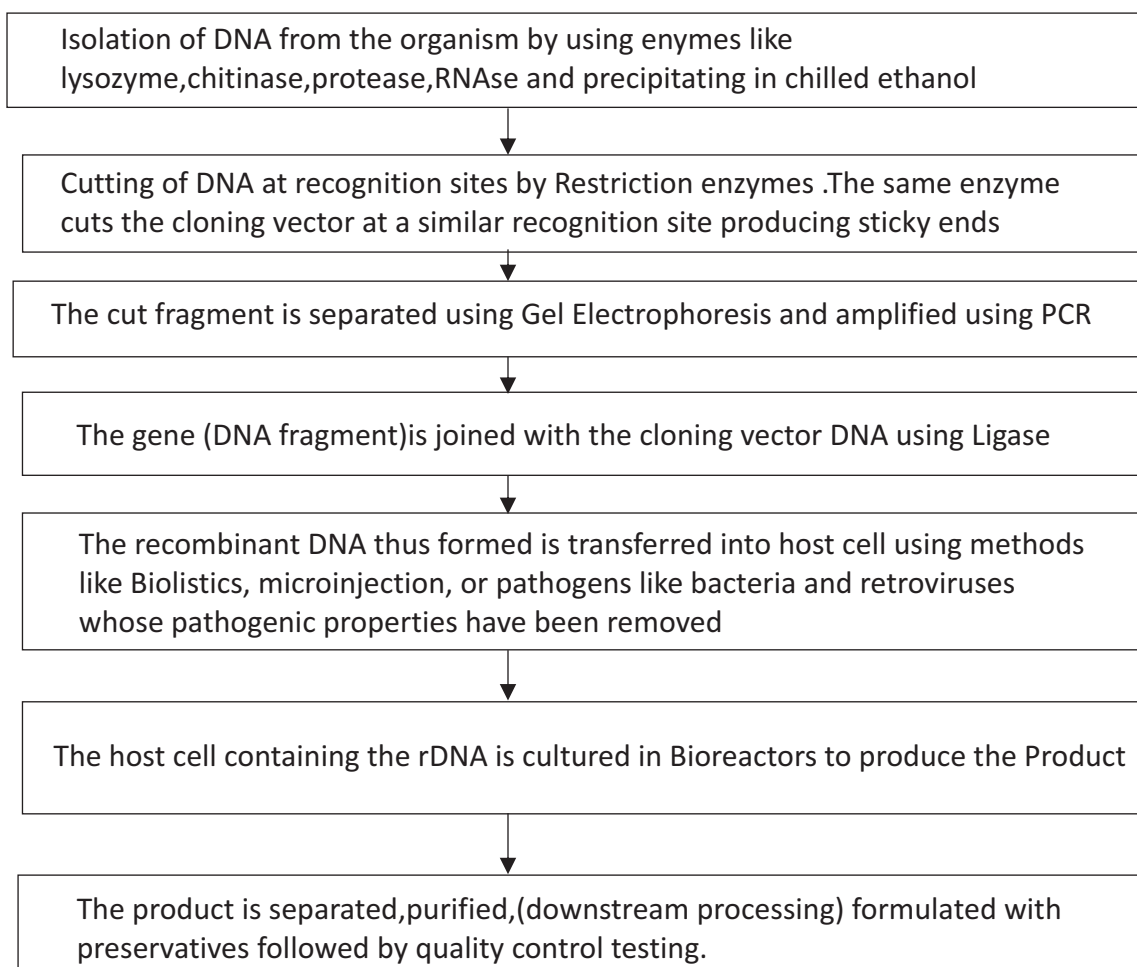
BIOLOGY

24	Lysozyme	The enzyme that digests the cell wall of bacteria
25	Cellulase	The enzyme that digests cellulose of plant cell walls
26	Chitinase	The enzyme that can digest cell walls of fungi containing chitin.
27	Polymerase Chain Reaction (PCR)	Polymerase Chain Reaction where DNA can be amplified in a short time to produce multiple copies of DNA (can be made in vitro)
28	Recombinant protein	Protein encoding gene expressed in a heterologous host
29	Bioreactors	Are vessels in which raw materials are Biologically converted into specific products using microbial, plant or animal cells
30	Downstream Processing	The process of formulation, separation and purification of rDNA products made in Bioreactors.
31	Spooling	The method of separating DNA precipitates in chilled ethanol ,after its isolation from the other cell contents
32	Disarmed pathogens	Some bacteria or viruses, which are used to transfer recombinant DNA carrying the gene of interest to the host's cells.
33	Retrovirus	RNA virus containing reverse transcriptase and can be used to transfer the gene of interest into the host chromosome
34	Ligases	Enzymes that can join fragments of DNA
35	Vector	NA molecule, capable of replication in a host organism, into which a gene is inserted to construct a recombinant DNA molecule
36	Competent Host Cell	A cell which has been chemically treated to take up rDNA from its surroundings by causing pores in its cell wall
37	Amplification	An increase in the number of copies of a specific DNA fragment; can be in vivo or in vitro
38	Sticky ends	Single stranded overhanging ends of DNA formed by the restriction enzymes cutting the strands of DNA at specific palindromic sequences
39	Denaturation	Double stranded DNA is separated by applying high temperature of 95°C
40	Annealing	Primers bind to the 3' ends of the separated DNA strands
41	Extension	DNA polymerase extends the primers by adding complementary nucleotides .Taq polymerase is used here
42	Taq Polymerase	DNA polymerase obtained from bacteria <i>Thermus aquaticus</i> , which

**CHAPTER : 11 BIO TECHNOLOGY PRINCIPLES & PROCESSES
(FLOW CHART)**



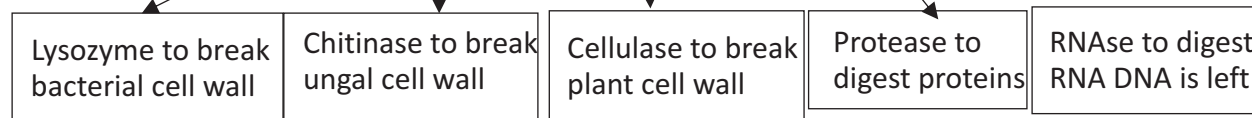
3 STEPS IN CREATION OF rDNA AND RECOMBINANT



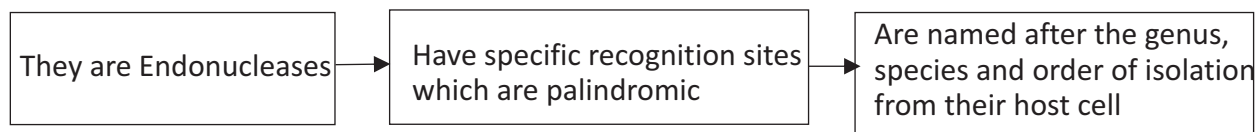


BIOLOGY

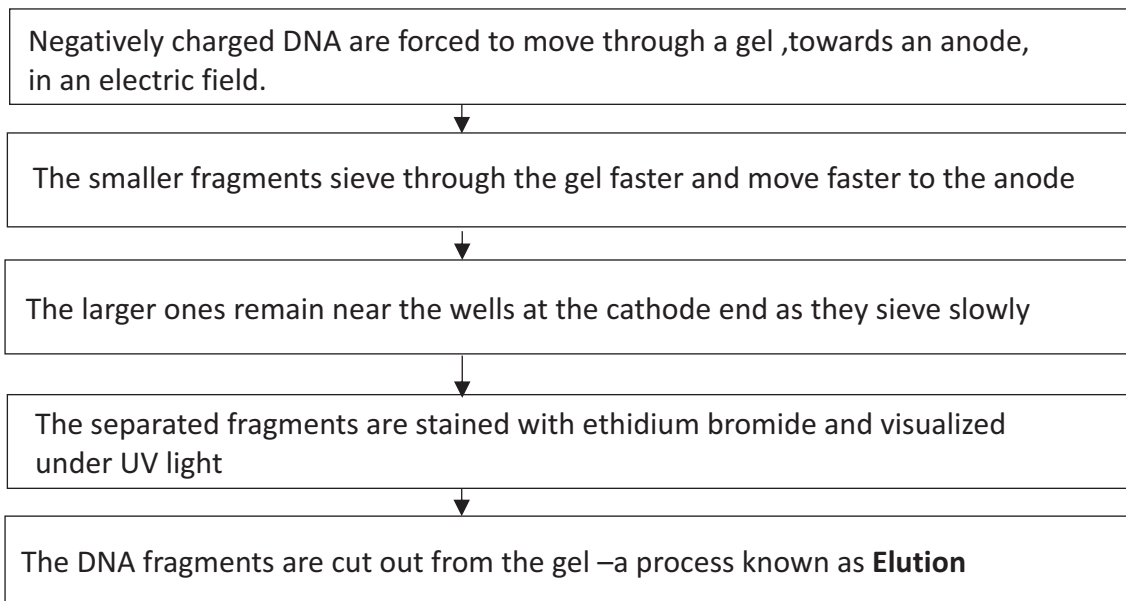
4 ISOLATION OF GENE(DNA) OF INTEREST USING ENZYMES



5 Characteristics of Restriction Enzymes :



6 Gel Electrophoresis:



7 PCR: POLYMERASE CHAIN

Denaturation of DNA (separation of DNA into single strands) by applying high temperature upto 95° C

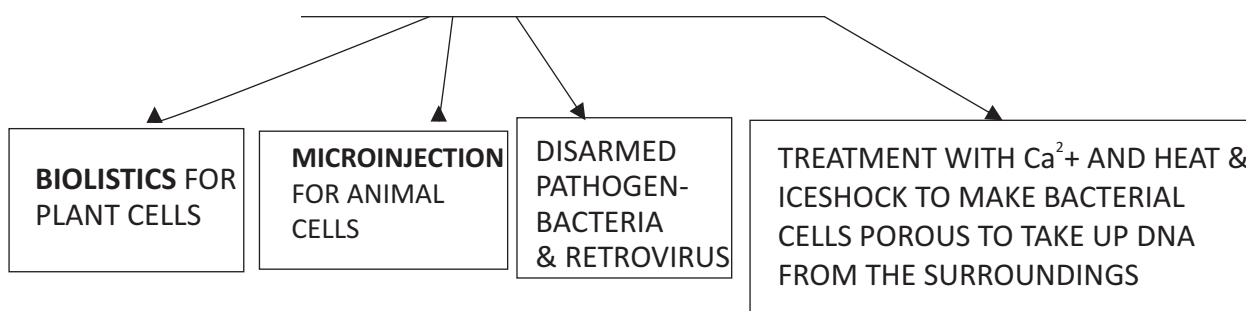
Annealing: Two sets of Primers (short stretches of RNA) attach to the single stranded DNA at complementary sites.

Taq Polymerase

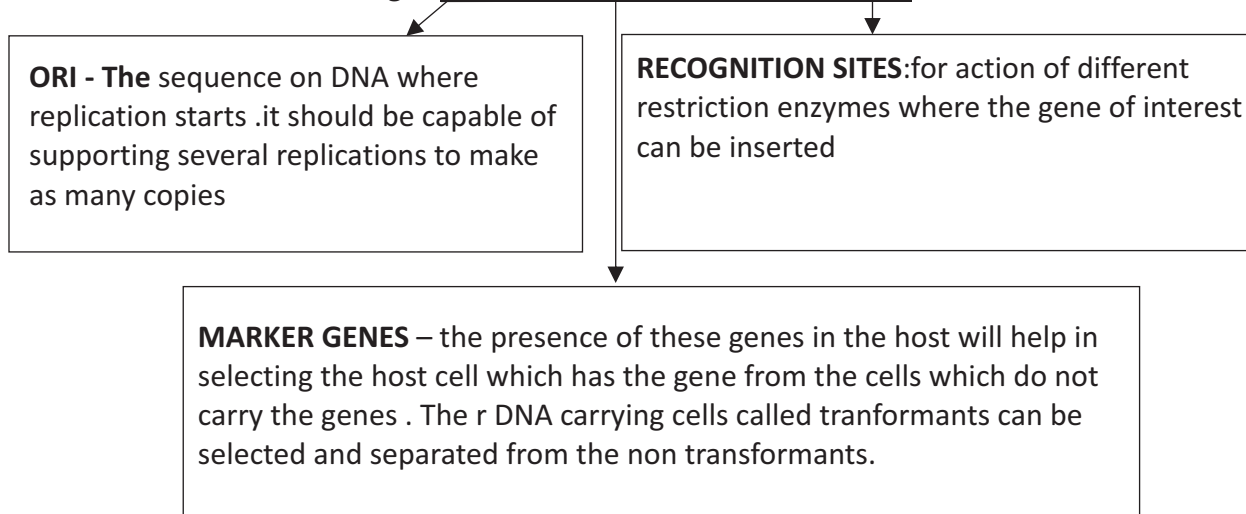
Extension: The primers extend by addition of nucleotides in the presence of thermostable DNA polymerase complementary to the DNA strand .The Primers are removed .

Repeat: This cycle gets repeated 30 times and the DNA fragment gets amplified about 1 billion times

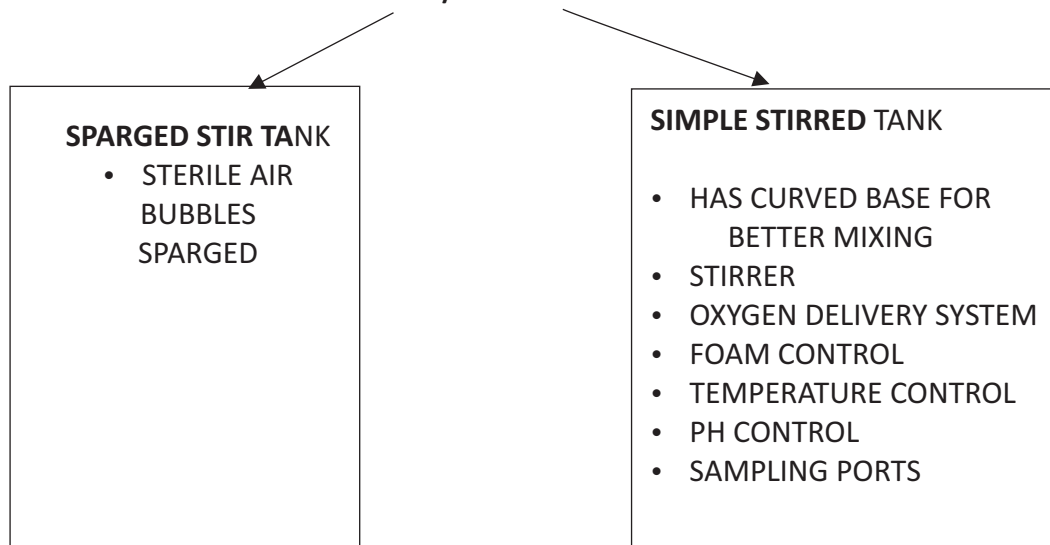
8 METHODS OF GENE TRANSFER INTO HOST CELLS:



9 CHARACTERISTICS OF CLONING VECTORS :

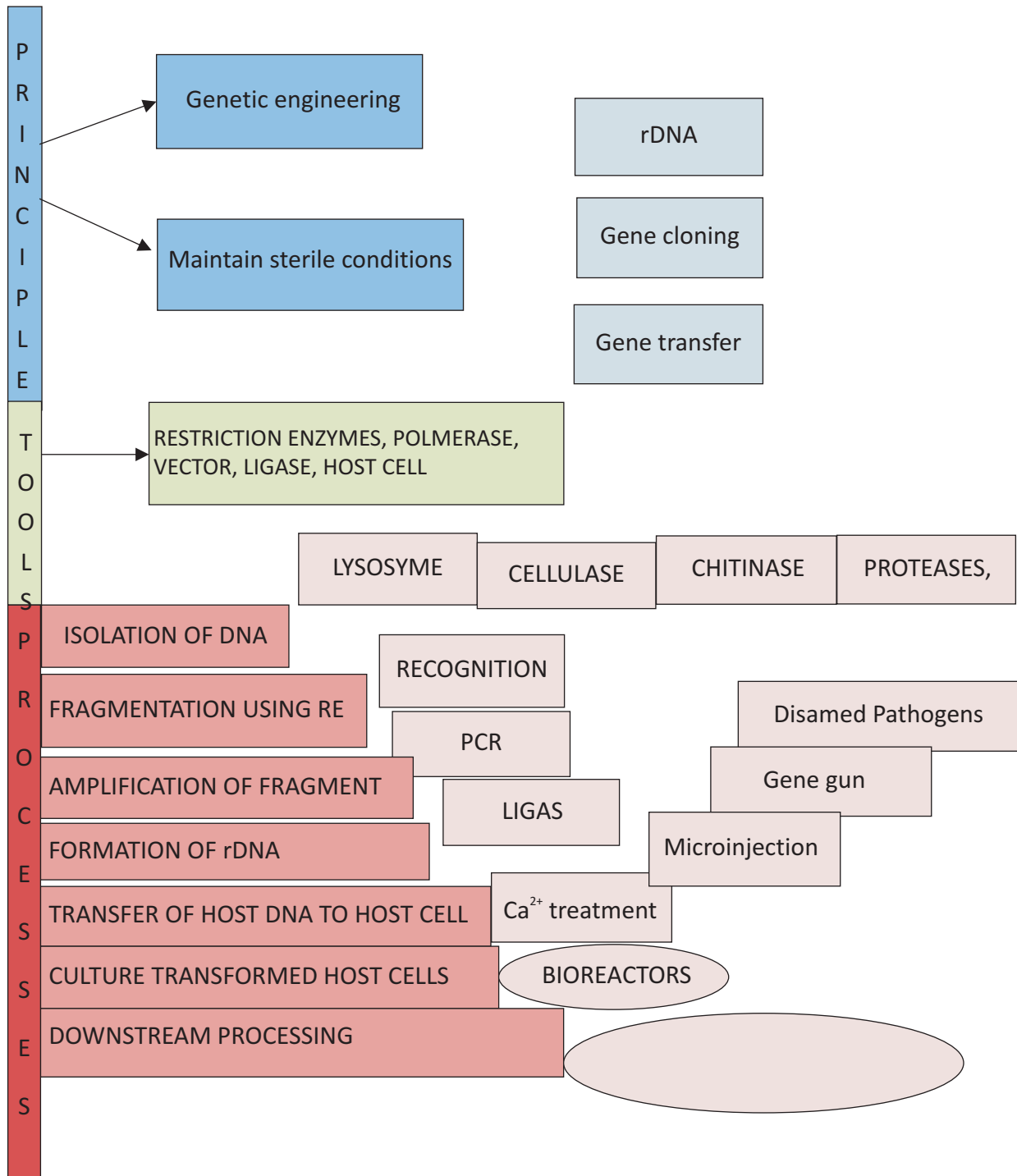


10 BIOREACTORS: PRODUCE RECOMBINANT PROTEIN USING RAW MATERIALS AND LIVING CELLS/ENZYMES

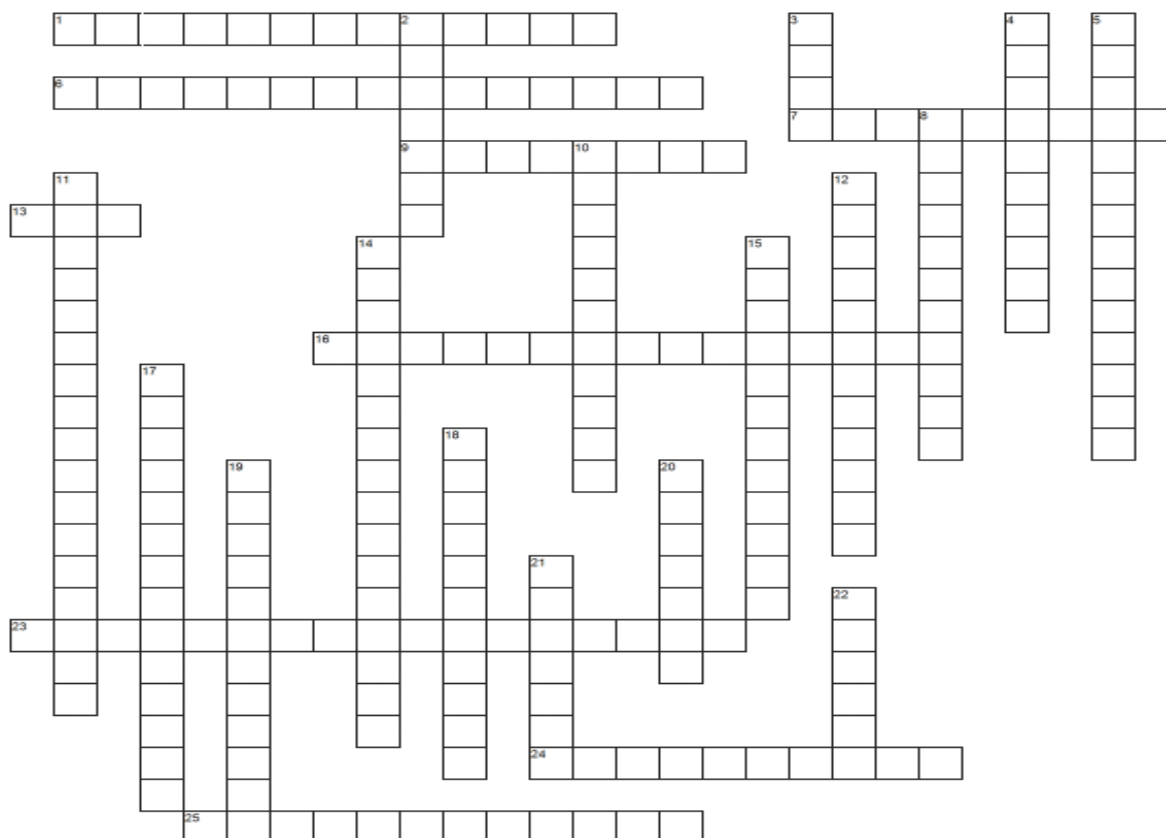


DOWNSTREAM PROCESSING +QUALITY CONTROL TESTING before the product is made commercially available.

**CHAPTER : 11 BIO TECHNOLOGY PRINCIPLES & PROCESSES
(CONCEPT MAP)**



**CHAPTER : 11 BIO TECHNOLOGY PRINCIPLES & PROCESSES
(CROSS WORD)**



ACROSS

- 1 Viruses infecting Bacteria
- 6 Sequence of genes present in the Bacteria to defend against bacteriophage. There may be more than one restriction sites added to vector depending on the need.
- 7 The process in which Two sets of Primers are added which bind to the 3' end of each separated strand, Primers act as initiators of replication.
- 9 Separated band of DNA (gel electrophoresis) are cut out from agarose gel & extracted from the gel piece.
- 13 It codes for the protein; involved in the replication of the plasmid.
- 16 Sequences of vector recognised by restriction enzymes
- 23 Restriction endonuclease
- 24 Every endonuclease after recognising the palindromic sequence in the DNA, binds to it, cuts the opposite strands of DNA in the sugar-Phosphate backbone, a little away from the centre of the palindromic sites but between the same bases on both stretches at the end of each strand called single stranded overhanging stretches at the end of each strand called
- 25 Restriction enzymes cut DNA at specific portion within the DNA.

DOWN

- 2 Small chemically synthesised oligonucleotides of about 10-18 nucleotides that are complementary to a region of template DNA.

- 3 DNA formed by combining DNAs from 2 different organisms
- 4 Cells are bombarded with high velocity micro particles of gold or tungsten coated with DNA
- 5 DNA molecules that can carry a foreign DNA segment & replicate inside the host cell.
- 8 Restriction enzyme cuts the DNA from the ends.
- 10 inactivation Due to the addition of alien DNA the coding sequence of an enzyme like α -galactosidase loses its property of converting X-gal/substrate -metabolising to produce blue colour. Its due to inactivation of
- 11 Restriction endonuclease the enzyme galactosidase.
- 12 Viruses infecting Bacteria.
- 14 Helps to select the host cell which contain the rDNA or plasmid with specific gene
- 15 Bacteria which has taken the vector with alien DNA
- 17 Recombinant DNA is directly injected into the nucleus through microinjection.
- 18 Are vessels of large volumes (100-1000 litres) in which raw materials are biologically converted into specific products
- 19 The double stranded DNA is split by applying high temperature
- 20 Small chemically synthesised oligonucleotides of about 10-18 nucleotides that are complementary to a region of template DNA.
- 21 Hybrid vectors derived from plasmids which contain cos site of phage.
- 22 In replicating a chromosome there is a specific DNA sequence called..... on which is responsible for initiating replication.

CHAPTER : 11 BIO TECHNOLOGY PRINCIPLES & PROCESSES (QUESTION BANK)

1. What are the two core techniques that enabled the birth of Biotechnology?
2. How does genetic engineering help in overcoming the limitations of traditional hybridization procedures used in plants & animals?
3. How does the stickiness of cut ends of DNA help?
4. How can an alien piece of DNA made to multiply in a host cell?
5. What are the 'molecular scissors' in rDNA technology. What are they used for in rDNA technology?
6. List the major techniques in Genetic Engineering? Who was the first to construct an rDNA?
7. What are the three basic steps in genetically modifying an organism?
8. What are recognition sequences of endonucleases? Name the five key tools in rDNA technology.
9. What are nucleases. What are the two types ?
10. Show diagrammatically how endonucleases work?(3)
11. How can the fragments of DNA be separated? Explain
12. Explain the features required for a cloning vector(3)
13. How can the cloning vector pBR322 be used in separating the transformants and recombinants .Explain(3)
14. Do you agree with the construction of rDNA to give new traits in animals.How do you think it can be done .State any issue of concern in this?(4)
15. How is *Agrobacterium tumefaciens* used in rDNA technology.Explain ii)What and how are other pathogens are used for the purpose ?State two other methods by which host organism can be transformed?
16. Sequentially state the process you would adopt for getting a recombinant protein?(5)

CHAPTER : 11 BIO TECHNOLOGY PRINCIPLES & PROCESSES (ANSWER KEY)

.Q.No	HINTS	Marks
1	Genetic Engineering & Maintenance of sterile ambience	$\frac{1}{2}+\frac{1}{2}$
2	It allows use to isolate & introduce only the desirable gene/genes without introducing the undesirable genes	1
3	Makes the joining easy ; Complimentary	1
4	Linked to ORI of the host genome	1
5	Restriction enzymes,DNA at specific sites	$\frac{1}{2}+\frac{1}{2}$
6	Creation of rDNA,gene cloning ,gene transfer,Stanley Cohen & Boyer	$\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}$
7	Identification of desirable DNA,introduction into host, maintenance and then transfer to its progeny	$\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}$
8	The sequence at which DNA is cut by a RE, RE, polymerases, ligase,vector,host	$\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}$
9	Enzymes that act on nucleic acids,Endonucleases ,Exnucleases	$1+\frac{1}{2}+\frac{1}{2}$
10	Fig 11.1	1+1+1
11	Gel electrophoresis-Explain Agarose gel	1+1+1
12	ORI,cloning sites,selectable markers	1+1+1
13	Tetracycline site can be cut ,to insert the desired insert ,the recombinants will lose resistance to tetracycline the transformants will have resistance to both tetracycline and ampicillin	1+1+1
14	Use of transgenic animals to serve several purposes. (chemical testing, drug safety, products for treatment,to study physiology.Not ethical when used for selfish greed.Not safe if done without caution	1+1+1+1
15	Used as vector ,by modifying tumour inducing Ti plasmid,it is not pathogenic ,transforms the host plant cell Retrovirus, disarmed	1+1+1 1+1
16	Isolation of DNA(enzymes used),cutting the DNA, separation of fragments , PCR, introducing into host cell, obtaining gene product in the Bioreactor, downstream processing	1+1+1+1+1

CHAPTER : 12 BIO TECHNOLOGY & ITS APPLICATION (KEY POINTS)

S.N	Term	Explanation
1	Green Revolution	The increased production of food production by use of improved varieties of crops, better agricultural practices and use of Agrochemicals
2	GMO	Genetically Modified Organisms-organisms in which the genes are manipulated or foreign gene introduced into
3	Bt	Bacillus thuringiensis, a bacteria producing an insecticidal protein.
4	Bt Cotton	Cotton plant with Bt gene thereby made resistant to Bollworm insects
5	Insecticidal protein	Protein toxin that kills insect pests
6	cry gene	Gene coding for insecticidal toxin
7	RNA interference	Process which interferes with the translation of mRNA of the parasite in the host plant/cell
8	ds RNA	Double stranded RNA formed to prevent the translation of the mRNA of the parasite DNA in the host cell
9	C peptide	The peptide which is part of the Pro-insulin and removed before maturation of Insulin
10	Transgenic animals	Animals with manipulated genes or a foreign gene that can be expressed are called as transgenic animals
11	GEAC	Genetic Engineering Approval Committee –checks the validity and safety of GM research and GM organisms
12	Biopiracy	Unauthorised use of Bioresources of one Nation by another without proper compensation being given
13	Gene therapy	The procedure by which a genetic disorder is treated by introduction of a functional gene in the body through cultured cells carrying the functional gene in children or embryo.
14	ADA	Adenosine Deaminase –an enzyme required for the functioning of the immune system.

15	c DNA	DNA which is made complementary to the mRNA
16	α 1-antitrypsin	Human protein (made from transgenic animals) used in the treatment of Emphysema
17	ELISA	Enzyme Linked Immuno Sorbent Assay-a test based on detection of antibody produced against the pathogen using specific antigen- antibody reaction used It is used for diagnosis of diseases like AIDS.
18	Agrobacterium vectors	The bacteria <i>Agrobacterium tumefaciens</i> (used in transferring rDNA to plant cells) has the natural ability to transfer genes to plant cells.
19	Indian Patents Bill	A Bill passed by the Indian Parliament which takes issues such as terms for patent ,research and development initiatives etc.
20	<i>Meloidogyne incognita</i>	The nematode that affects roots of tobacco plants and reduce their yield, RNA interference is used against the nematode to protect tobacco plants
21	cryIAb	Gene coding for protein that controls corn borer.
22	cryIAc and cry IIAb	Genes coding for protein that controls Bollworm insects



BIOLOGY

CHAPTER : 12 BIO TECHNOLOGY & ITS APPLICATION (FLOW CHART)

AGRICULTURE

MEDICINE

TRANSGENIC ANIMALS

1 AGRICULTURE :APPLICATIONS

CREATE GM CROPS RESISTANT TO PEST (Bt COTTON, BRINJAL, SOYA)

GM CROPS TO REDUCE POST HARVEST LOSS (FLAVRSVR TOMATO)

GM CROPS TOLERANT TO COLD, SALINITY, WATER SCARCITY

GM CROPS CAPABLE OF USING MINERALS EFFICIENTLY

GM CROPS ENRICHED WITH NUTRIENTS (BIOFORTIFIED)

2 METHODS TO PRODUCE PEST RESISTANT PLANTS:

CROPS WITH Bt GENE INSERTED IN ITS CELLS

RNA INTERFERENCE (TOBACCO RESISTANT TO NEMATODE)

3 Bt COTTON:

The gene for the insecticidal toxin is transferred to cells of the crops in culture

The crop plant is cultured from these cells and therefore expresses this gene

The toxin protein is produced in the crop which is ingested by the pest that feeds on

The toxin is activated in the gut of the pest larva due to the alkaline pH in the gut of the insect pest

4 APPLICATIONS IN MEDICINE: FORMATION OF INSULIN BY r DNA TECHNOLOGY

Gene for A peptide introduced into E Coli plasmid to produce A peptide

Gene for B peptide introduced into another batch of E Coli plasmid to produce B peptide

The two peptide chains are joined by creating disulphide bonds to form mature Insulin

5 TREATMENT : FOR ADA DEFICIENCY

Enzyme Replacement
-temporary cure

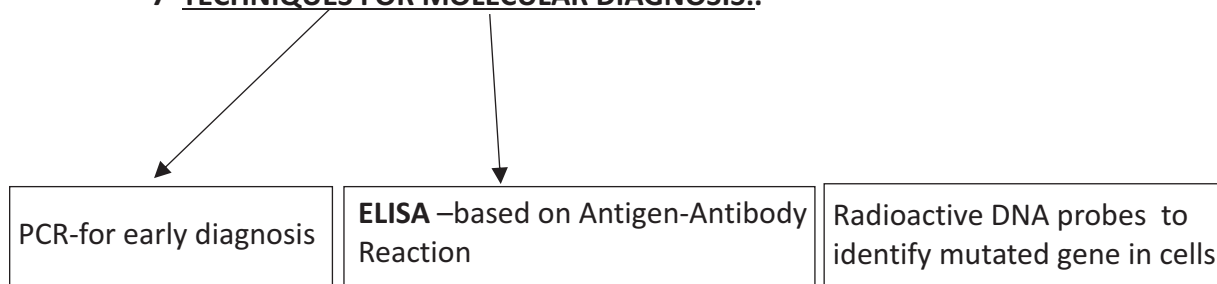
Bone Marrow Transplant –
temporary cure

Gene Therapy

6 GENE THERAPY:

- (c) Lymphocytes cultured outside the body
- (d) The gene for ADA introduced into the lymphocytes using retrovirus
- (e) The lymphocytes with the functional gene is returned to the patients body .
- (f) The lymphocytes produce ADA enzyme as long as they last in the body .
- (g) If the gene is introduced into cells in the embryonic stages ,the cure could be permanent.

7 TECHNIQUES FOR MOLECULAR DIAGNOSIS:



8 USES IN ANIMALS:-

To study normal functions of the body .When an altered gene is introduced the altered effects can be studied.

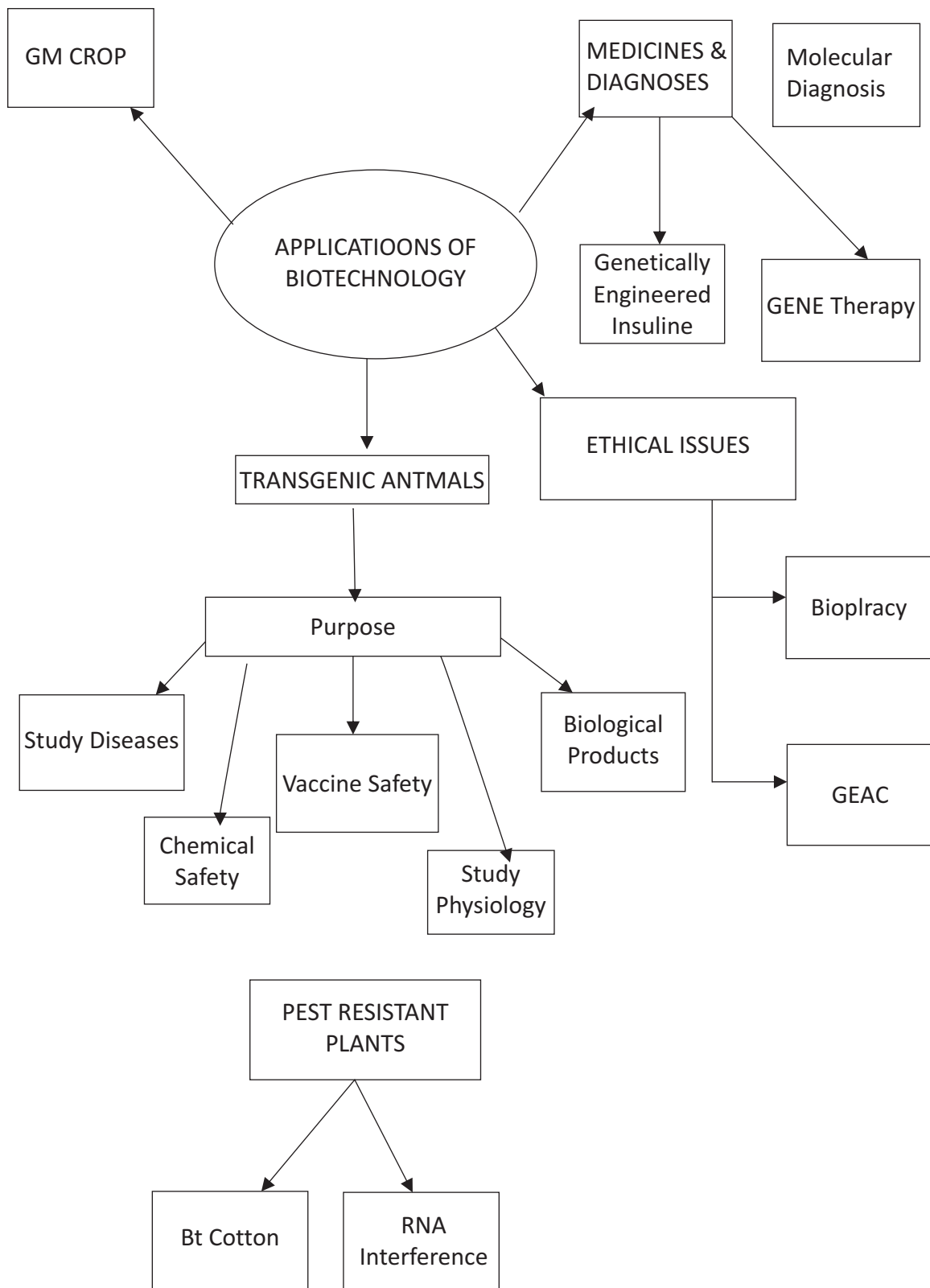
Animals are made as models of human diseases to study their effects.

To produce Medicines, proteins required for treatment of disease,human milk- protein etc

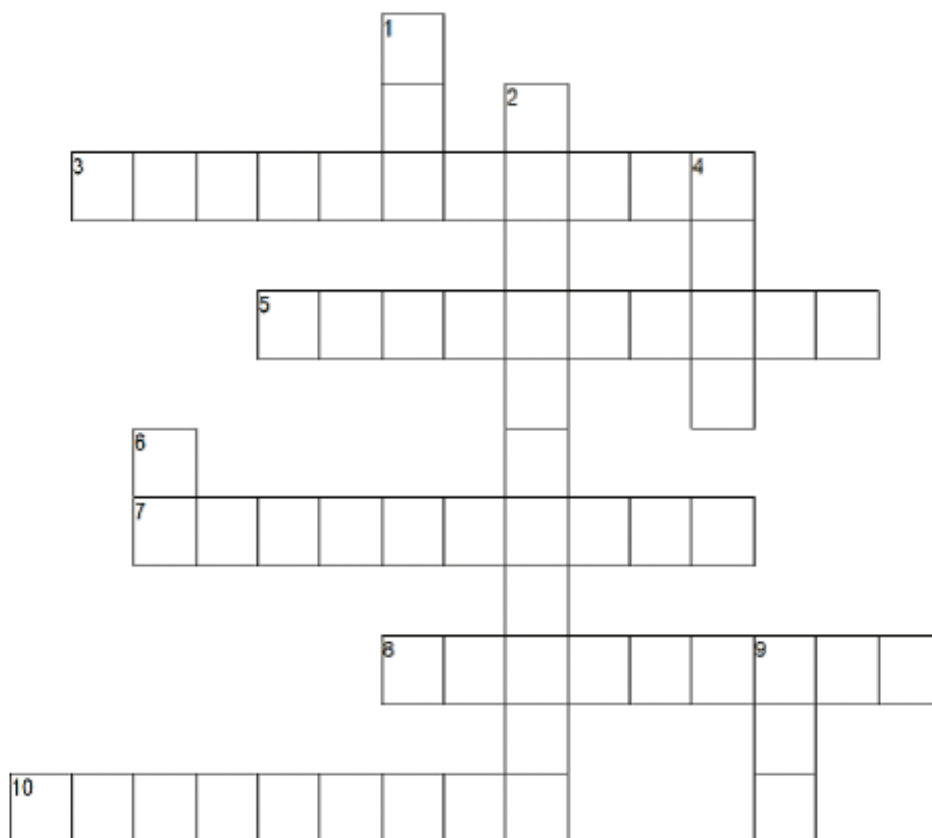
Animals modified to test safety of vaccines like Polio.

Animals with genes sensitive to the chemical, is exposed to the chemical to test the safety of the chemical

**CHAPTER : 12 BIO TECHNOLOGY & ITS APPLICATION
(CONCEPT MAP)**



**CHAPTER : 12 BIO TECHNOLOGY & ITS APPLICATION
(CROSS WORD)**



Across:

- 3 Crystal protein is a toxin coded by a gene cry & is poisonous to some insects- derived from *Bacillus thuringiensis*
- 5 Genetically engineered rice variety rich in vitamin A
- 7 Animals with foreign DNA
- 8 Transgenic tomato-which has blocked production of polygalacturonase.
- 10 Use of bioresources by multinational companies & other organisation without proper autorisation from the countries & concerned people without compensatory payments.

Down:

- 1 Genetically modified plant /animal/bacteria/fungi/, whose genes have been altered by manipulation.
- 2 Collection of methods that allows correction of gene defects diagnosed in a child or embryo.
- 4 Severe Combined Immunodeficiency
- 6 *Bacillus thuringiensis*
- 9 Adenosine deaminase

**CHAPTER : 12 BIO TECHNOLOGY & ITS APPLICATION
(QUESTION BANK)**

1. PCR is a powerful diagnostic technique .Justify. (1)
2. Name the diagnostic test for AIDS when the concentration of HIV is (a) low (b) high. (1)
3. State the principle used in ELISA? (1)
4. What is GEAC .State its function? (2)
5. How are transgenic animals made useful in chemical safety testing and studying diseases? (2)
6. How is use of r DNA better than using traditional methods of agriculture? (2)
7. Name four application of biotechnology (2)
8. Mention two applications of biotechnology in medicine with examples (2)
9. What problem was faced in production of insulin by rDNA technology and how was it resolved (2)
10. What merits do the products made using Biotechnology have ?Give an example of one such product used in treatment.? (3)
11. What are the three critical research areas of Biotechnology (3)
12. How is Biotechnology used to produce bt cotton? Explain (3)
13. How has the bt toxin been effective against insects? (3)
14. How can biotechnology help in increasing the yield of tobacco (3)
15. Name a natural genetic engineer and state how it has been used to create pest resistant tobacco? (3).
16. Insulin produced earlier had problems This has been overcome with rDNA technology. Explain.Why is Insulin not administered orally?. (3)
17. Gene therapy is a better alternative to the other measures taken for ADA deficiency. Why is it a better alternative . What are the other methods used earlier? How can it be done? (3)
18. GMO's have been useful to mankind. List about five useful GMO's created so far. and how they have been useful (5)
19. "Most of the industrialized nations are rich financially but poor in biodiversity and traditional knowledge." Justify this statement with an example.How can you as a Biology student help a tribe who is exploited for their traditional knowledge (4)
20. How would you have used Biotechnology if you had the complete technology in your hands? (4)

**CHAPTER : 12 BIO TECHNOLOGY & ITS APPLICATION
(ANSWER KEY)**

Q.No	Hints	Marks
1	Diagnosis at the time when symptoms are not shown(early stage)of AIDS /Cancer	$\frac{1}{2}+\frac{1}{2}$
2	PCR,ELISA	1
3	Antigen-antibody interaction	1
4	Genetic Engineering Approval Committee,ensure safety and validity of experiments	1+1
6	Made sensitive to chemicals,making them disease models for studying	1+1
6	Use of fertilizers ,pesticides minimized,only desirable traits can be selected for breeding,create tailor made plants for industries	$\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}$
7	(I) therapy,(ii) Diagnostics,(iii) Genetically modified crop in agriculture,(iv)Biofortified food,(transgenic animals)	$\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}$
8	Insulin production ,treatment og genetic disorders with gene therapyas in ADA deficiency	1+1
9	To assemble mature insulin from Proinsulin,separate production of A and B in E Coli peptide and combined	1+1
10	No allergic reactions(Could cause allergy if made using other animals), α -1 antitrypsin in treatment of emphysema	1+1
11	Providing the best catalyst in the form of a microbe/enzyme,creating optimal conditions for their action,downstream processing technologies Toxins of Bacillus introduced into cotton using r DNA,the toxin was activated	1+1+1
12	Toxins of Bacillus introduced into cotton using r DNA,the toxin was activated therefore became reistant to Bollworms	1+1+1
13	The larva ingests the leaves of Bt cotton containing the toxin,the toxin is activated in the gut of the insect by enzymes,which solubilize the toxin, the toxin binds to the lining of epithelial cells create pores cause swelling and death of the insect (i)cause for tobacco reduction due to infection by parasitise, nematode Meloidegyne incogntia, in roots.	1+1+1
14	RNA interference,Agrobacterium as vectors,formation of complementary RNA double strand specific to nematode DNA,silencing of mRNA of nematode,makes tobacco pest resistant	1+1+1
15	Agrobacterium tumifaciens,By RNA interference,and stopping of nematode protein production,agrobacterium as vectors to introduce genes into tobacco plants which result sin ,formation of complementary RNA double strand specific to nematode DNA, silencing of mRNA of nematode, makes tobacco pest resistant	1+1+1

BIOLOGY



16	Obtained from animals caused allergic reactions, Insulin produced using rDNA did not cause allergic reactions as animal proteins were not used here, Insulin being a protein gets digested if taken orally	1+1+1
17	Permanent cure, Bone marrow transplantation and enzyme replacement therapy, introducing cDNA of a functional ADA using retrovirus into the stem cells/early embryonic stages	1+1+1
18	Crops tolerant to abiotic stress, reduced reliance on chemicals, reduced post harvest loss, enhanced nutritional value, physiological models, human lactalbumin-producing cow (any 5)	1+1+1+1+1
19	(i) ethical issues (iii) e.g. basmati an Indian variety, patent obtained by US (iv) awareness of Biopiracy and need for Biopatent of the traditional resources and wisdom	1+1+2
20	Any five applications of the student's choice-values of societal needs problem awareness, selflessness reflected in the answers	1+1+1+1+1



UNIT - 10 ECOLOGY
CHAPTER : 13 ORGANISMS AND POPULATIONS
(KEY POINTS)

S.N	Term	Explanation
1	Benthic Zone	Angler
2	Carrying capacity	Max. no. of an organism of a population that can be sustained by a given habitat or ecosystem
3	Ecological niche	Ranges of tolerance, resources utilizes & its functional role in an ecosystem
4	Aerenchyma .	In aquatic plants gives buoyancy to the aquatic plants due to presence of air chambers
5	Eurythermal	Tolerate & thrive in a wide range of temperatures
6	Stenothermal	Organisms restricted to a narrow range of temperatures
7	Habitat	Place where organism lives, reproduces
8	Sexual deceit	Ophrys get its flower pollinated
9	Phytophagus	Animal feeding on plant sap & other parts of plants
10	Allen's rule	Mammals in colder climate have shorter ears & shorter limbs to minimise heat loss.
11	Pseudocopulates	Male bee is attracted to what it perceives as female "pseudocopulates" with the flower..e.g.Mediterranean orchid-ophrys-sexual deceit —pollinated-bees, bumblebees.-co-evolution-operates.; (petal similar to female bee)
12	Brood parasitism	Cuckoo/koel lays its eggs(resembles the egg of host)in the nest of crow & lets the host incubate them
13	Competitive release	A species whose distribution is restricted to a small geographical area because of the presence of a competitively superior species, is found to expand its distributional range when the competing sps. is removed.(Connell's elegant field experiments —rocky sea coasts of Scotland-larger competitively superior barnacle balanus dominates, & excludes smaller barnacle chatharrialus), Abingdon Tortoise eliminated by goat due to greater grazing efficiency

14	Regulators	Organisms maintain homeostasis by physiological & behavioral means
15	Conformers	Organisms change their osmotic concentration of the body fluids change with that of the ambient water osmotic concentration
16	Age pyramid	Age distribution (percent individuals of a given age group) is plotted for the population. Shape of the pyramid- expanding, stable & declining
17	Natality Mortality Emigration Immigration	Birth rate Death rate Moving out-population decreases Coming in population increases.
18	Logistic growth	When the resources become limited ,population growth will be 's shaped,' sigmoid', no exponential
19	Mutualism	Interaction in which both species are benefited
20	Amensalism	Interaction between 2 different species —one harmed & the other neither benefited nor harmed.
21	Predators	Interspecific interaction where an animal —predator kills & consumes the other weaker animal-prey.
22	Competition	Both the species suffer & it may exist between some sps.(interspecific competition) or between individuals of different species(intraspecific competition)
23	Gause's Principle	'Competitive exclusion principle' states that two closely related species competing for the same resource cannot coexist indefinitely & the competitively inferior one will be eliminated eventually by the superior one
24	Resource partitioning, co-existence.	Phenomenon- in which species facing competition might evolve mechanisms that promote co-existence rather than exclusion. MacArthur showed that 5 closely related warblers living on the same tree were able to avoid competition & co-exist due to behavioural differences in their foraging activities.
25	Parasitism	one sps. Depends (parasite) on other sps. (host) for food, shelter, and in the process host is damaged.



BIOLOGY

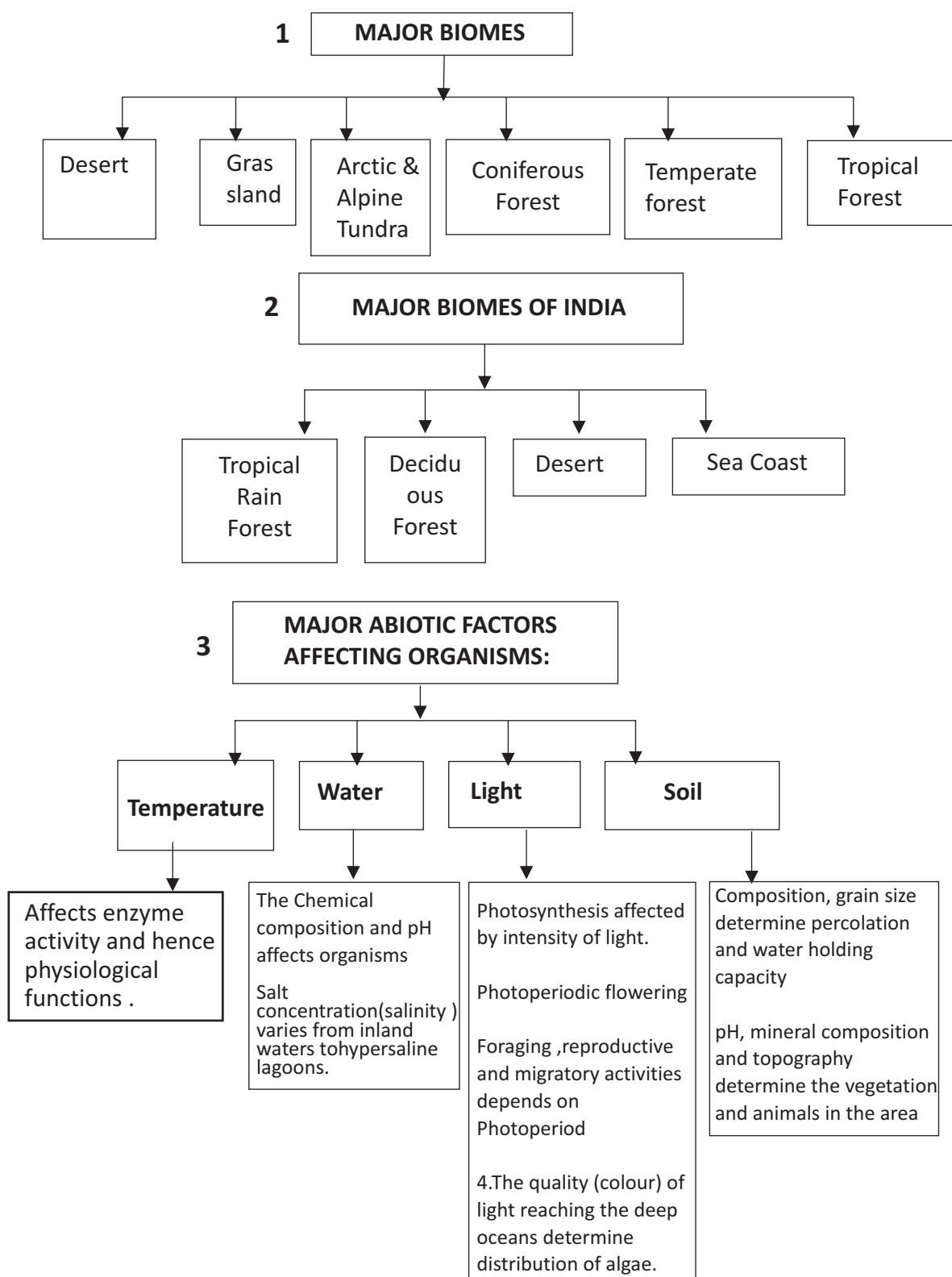
26	Endoparasite	Parasite live inside the host's body. E.g. Plasmodium
27	EctoParasite	Parasite feed on the external surface of the host organism for food & shelter-lice, copepods, ticks, cuscuta
28	Diapause	In unfavourable conditions, many sps. In lakes & ponds are known to enter a stage of suspended development-diapause. It occurs both in summer & winter, e.g. Zooplankton —diapause in lakes & ponds
29	Hibernation	Winter /summer sleep to evade stress/unfavourable conditions. Winter-bear winter sleep. Frog
30	Prey defence mechanism	Insects & Frogs-camouflaged. Monarch Butterfly-distasteful to birds (by eating poisonous weed, -spl chemical into body) Plants-thorns/spines-Acacia, Cactus Plants produce highly poisonous chemicals like cardiac glycosides, nicotine, caffeine, quinine, strychnine, opium-defence against grazers & browsers.
31	Phenotypic adaptation	Non-genetic temporary nonheritable changes in physical or morphological characteristics/behaviour/physiology-in response to changes in environment. E.g. appearance of mountain sickness at high altitude —gradually disappear by increasing RBC, increasing breathing rate.
32	Endothermic	Warm blooded- regulate body temp.-Monkey
33	Ectothermic	Cold blooded-changes its body temp with that of envt.
33	Ecology	Cold blooded-changes its body temp with that of envt
34	Ecology	Branch of Science —deals with interactions among organisms & between the organisms (biotic)& its Physical (abiotic) environment
35	Population	Sum total of all individuals of a species in a specific geographical area.
36	Species	Group of individuals of one or more populations —resemble each other, interbreed among themselves successfully.
37	Biotic community	Assemblage of all the populations of different species present in an area that interact among themselves. 3 types, Plant community, Animal community, & Microbial community

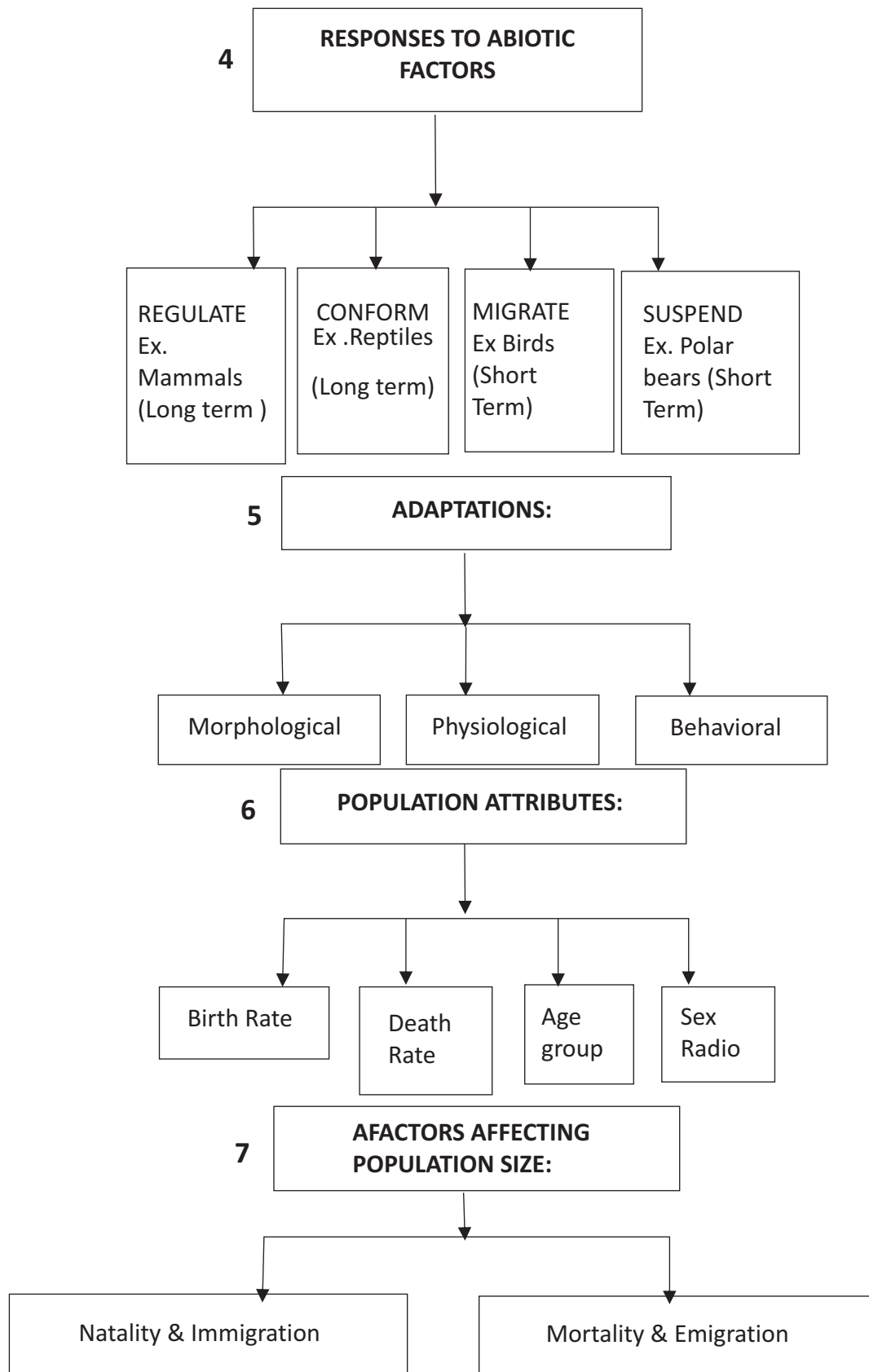


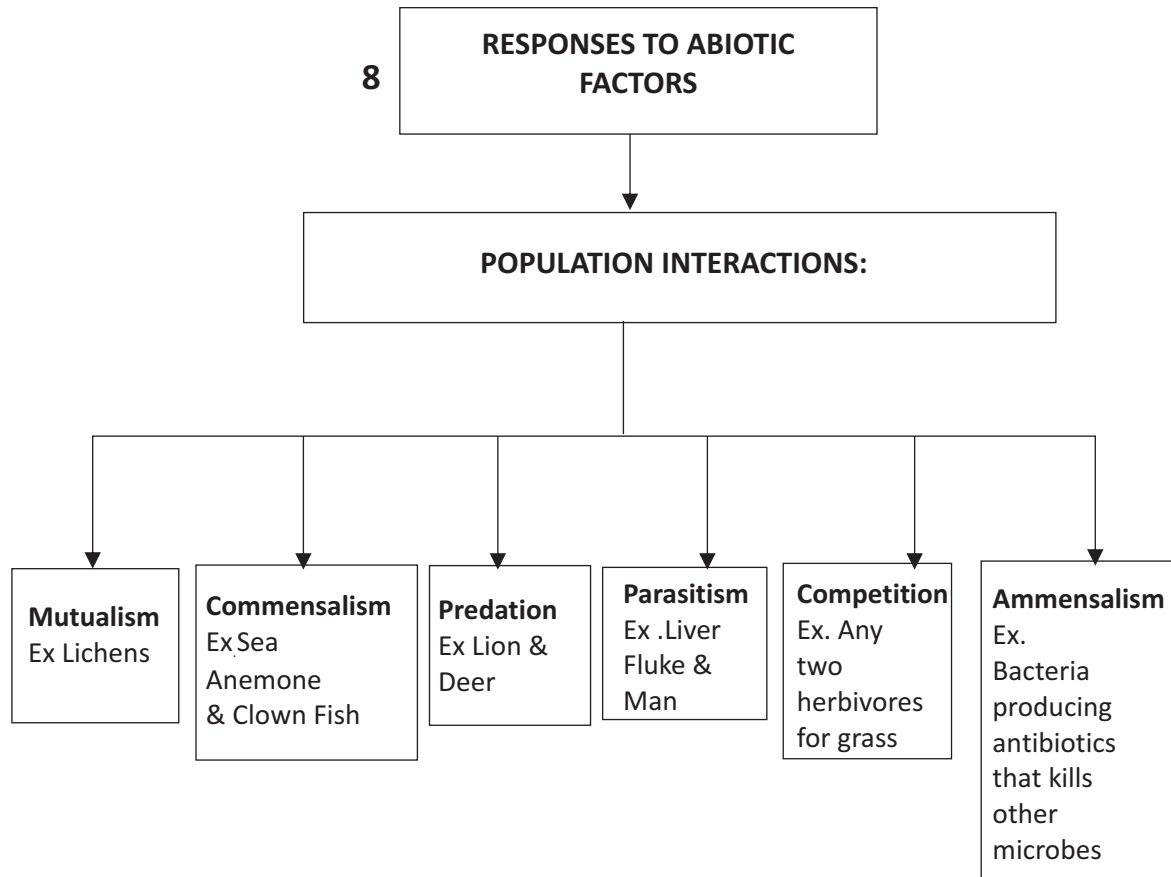
BIOLOGY

38	Ecosystem	Sum total of biotic & abiotic components of a particular geographical area being integrated through exchange of energy & recycling of nutrients are collectively called ecosystem
39	Biome	Large unit of environment, consists of a major vegetation type & its associated fauna in a specific climatic zone
40	Biosphere	All ecosystems of the world-collectively called Biosphere
41	Factors of environment	Abiotic(Temperature, water, light, Soil), Biotic(Pathogen, Parasites, Predators & Competitors)
42	CAM	Crassulacean Acid Metabolism-Photosynthetic pathway
43	Adaptation-desert plants	Waxy coating on leaf-cuticle, CAM(Stomata closes during day), Spines-in place of leaves--> reduce water loss
44	Adaptation-Mammal-Cold climate	Shorter ears & limbs-Allen's rule, Thick layer of fat-blubber below skin-insulator-reduce loss of heat.
45	Adaptation-desert-Lizards	Absorb heat from sun when body temp. drops below comfort zone., move to shade when ambient temp. temp. rise above comfort levels
46	Adaptation-high altitude-human	Compensate low O ₂ by increasing RBC & total HB-increased breathing-vital capacity.
47	Population density	No. of individuals of a species per unit area or volume. $PD = N/S$; N=individuals, S=Area
48	Birth rate	No. of births per 1000 individuals of a population
49	Death rate	No. of deaths per 1000 individuals of a population
50	Sex ratio	No. of females per 1000 males of a population in a given time
51	Exponential growth	-common where the resources (food+ space) are not limited. $dN/dt = (b-d)N = rN$; $r = \text{intrinsic rate of natural increase}$

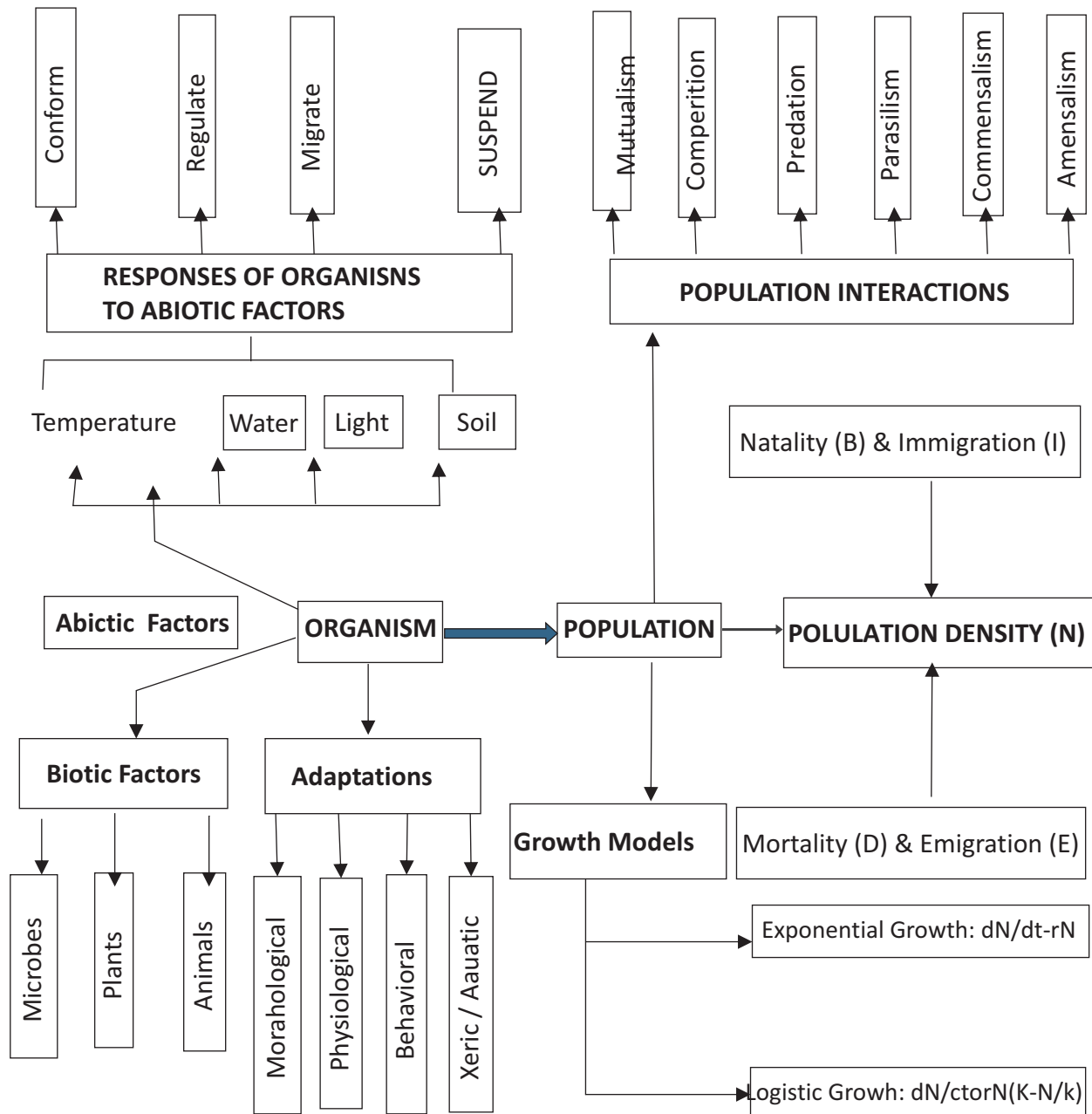
**CHAPTER : 13 ORGANISMS AND POPULATIONS
(FLOW CHART)**



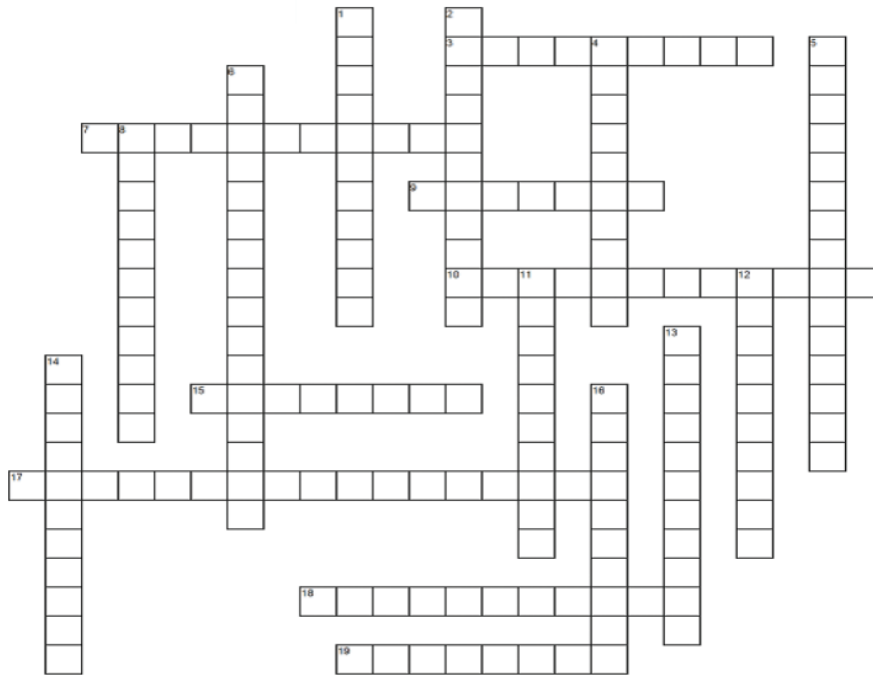




**CHAPTER : 13 ORGANISMS AND POPULATIONS
(CONCEPT MAP)**



CHAPTER : 13 ORGANISMS AND POPULATIONS (CROSS WORD)



Across:

- 3 It refers to the number of deaths in a population at a given period
- 7 It is the process of spending the winters or very cold conditions in an inactive or dormant state to escape in time.
- 9 It is the place where an organism lives.
- 10 these are the animals, which can tolerate only a very narrow range of temperature and are restricted in distribution.
- 15 refers to the number of births added to the initial population during a given period.
- 17 It refers to the total number of individual species, present per unit area or volume, at a given time,
- 18 It is the process of spending the dry hot periods or summers in an inactive or dormant state to escape in time.
- 19 It is a stage of suspended development shown by many zooplankton species in fresh water bodies.

Down

- 1 These are the animals, which can tolerate a wide range of temperature and are geographically widely distributed.
- 2 It is an interaction between species where one is harmed and the other is unaffected..

- 4 Any morphological, physiological or behavioural attribute of an organism that enables it to survive and reproduce in its habitat.
- 5 It refers to the range of conditions an organism can tolerate, the resources it utilises and its distinct functional role in the ecological system.
- 6 It is the maximum number of individuals of a population (or a population) that can be sustained by a given habitat.
- 8 It refers to the number of individuals of the same species that come into a habitat from elsewhere during the time period under consideration,
- 11 It refers to the number of individuals of the same species that left the habitat during the time period under consideration,
- 12 Those organisms which maintain a constant internal (within the body) environment (homeostasis), despite the fluctuations in the environment.
- 13 These are the animals, which can tolerate a very narrow range of salinity
- 14 It is the maintenance of a steady internal environment by organisms,
- 16 These are the animals, which can tolerate a range of salinity.

CHAPTER : 13 ORGANISMS AND POPULATIONS (QUESTION BANK)

1. Predators are prudent. Why? 1
2. Will the distribution level of species be affected by gradual increase in temperature? Say briefly 1
3. How is orchid ophrys pollinated by sexual deceit? 1
4. What is the relationship between egret and grazing cattle? Why? 1
5. Why is female mosquito not considered a parasite? 1
6. What is brood parasitism? 1
7. How is liver fluke adapted to parasitism? 1
8. Gause's competitive exclusion principle, where does this apply? 1
9. How is competition avoided in Nature? Give example. 1
10. How have prey reduced impact of predation? 2
11. How have plants developed defence against predators? 2
12. How are the four levels of biological organisations in ecology interrelated? 2
13. How does temperature affect distribution of animals? Name two types based on their temperature tolerance. 2
14. How does water affect aquatic animals? Explain. 2
15. What is the importance of light for organisms? How do deep sea organisms get their energy? 2
16. Which is the deepest dwelling algae- red, green or brown, why? 2
17. What characteristic of soil determine the vegetation? How are these different at different places? 2
18. What adaptation have parasites evolved? 2
19. What do you mean by competitive release? 2
20. What are the roles of predators? 3
21. Give three example of mutualistic relationship. 3
22. Name the major biomes and the factors by which they vary. 3
23. What are the factors that lead to the variation in the conditions of the habitat? 3
24. How does constancy in the internal environment help an organism? How do organisms achieve it with regard to temperature? Give example. 3
25. What alternatives do organisms take if stressful external conditions are localized? Give examples. 3
26. What is altitude sickness? How does the body overcome this? 3
27. Give example of adaptation to desert condition shown by organisms. 5
28. Give example of biochemical adaption shown by organisms. What are the behavioral adaptations shown by organisms. 5
29. Define population and population density. How is it estimated? What are the attributes that determine the population characteristics? 5
30. What factors contribute to growth in population. In what way does logistic growth differ from exponential growth? 5
31. Define adaptation. What is the adaptation shown by, - a, whales, b, kangaroo rat, c, polar bear. Why do cold regions not have small animals? 5
32. Lions are natural predators .Can you compare this act with that of indiscriminate killing of animals by humans for their leather horns etc . Comment .What can be done to create awareness about this. 4



BIOLOGY

**CHAPTER : 13 ORGANISMS AND POPULATIONS
(ANSWER KEY)**

Q.NO.	Value Points	Marks
1	They keep they prey population in check without causing their extinction	1
2	Yes the pattern of distribution will shift towards the poles with increase in temperature	1
3	Sexual deceit	1
4	Commensalism-egret benefits while the cattle are not affected	$\frac{1}{2}+\frac{1}{2}$
5	It does not live in/on the body of the host	1
6	Onespecieslayseggsinthenestofanotherbird,letsthehostincubatethem.E.g. Cuckoolays eggsinthenest ofacrow	1
7	Flat body,suckers for adhering to the host	$\frac{1}{2}+\frac{1}{2}$
8	Organisms living closely related and in case if resources are limiting	1
9	Resource partitioning,two species adopt to have different razing time to avoid competition.	1
10	Various defences-distasteful ,cryptically coloured to avoid detection	1+1
11	Morphological-thornsand chemical-cardiac glycosides defences	1+1
12	-Similar organisms make Populations -make communities make Biomes	$\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}$
13	Enzymes activity and therefore metabolic activities ,Eurythermal,stenothermal	$\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}$
14	pH of water salt concentration Salinity,	1+1
15	Quality of light,photoperiod affect photosynthesis, affectreproductive, for agingactivities, ii)scavenging and predation	1+1
16	Red-has longest wavelength	1+1
17	Soil composition,grainsize,percolation and water holding capacity-different based on climate and the weathering process	1+1
18	Loss of unnecessary sense organs,presence of adhesive organs,suckers , loss of digestive system,high reproductive capacity	1+1
19	A species whose distribution is restricted because of the presence of a competitively superior species, expands its distribution when the superior competitor is removed	1+1
20	Conduits of energy,checks prey population,maintains species diversity	1+1+1
21	Lichens-algae and fungi,bird and cattle,wasp and fig tree,	1+1+1
22	Desert,forest and grasslands-Precipitation,temperature,soil	1+1+1

23	Soil,temperature,water,light and biotic components like pathogens, parasites, predators and competitors.	1½+1½
24	Constant internal environment permits all biochemical reactions to proceed with maximal efficiency,ii)regulate by physiological means eg sweating to reduce temperature when the external temperature increases.	1+1+1
25	Suspend activities for a brief period till the stressful conditions go(Hibernate or aestivate),migrate –move away to afar off place and return when stressful period is over-birds	1½+1½
26	At higher altitudes the body shows symptoms like nausea,fatigue, heartpalpitations, due to insufficient oxygen in the body.The body increases RBC production,decreases oxygen binding capacity of haemoglobin and I ncreases breathing rate.	1½+1½
27	Spines in place of leaves in cactus,deeply set stomata,thick cuticle covering leaves, CAM photosynthetic pathway ,minimum loss of water in excretion, flattened green photosynthetic stems in place of leaves	½ x 6
28	Presence of thermostable enzymes in thermophiles,presence of antifreeze proteins in cold water fishes, presence of molecules that can withstdnd high pressure conditions in the deep sea .Lizards bask in the sun when temperature of their body drops and move to shade,burrows when the temperature around starts increasing	1x5
29	The organisms of the same species at a given time in a specific area. Number of organisms is a measure of population density,or the biomass cover,ii) attributes are natality,mortality,immigrationemigration,sex ratio and age distribution	1+1+1+1+1
30	Increase Natality and Immigration .decrease mortality and emigration. exponential growth takes place when resources are unlimited and therefore the reproductive potential is highest.,logistic growth shows that the population cannot grow beyond the carrying capacity of the environment.(Depict graphically)	1+1+1+1+1
31	Adaptation is any attribute of an organism that allows the organism to survive and reproduce in its habitat.i)Blubber a layer of fat to prevent heat loss from the body ii)the animal needs only the metabolic water to survive iii)hibernation in polar bears iv)they lose heat faster than the rate of production as their surface area is large compared to its volume.	
32	No predators are prudent and with decrease in prey population the predator population also decreases. This is a Natural chain that helps in keeping a check on population size.Humans on the other hand kill for greed and not for basic needs.It should be realized that every species has a significant role in Nature	1+1+1+1

CHAPTER : 14 ECOSYSTEM (KEY POINTS)

S.N	Term	Explanation
1	Photosynthetic efficiency	Some plants have more efficiency to trap sunlight-sugarcane
2	Ecosystem	The unit including biotic and abiotic components and their interactions .(Coined-Sir A. G. Tansley1935)
3	Abiotic	Non-living (ex. Temp,light, water, utrients)
4	Biotic:	Living organisms (called biota)
5	Functional Components of Ecosystem	1. Productivity, 2. Decomposition 3. Energy flow 4. Nutrient cycling
6	Primary Production	Amount of biomass or organic matter produced per unit area. Over a time period by plants during photosynthesis, expressed in terms of weight (e) or energy (kcal m-2).
7	Productivity	Rate of biomass production-expressed in terms of $g^{-2}yr^{-1}$ or $(kcal m^2)yr^{-1}$
8	Gross primary productivity Net primary productivity Secondary productivity	-rate of production of organic matter during photosynthesis-GPP GPP- respiratory loss(R)=NPP-> available to heterotrophs (herbivore & decomposers) Rate formation of new organic matter by consumers
9	Decomposition	Decomposer& break down complex organic matter into inorganic substances like carbon dioxide, water & nutrients
10	Detritus	Dead plant remains such as leaves, bark flowers & dead remains of animals, including faecal matter.-raw material for decomposition, found above & below the ground.
11	Decomposition	Includes Fragmentation, leaching, catabolism, humification & mineralisation
12	Detritivores	Earthworm-breakdown detritus into smaller particles —fragmentation.
13	Process of Decomposition	Fragmentation- Earthworm-breaks down detritus into smaller particles Leaching--Water soluble inorganic nutrients go down into soil horizon, get precipitated as unavailable salts Catabolism-Bacterial & fungal enzymes convert degraded detritus into Inorganic substances(Simpler) Humification-Occur during decomposition in the soil, lead to accumulation of dark coloured amorphous substance resistant to microbial action, undergoes decomposition at extremely slow rate.(Humus)! Mineralisation- Humus degraded by microbes & release inorganic-nutrient
14	PAR	Photosynthetically Active Radiation
15	Producers	Autotrophs-produce organic matter from inorganic matter (producing chemical energy in the form of organic matter)



BIOLOGY

16	Consumers	Heterotrophs-herbivore-carnivore / that depend on producers or other consumers for food.
17	Decomposers	Fungi & bacteria-heterotrophic organisms that break down(decompose)detritus
18	Saprotrophs	Sapro- meaning decompose; decomposers secrete digestive enzymes that breakdown dead & waste materials into simple, inorganic material-subsequently absorbed by them.
19	Food chain	Transfer of energy from producers to top consumers through a series of organisms, one organism holds only one position in the chain, thereby transferring matter/energy from one level to the next.
20	Food web	No. of food chain interconnected with each other like a web, one organism holds more than one position., there are series of branching lines, competition among different members of different trophic levels.(complex network of many interconnected food chains and feeding relationships_
21	Standing crop	Each trophic level with certain mass of living material at a particular time
22	Seral community	Individual transitional community —seral stage/seral community
23	Climax community	Community that is in near equilibrium with the environment
24	Pioneer community	Species that invade a bare area.
25	Primary succession	Establishment of a biotic community in a newly cooled lava, bare rock, newly created pond or reservoir.-slow processes (In water primary succession Phytoplankton->free floating angiosperm-rooted hydrophytes->sedges grasses-> trees->forest(climax)
26	Secondary succession	It begins in areas where natural biotic communities have been destroyed e.g. abandoned farm land, buried or cut forests. Since soil is available —faster process.
27	Hydrarch succession	Takes place in wetter areas(water bodies)& the series progress from hydric to mesic conditions
28	Xerarch succession	Takes place in dry areas (rocks)& series progress from xeric to mesic conditions.
29	Gaseous cycle	Reservoir-atmosphere; nutrient —gas/vapour; quick/faster cycling eg. C& N ₂ -cycle
30	Sedimentary Cycle	Reservoir-earth crust; Nutrient-nongaseous; slow; e.g. P,S cycle
31	Phosphorous	Make shell, bone, teeth, biological membrane, nucleic acids, cellular energy transfer system.
32	Ecosystem services	Robert Constanza-18 trillion US \$ price tag of Nature's life support services.- '1. Purify air,2.cycle nutrient,3.mitigate droughts .& floods, 4.generate fertile soil,5.provide wild life habitat, 6.Pollinate crop,7.Maintain biodiversity,8.Provide storage site for C, 9.provide aesthetic, cultural & spiritual.



BIOLOGY

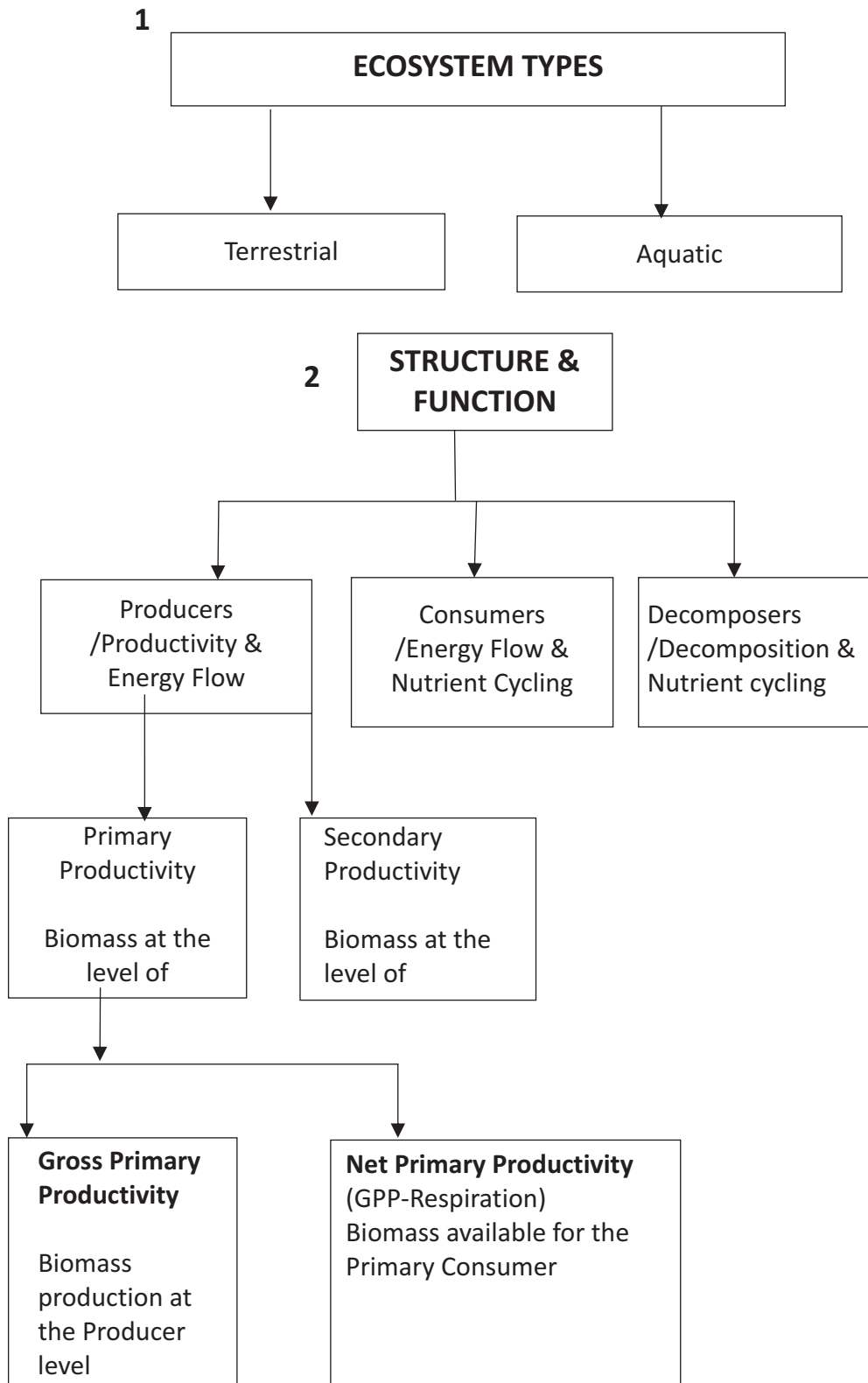
33	Energy flow	Solar energy 100%-->plants 2-10%—>consumers; Energy is transferred in an Ecosystem & in each step food is degraded & major portion lost as heat energy at each step.
34	Lindeman's 10% Law	At each step of food chain when food energy is transferred from one trophic level to the next only 10% of energy is passed on to next level.-(1942).
35	Ecological pyramid	The relation between producers & consumers in an ecosystem —graphically represented in the form of pyramid
36	Pyramid of Number	Relationship between producers & consumers in an ecosystem represented in the form of a pyramid in terms of number.- upright(except tree ecosystem-inverted)
37	Pyramid of Biomass	Relationship between producers & consumers in an ecosystem represented in the form of a pyramid in terms of biomass.(biomass in sea-inverted, e.g.fish-Plankton)
38	Pyramid of energy	Relationship between producers & consumers in an ecosystem represented in the form of a pyramid in terms of flow of energy.- always upright never inverted
39	Ecological succession	Sequential, gradual & predictable changes in the species composition in an area.
40	Sere	Entire sequence of communities that successively changes in a given area.
41	Biome	:Any of the world's major ecosystems, classified according to the predominant vegetation and characterized by adaptations of organisms to that environment.Terrestrial regions inhabited by certain types of life,especially vegetation. eg. Deserts, grassland and forests.
42	Carrying capacity(K)	-maximum population of a particular species that a given habitat can support over a given period of time.
43	Competition	-two or more individual organisms of a single species(intraspecific competition) or two or more individuals of different species (interspecific competition) attempting to use the same /scarce resources in the same ecosystem.
44	Consumer	-organism that cannot synthesize the organic nutrients it needs and gets its organic nutrients by feeding on the tissues of producers or of other consumers;generally divided into primary consumers(herbivores),secondary consumers(carnivores),tertiary(higher-level)consumers,omnivores,and detritivores (decomposers and detritus feeders).
45	Deforestation	-removal of trees from a forested area without adequate replanting.
46	Desert	-biome where evaporation exceeds precipitation and the average amount of precipitation is less than 25centimeters(10inches)ayear.Such areas have little vegetation or have widely spaced ,mostly low vegetation.



BIOLOGY

47	Desertification	-conversion of rangeland, rain-fed cropland, or irrigated cropland to desertlike land,with a drop in agricultural productivity of10% or more.It is usually caused by a combination of overgrazing,s oilerosion,prolonged drought,and climate change.
48	Ecological niche	-total way of life or role of a species in an ecosystem .It includes all physical,chemical,and biological conditions a species needs to live and reproduce in an ecosystem.
49	Environmental degradation	-depletion or destruction of a potentially renewable resource such as soil, grassland,forest, or wildlife by using it at a faster rate than it is naturally replenished. If such use continues, the resource can become nonrenewable on a human time scale or nonexistent (extinct).
50	Extinction	-complete disappearance of a species from the earth. This happens when a species cannot adapt and successfully reproduce under new environmental conditions or when it evolves into one or more new species (speciation).
51	Forest	-biome with enough average annual precipitation(atleast76centimeters,or30inches) to support growth of various species of trees and smaller forms of vegetation.
52	Grassland	-biome found in regions where moderate annual average precipitation (25to76centimeters,or10to30inches)is enough to support the growth of grass and small plants, but not enough to support large stands of trees.
53	Habitat	-place or type of place where an organism or a population of organisms lives.
54	Keystone species	species that play roles affecting many other organisms in an ecosystem.
55	Limiting factor	-single factor that limits the growth ,abundance, or distribution of the population of a species in an ecosystem.
56	Native species	-species that normally live and thrive in a particular ecosystem.
57	Pioneer community	-first integrated set of plants, animals, and decomposers found in an area undergoing primary ecological succession.
58	Pioneer species	-first hardy species, of microbes, mosses, and lichens, that begin colonizing a site as the first stage of ecological succession.
59	Primary succession	-sequential development of communities in a bare area that has never been occupied by a community of organisms.
60	Secondary succession	-sequential development of communities in an area in which natural vegetation has been removed or destroyed but the soil is not destroyed and has remnants of vegetation.
61	Stratification	Stratification in an ecosystem refers to the vertical distribution of different species occupying different levels

**CHAPTER : 14 ECOSYSTEM
(FLOW CHART)**



3

**ENERGY FLOW
FROM SUN TO PRODUCERS TO CONSUMERS**

10% law only (10% of the previous level is transferred to the successive level)

Flow is unidirectional
Loss of energy in the form of heat takes place at each level

Flow is from Producers through the Primary, secondary, tertiary consumers

Decomposers derive energy from dead bodies of both Producers and consumers

4

Decomposition

Mineralisation (Slow breakdown of humus to release minerals)

Humification (Formation of humus)

Leaching (Inorganic nutrients percolate into the soil)

Catabolism (Action of enzymes on detritus)

Fragmentation by (detritivores)

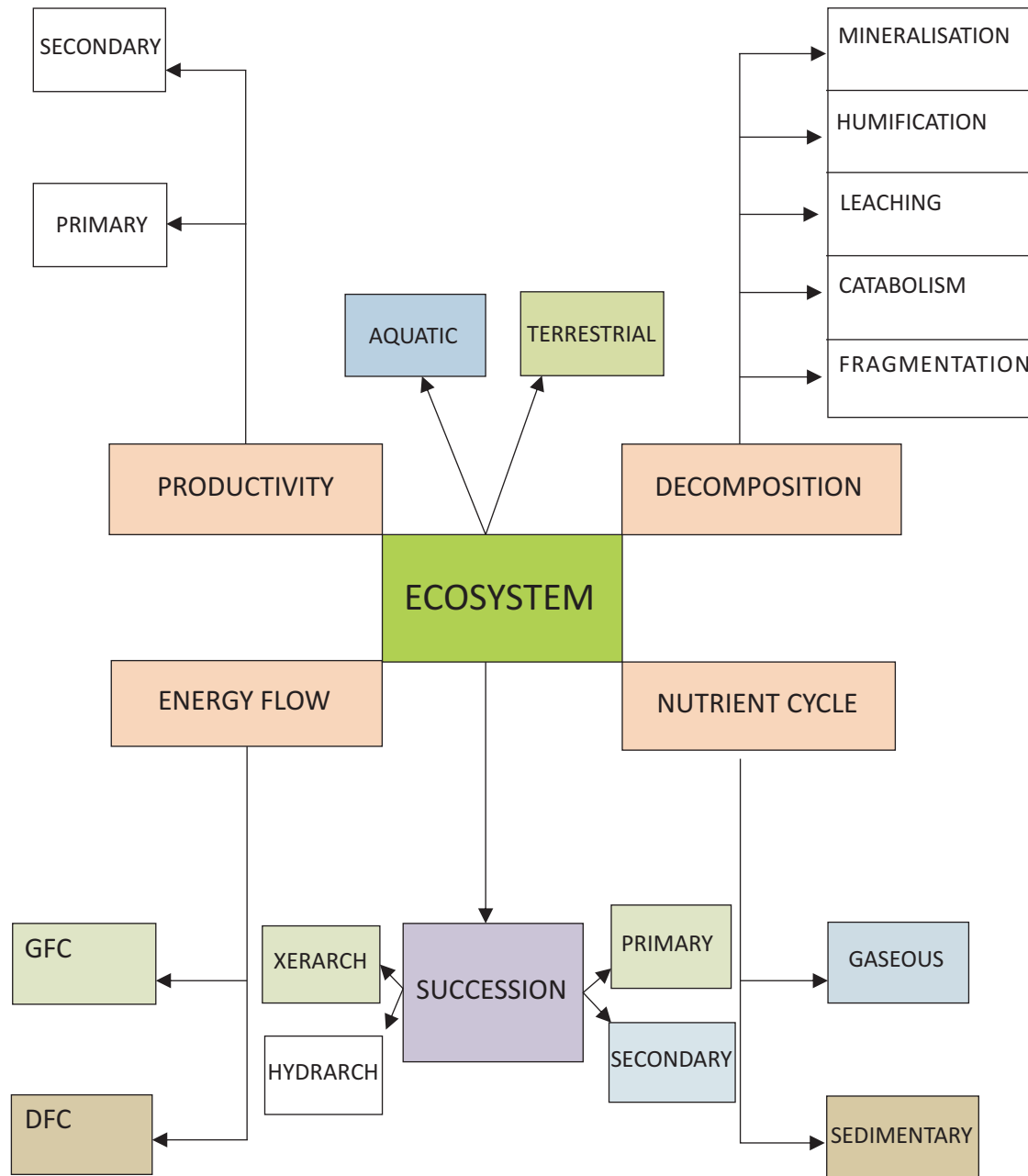
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FOOD CHAINS

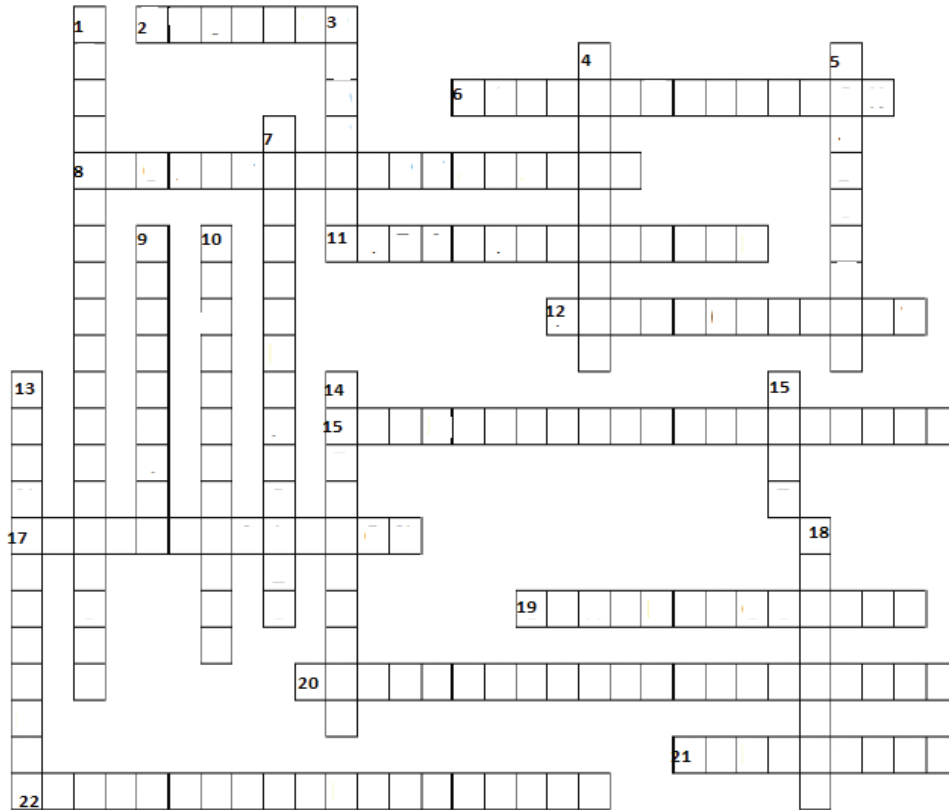
Detritus Food chain
Begins with detritus

Grazing food Chain
Begins with Producers

CHAPTER : 14 ECOSYSTEM (CONCEPT MAP)



**CHAPTER : 14 ECOSYSTEM
(CROSS WORD)**



ACROSS:

- 2 An interconnected matrix of food chains,
- 6 It is the process by which humus is degraded to release inorganic nutrients
- 8 The graphic representation of the trophic levels of a food chain.
- 11 refers to the vertical distribution of different species occupying different levels.
- 12 The rate of production of biomass is called
- 16 Ecological succession is a community-controlled process in which the structure and composition of communities change in an orderly and manner, leading ultimately to the establishment of a climax community.
- 17 It is the process in which the complex organic matter is broken down into simpler organic substances and ultimately into inorganic compounds
- 19 It is the amount of nutrients such as nitrogen, phosphorus present in the soil at any given time.
- 20 It is defined as the rate of assimilation and formation of new organic matter by consumers.
- 21 All organisms/animals which depend directly or indirectly on plants for their food.
- 22 It is defined as the amount of biomass or organic matter produced per unit area over a time period by the plants during photosynthesis.
- 3 It is the amount of living /organic matter present in an organism/a trophic ecosystem
- 4 The green plants of an ecosystem are called
- 5 It refers to the transfer of energy (food) from the producers through a series of organisms
- 7 The species which invade a bare area and initiate the ecological succession
- 9 is a functional unit of nature consisting of biotic and abiotic factors, where the living organisms interact among themselves and also with their physical environment (abiotic factors).
- 10 Those organisms which feed on the detritus and break down into smaller particles.
- 13 It is the mass of living matter in unit area
- 14 The primary consumers, which depend only on plants for their food needs.
- 15 The entire sequence of communities that successively change in a given area in a climax community, is called a sere.
- 18 The dead remains of plants and animals and also the faecal matter without compensatory payments.

DOWN:

- 1 It is the continuous exchange of nutrients among organisms and between organisms and their physical environment



CHAPTER : 14 ECOSYSTEM (QUESTION BANK)

1. How is a food web formed? 1
2. What is stratification in a forest? 1
3. Define standing crop? How is it measured? 2
4. What is the importance of humus? 2
5. Why is secondary succession faster than primary succession? 2
6. Name the pioneers and climax of primary succession in water and on rocks. 2
7. As succession proceeds the type and number of animals and decomposers also change.
8. Define ecological succession. What is sere 2
9. What characteristic features are seen in Ecological succession? 2
10. Why is there a restriction on trophic levels in a grazing food chain? Is there such a limitation in the detritus food chain? Explain. 2
11. Schematically show the flow of energy in a grazing food chain from the sun. 2
12. Justify the statement succession and evolution would have been parallel processes at that time when life started on earth. 3
13. In general all pyramids are upright. Explain. What are the exceptions to this generalization? 3
14. What are the limitations of ecological pyramids? 3
15. What are the producers in grass land and oceans .How is GPP different from NPP? Why is the productivity in oceans lesser than on land? 5
16. Why is it reasonable to think that biodiversity should carry a hefty price tag? Justify. 5
17. a, Why are Carbon and Phosphorus essential to living organisms?
 a. b, What are the natural reservoirs of these elements and in what form?
 b. c, Give the important differences between the two cycles in nature ? 5
18. With a flow chart explain the process of decomposition .What factors affect this process? (5)
19. What are the major functions of an ecosystem. How do the structural components work as a unit to perform the function? (5)
20. Humans do a disservice to nature by creating a desert from a forest. Comment and say why should it be a cause of concern? (4)



BIOLOGY

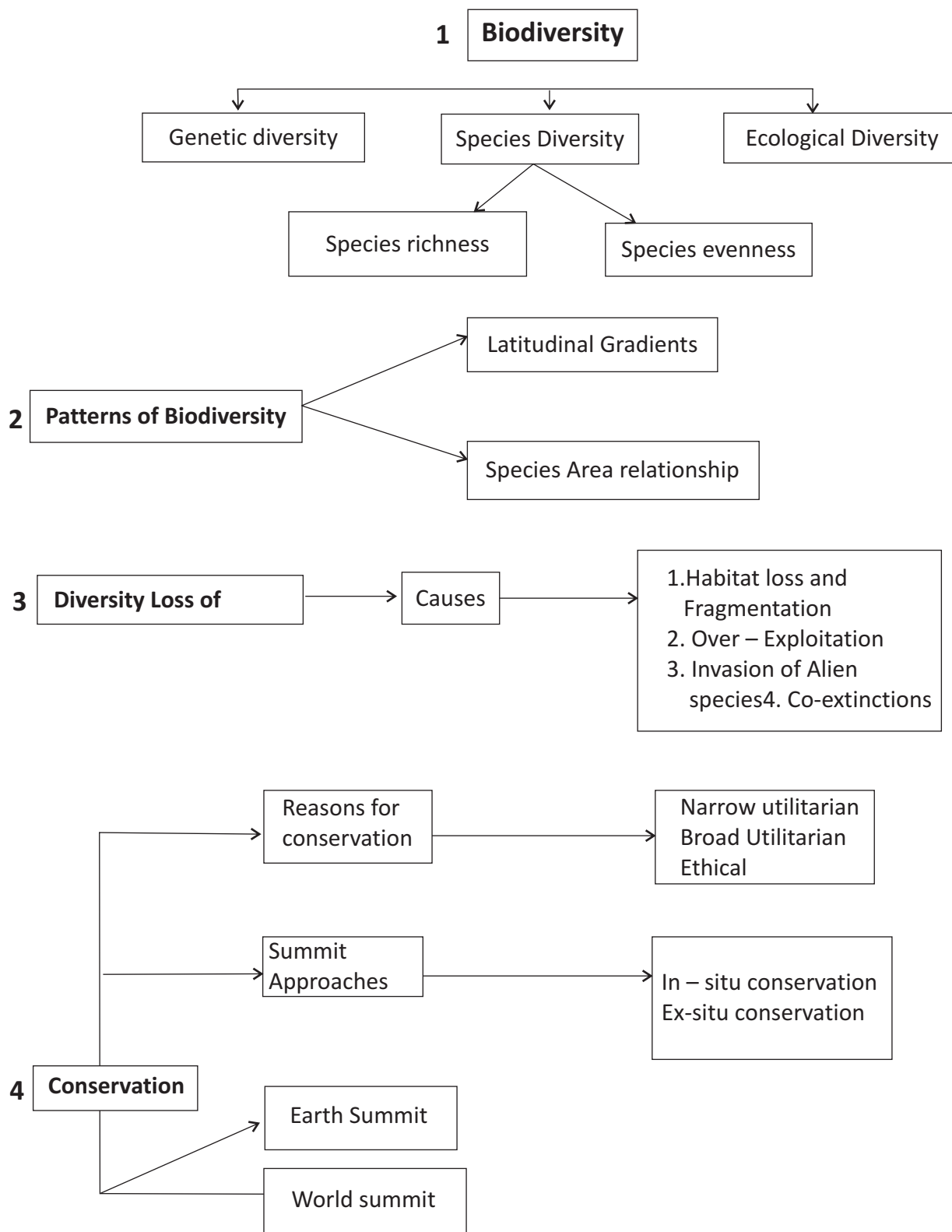
**CHAPTER 14 – ECOSYSTEM
(ANSWER KEY)**

Q No.	HINTS	Marks
1	Interconnecting foodchains/one organism in different trophic levels	1
2	The vertical levels of trees in a forest	1
3	The mass of living matter at a given time measure of biomass ,dry weight of living matter at a given time	1+1
4	The colloidal matter resistant to microbial action ,reservoir of nutrients,breaks down slowly	1+1
5	Soil already formed,spores,seeds remnants of vegetation	½+½
6	Phytoplanktons and forest,lichens and forest	½+½+½+½
7	Vegetational changes, affect food and shelter for various types of animals	1+1
8	Gradual fairly predictable change, in the species composition of a given area.The entire sequence of communities that change in a given area during the succession	1+1
9	There is increase in diversity,species increase and increase in number,increase in biomass	½+½+½+½
10	Energy decreases with successive levels. 10% only transferred to next level.	1+1
11	Sun----1%----- plants----2-10%-----herbivores-----10%-----carnivore	½+½+½+½
12	Succession starts from the pioneer species giving way to seral communities before establishing the climax.Evolution also involves change of environmental factors followed by change in the communities containing fittest species	1+1+1
13	The producers are the most ,in terms of energy,biomass and number and subsequent levels are fewer in number,energy and Biomass .Energy decreases with successive levels, The pyramid of Biomass in the oceans and pyramid of number in the case of a fruiting tree supporting hundreds of consumers ,the pyramids can be inverted.	1+1+1
14	Decomposers are not taken into account,two trophic levels may be taken up by the same species which is not considered,a food wb is not accomodated	1+1+1
15	Grass,phytoplanktons,GPP is the rate of Biomass production /g/yr whereas NPP is the rate of Biomass converted into plant matter and available for the consumers (NPP=GPP-Respiration),Oceans have less solar energy available compared to land hence productivity is lower.	1+1+1
16	Ecosystem services include 1) maintaining soil 2) regulating rainfall 3) preventing erosion of soil,4) pollination 5)providing materials of medicinal,food and other values	1+1+1+1+1
17	Carbon part of all organic compounds ,Phosphorus for ATP,DNA etc Gaseous-Reservoir in atmosphere,Nitrogen cycle b)Sedimentary-Soil,eg-phosphorus. No gaseous component in phosphorus and reservoirs of the two are atmosphere and sediments respectively	1+2+2
18	Breakdown of complexorganicmatterbydecomposers.a)Process-i)fragmentation ii)leachingiii)catabolism.Humificationandmineralization–humificationleadsto accumulationofdarkcoloursubstancecalledhumus.Mineralisationresultinreleaseof inorganic substances a)climaticfactor– i)tempii)soilb)chemicalqualityofdetritus.Highertempandmoist condition – high rate of decomposition.Drysoil ,High temp–Lowrate	2 ½ +2 ½
19	Productivity-producers,nutrient cycling and energy flow through the food chains-GFC & DFC,decomposition by the detritivores and decomposers	1+1+1+1+1
20	Ecosystem services include regulating the climate,hence livelihood and food of animals and people. Conversion of range land fedcropland, rainorirrigated cropland to desert like land,withadropinagriculturalproductivityof10%ormore.Itisusuallycausedbya combination ofovergrazing,soilerosion,prolongeddrought,and climatechange. The soil becomes unsuitable for crops and vegetation food would also become scarce besides water and oxygen.	1+1+1+1

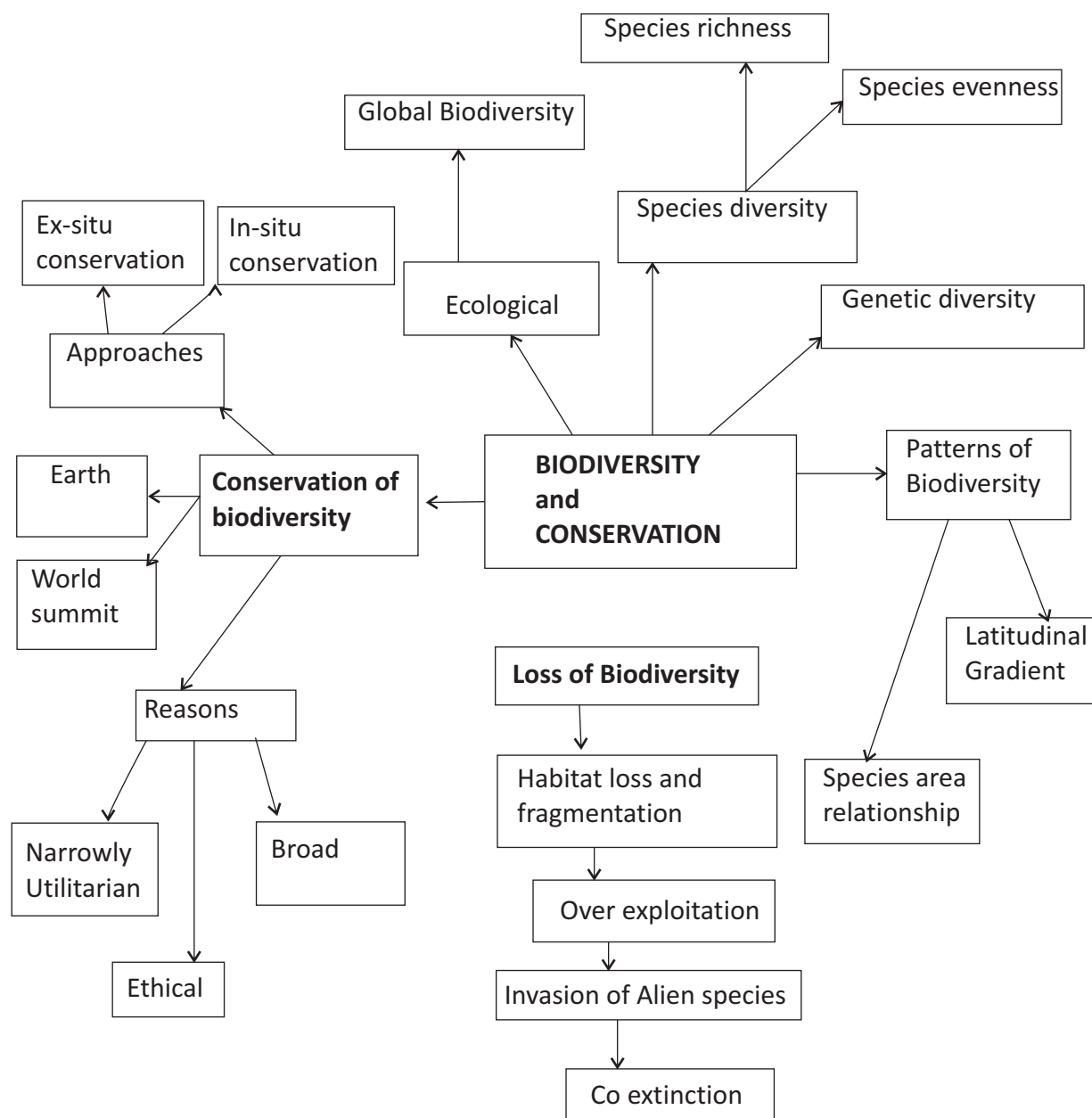
CHAPTER:15 BIODIVERSITY AND CONSERVATION (KEY POINTS)

S.No	Term	Explanation
1	Biodiversity	refers to the sum total of diversity that emits all levels of biological organization
2	Genetic diversity	a single that shows high diversity at the genetic level over its disributional range
3	Species diversity	the diversity at the species level
4	Ecological diversity	the diversity at the ecosystem level
5	Bioprospecting	exploring molecular , genetic and species level diversity for product of economic importance
6	Sacred grooves	tracts of forests were set aside and all the trees and wildlife within were venerated and given total protection
7	Evil Quartet	Sobriquet use to describe 4 major causes of species extinction=Habitat loss & Fragmentation ,Over exploitation ,Alien species invasion &Coextinctions
8	Insitu Conservation	Conservation of species in their natural habitat that is on site conservation
9	Exsitu Conservation	Conservation of threatened species in special settings where they are protected & given special care that is off site conservation .Eg-zoological parks ,Botanical gardens ,etc.
10	Biodiversity Hotspots	Regions with very high levels of species richness
11	Sacred Groves	Tracts of forests where all trees & wild life within are venerated & given total protection
12	The Earth Summit	Meeting of several nations at Rio de Janeiro in 1992 to discuss appropriate measures for conservation of Biodiversity
13	World Summit on Sustainable Development	Meeting of several nations In Johannesburg, South Africa in 2002 to reduce the rate of biodiversity loss
14	Endemism	Species confined to a region & not found elsewhere

**CHAPTER:15 BIODIVERSITY AND CONSERVATION
(FLOW CHART)**



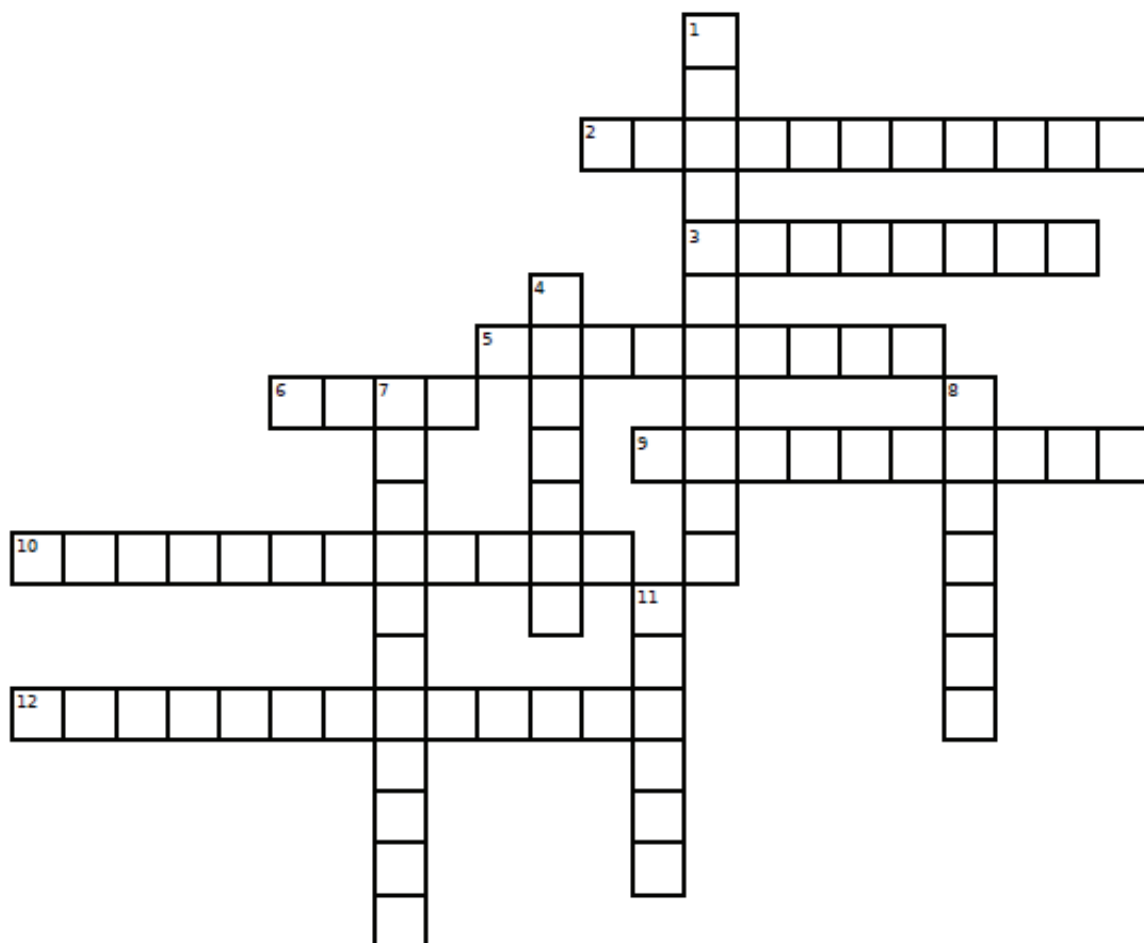
**CHAPTER:15 BIODIVERSITY AND CONSERVATION
(CONCEPT MAP)**





BIOLOGY

CHAPTER:15 BIODIVERSITY AND CONSERVATION (CROSS WORD)



Down:

1. rivet popper hypothesis
4. priority area of conservation
7. long term ecosystem experiment
8. diversity of genes within a speices
11. threatned animals and plants are taken out from habitat

Across:

2. fruit eating animals
3. species confined to specific region
5. estimation of species
6. extinct bird found in mauritis
9. total areas of environment
10. who popularized the term biodiversity
12. sacred grove found in rajasthan



CHAPTER:15 BIODIVERSITY AND CONSERVATION (QUESTION BANK)

1. Why is India said to have greater ecosystem than Norway?
2. Write the importance of cryopreservation in conservation of biodiversity.
3. The amazon rain forest is referred to as 'the lungs of the planet'. Mention any one human activity which causes loss of biodiversity in this region.
4. About 20 species of a Cichlid fish became extinct when a particular fish was introduced in Lake Victoria of Africa. Name the invasive fish.
5. What is the expanded form of IUCN?
6. Why is genetic variation important in the plant *Rauwolfia vomitoria*?
7. What is meant by 'alien species' invasion? Name one plant and one animal alien species that are threat to our Indian native species.
8. Why should biodiversity be conserved? List any two ethical arguments in this support.
9. State the use of biodiversity in modern agriculture.
10. Differentiate between in situ and ex situ approaches of conservation of biodiversity?
11. Explain taking one example, the effect of co-extinction on biodiversity?
12. In the biosphere, immense biological diversity exists at all levels of biological organization. Explain any two levels of biodiversity?
13. What does the term genetic diversity refer to? What is the significance of large genetic diversity in a population?
14. The sacred grooves of Aravalli hills and Ooty botanical garden, both aim at biodiversity conservation. How do they differ in their approaches? Explain.
15. Alien species are highly invasive and are a threat to indigenous species. Substantiate this statement with any three examples.
16. List the reasons that account for the greater biological diversity in tropics?
17. Explain giving one example, how co-extinction is one of the causes of loss of biodiversity. List the three other causes also (without description).
18. Explain 'Rivet popper hypothesis' name the ecologists who proposed it.
19. What are the two types of desirable approaches to conserve biodiversity? Explain with examples bringing out the difference between the two types.
20. a) Taking one example each of habitat loss and fragmentation, explain how the two are responsible for biodiversity loss.
b) Explain two different ways of biodiversity conservation.
21. Isah Upanishad says 'let no one species encroach over the rights and privileges of other species. One can enjoy nature by giving up greed'. But human activities have accelerated the rate of extinction of species in recent times.
(a) Name any four such mass activities.
(b) Describe how each of these activities leads to loss of biodiversity.
(c) What value is taught by the Upanishad?
22. During an excursion to a botanical garden, the teacher shows an old tree which was on the verge of extinction. As soon as the teacher advanced with the students, some enthusiastic students climbed up the tree and started cutting the branches, collecting its leaves as precious collection. Rajesh instead took photographs of the tree from various angles. The boys mocked at Rajesh while the teacher appreciated him.
a) What values did Rajesh possess?
b) Why should we conserve biodiversity?
c) How can be biodiversity be conserved?

**CHAPTER:15 BIODIVERSITY AND CONSERVATION
(ANSWER KEY)**

Q. No.	Hints	marks				
1.	India has a number of ecosystems like deserts, rain forests, coral reefs, mangroves, wetlands, estuaries and alpine meadows, hence, it has greater ecosystem diversity than Norway.	1				
2.	Gametes of threatened species can be preserved in viable and fertile conditions for long periods using cryopreservation.	1				
3.	a) Many plants are cut and land is cleared for cultivation of soya bean. b) Conversion of forest land into grassland for raising beef cattle.	1				
4.	Nile perch	1				
5.	International union for conservation of nature and natural resources.	1				
6.	Genetic variation in Rauwolfia is shown in terms of potency and concentration of the active chemical reserpine produced by the plant.	1				
7	The introduction of Nile perch into lake Victoria led to the extinction of more than 200 species of cichlid fish in that lake, Introduction of African catfish clarkiasgariepinus for aquaculture poses a threat to the indigenous catfishes in Indian rivers. Carrot grass and lantana introduced into our country have become invasive and caused environmental damage; they pose a threat to the native species of plants in our forests.	2				
8	Biodiversity must be conserved as it plays an important role in many ecosystem services. a) Spiritually or philosophically, we have to realize the every species has an intrinsic value, though it may not be of any economic value to us currently. b) Morally, we have a duty to care for well-being of the species and pass on our biological legacy in good order to future generations.					
9.	<ul style="list-style-type: none"> • Human beings obtain food, fibers, medicines and many industrial products from plants. • The wild relatives of our crops are useful as a source of disease-resistance, pest-resistance and many desirable characters; they are used in breeding of plants to raise plants with desirable traits. • With increasing resources put into bioprospecting, exploring molecular genetics and species level diversity for economically important products, rich biodiversity will be beneficial. 					
10	<table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 50%; text-align: center;">In situ</th> <th style="width: 50%; text-align: center;">ex situ</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> - It is the method of protecting the endangered species of the plants or animals in the natural habitat, either by protecting or cleaning up the habitat itself or by defending species from predators. - It helps in recovering populations in the surroundings where they have developed their distinct features. </td> <td> <ul style="list-style-type: none"> - It is the method of protecting endangered species of plants and animals by removing them from the unsafe or threatened habitat and placing under the care of humans. - It helps in recovering populations or preventing their extinction under simulated conditions that closely resemble their natural habitats. </td> </tr> </tbody> </table>	In situ	ex situ	<ul style="list-style-type: none"> - It is the method of protecting the endangered species of the plants or animals in the natural habitat, either by protecting or cleaning up the habitat itself or by defending species from predators. - It helps in recovering populations in the surroundings where they have developed their distinct features. 	<ul style="list-style-type: none"> - It is the method of protecting endangered species of plants and animals by removing them from the unsafe or threatened habitat and placing under the care of humans. - It helps in recovering populations or preventing their extinction under simulated conditions that closely resemble their natural habitats. 	2
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BIOLOGY

11	<p>Co-extinction leads to loss of biodiversity because when a species become extinct, the plant and animal species associated with it in an obligatory manner, also become extinct.</p> <p>- In case of a co-evolved plant-pollinator mutualists, extinction of one of them invariably leads to the extinction of the other.</p>	2
12	<p>- Humans depend on nature for food and shelter: -But over-exploitation of natural resources has led to extinction of many species in the last 500 years, e.g., Steller's sea-cow and passenger pigeon, are lost due to over-exploitation.</p> <p>- Many marine fish populations around the world are over-exploited thus enhancing the continued existence of some commercially important species. Levels of biodiversity:</p> <p>- Genetic diversity refers to the diversity of genes within a species, e.g., there are more than 50,000 genetically different strains of rice in India.</p> <p>- Species diversity refers to the number of different species within a species within a given region, e.g., Western Ghats have a greater amphibian species diversity than Eastern Ghats.</p> <p>- Ecological diversity refers to variation of habitats, community types and abiotic environments present in a given area.</p> <p>- India has a greater ecosystem or ecological diversity than Scandinavia.</p>	2
13	<p>Genetic diversity refers to the diversity of genes within a species.</p> <p>Genetic diversity is important for the following reasons:</p> <p>- Greater the genetic diversity among organisms of a species, more sustenance it has against environmental perturbations.</p> <p>- Genetically uniform populations are highly prone to diseases and harsh environment.</p>	2
14	<p>The sacred groves are a part of in situ conservation while Ooty botanical garden is a part of ex situ approach.</p>	2
15	<p>- The Nile perch introduced into Lake Victoria in East Africa caused extinction of more than 200 species of cichlid fish in that lake.</p> <p>- Parthenium, -Lantna and Eichhornia caused environmental damage and posed threat to many species in our country. Illegal introduction of African catfish, Clariasgariepinus for aquaculture purposes is posing a threat to the indigenous catfishes in our rivers.</p>	3
16	<p>- Speciation is a function of time; the temperate regions were subjected to frequent glaciation in the past, while the tropics have remained undisturbed and hence had longer time to evolve more species diversity.</p> <p>- The tropical environments are less seasonal and relatively more constant and more predictable than temperate regional speciation has been promoted/favored by such constant environments and haven there is greater species diversity.</p> <p>- There is more solar radiation available in the tropical region; this contributes directly to more productivity and indirectly to greater species diversity.</p>	3
17	<p>Co-extinction is a phenomenon in which when a species becomes extinct, the plant and animal species associated with it, in an obligatory manner, also become extinct.e.g.,</p> <p>- In case of a co-evolved plants and its pollinator, if one of them becomes extinct, invariably the other one becomes extinct.</p> <p>-If a host fish becomes extinct, the unique parasites depending on it would also become extinct.</p> <p style="padding-left: 20px;">The three other causes are:</p> <p style="padding-left: 40px;">(i) Habitat loss and fragmentation</p> <p style="padding-left: 40px;">(ii) Over-exploitation</p> <p style="padding-left: 40px;">(iii) Invasion of alien species</p>	3

18	<p>Rivet- Popper Hypothesis</p> <ul style="list-style-type: none"> - It was proposed by Paul Ehrlich. - In an airplane all parts are joined together using thousands of rivets. - If every passenger travelling in it, starts popping a rivet to take home, it may not affect the flight safety initially, but as more and more rivets are removed, the plane becomes dangerously weak over a periods of time. -Further, which rivet is removed may also be critical; i.e., loss of rivets on the wings. <p>Key species that drive major ecosystem function is obviously a more serious threat to flight safety than loss of a few rivets on the seats or windows inside the plane.</p>	3				
19	<p>(a) The two desirable approaches to conserve bio diversity are:</p> <ol style="list-style-type: none"> 1. In situ conservation and 2. Ex situ conservation <table border="1"> <thead> <tr> <th>In situ</th> <th>ex situ</th> </tr> </thead> <tbody> <tr> <td> <p>It is the method of protecting the endangered species of the plants or animals in the natural habitat, either by protecting or cleaning up the habitat itself or by defending species from predators.</p> <p>It helps in recovering populations in the surroundings where they have developed their distinct features.</p> </td> <td> <p>It is the method of protecting endangered species of plants and animals by removing them from the unsafe or threatened habitat and placing under the care or humans.</p> <p>It helps in recovering populations or preventing their extinction under simulated conditions that closely resemble their natural habitats.</p> </td> </tr> </tbody> </table> <p>(b) It is the case of co-evolution.</p> <ul style="list-style-type: none"> - The orchid Oshryemploy's sexual deceit' to get pollinated by the specific bumble bee. - One petal of its flower beers uncanny resemblance to the female of the bee, in size, color and markings. - The male bee perceives it as a female psudocopulates with it; during the process of pollen brought by the bee from the bee from another orchid flower is dusted on the stigma. - If the occurs a slight change in the colors or patterns of the female bee, the pollination success will be reduced unless the orchid coevolves to maintain the resemblance of its petal to the female bee. 	In situ	ex situ	<p>It is the method of protecting the endangered species of the plants or animals in the natural habitat, either by protecting or cleaning up the habitat itself or by defending species from predators.</p> <p>It helps in recovering populations in the surroundings where they have developed their distinct features.</p>	<p>It is the method of protecting endangered species of plants and animals by removing them from the unsafe or threatened habitat and placing under the care or humans.</p> <p>It helps in recovering populations or preventing their extinction under simulated conditions that closely resemble their natural habitats.</p>	5
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20	<p>(a) habitat loss and fragmentation</p> <ul style="list-style-type: none"> - It is the primary cause for extinction. - The tropical rain forests initially covered 14% of the landsurface of the earth, but now they cover only 6% of land area. - Total loss of a habitat deprives many animals and plant of their homes and they face extinction. -When a large habitat becomes fragmented, animals requiring large territories and those with certain migratory habits startdecreasing. <table border="1"> <thead> <tr> <th>In situ</th> <th>ex situ</th> </tr> </thead> <tbody> <tr> <td> <p>It is the method of protecting the endangered species of the plants or animals in the natural habitat, either by protecting or cleaning up the habitat itself or by defending species from predators.</p> <p>It helps in recovering populations in the surroundings where they have developed their distinct features.</p> </td> <td> <p>It is the method of protecting endangered species of plants and animals by removing them from the unsafe or threatened habitat and placing under the care or humans.</p> <p>It helps in recovering populations or preventing their extinction under simulated conditions that closely resemble their natural habitats.</p> </td> </tr> </tbody> </table>	In situ	ex situ	<p>It is the method of protecting the endangered species of the plants or animals in the natural habitat, either by protecting or cleaning up the habitat itself or by defending species from predators.</p> <p>It helps in recovering populations in the surroundings where they have developed their distinct features.</p>	<p>It is the method of protecting endangered species of plants and animals by removing them from the unsafe or threatened habitat and placing under the care or humans.</p> <p>It helps in recovering populations or preventing their extinction under simulated conditions that closely resemble their natural habitats.</p>	
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21	<p>(a) major causes for loss of species include:</p> <ul style="list-style-type: none"> - Habitat loss and fragmentation. - Over-exploitation by man for natural resources. - Invasion of alien species, which compete with the native species and cause their extinction. - Co-extinction of related plants and animals. <p>(b) Biodiversity loss</p> <p>(i) habitat loss and fragmentation</p> <ul style="list-style-type: none"> - It is the primary cause for extinction. - The tropical rain forests initially covered 14% of the land surface of the earth, but now they cover only 6% of land area. - Total loss of a habitat deprives many animals and plants of their homes and they face extinction. - When a large habitat becomes fragmented animals requiring large territories and those with certain migratory habits start decreasing. <p>(ii) Over-exploitation</p> <ul style="list-style-type: none"> - When nature is over exploited by man for the natural resources, many species become extinct <p>(iii) Invasion by Alien Species</p> <ul style="list-style-type: none"> - The alien species become invasive and compete with native species and cause extinction of indigenous species. <p>(iv) Co-extinction</p> <ul style="list-style-type: none"> - It is a phenomenon in which when a species becomes extinct, the plant and animal species associated with it in an obligatory manner, also become extinct. <p>(c) As per the Upanishad itself, you don't have any right to kill other species; live and let others live.</p>	
22.	<p>a) Respect for nature, scientific attitude with a vision of the future</p> <p>b) We should conserve Biodiversity since it provides us</p> <ul style="list-style-type: none"> • Main source of food • Source of economically important fibers (cotton, flax, hemp, jute etc) • Plant products (gum, resin, dye, fragrance, waxes, wool, leather, honey, lac, pearl, ivory, silk, horns) • Drugs and medicine • Sports and recreation • Aesthetic value • Cultural value • Scientific research • Eco system services <p>c) In situ conservation: Sacred grove, Biosphere reserve (Terrestrial and Marine), National parks and Wild life sanctuaries etc)</p> <p>Ex situ conservation: a) Sacred plants, home gardens b) Seed banks, gene bank, cryopreservation c) Botanical garden, Zoological garden, Aquaria etc.</p>	4

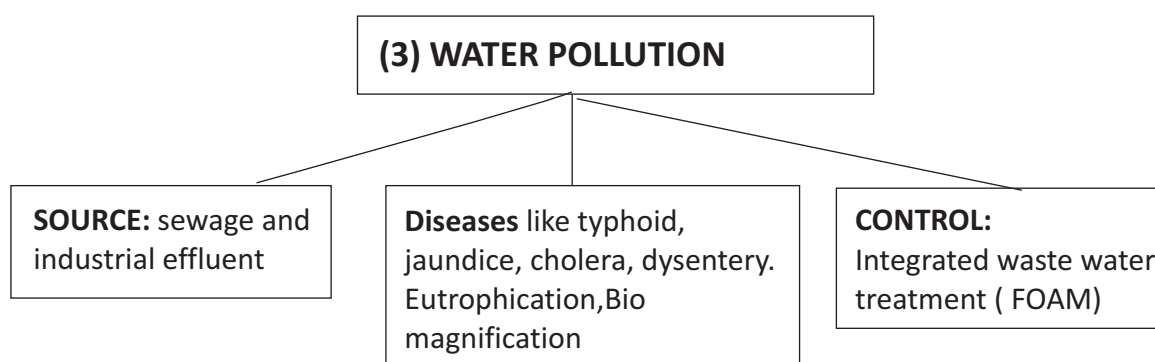
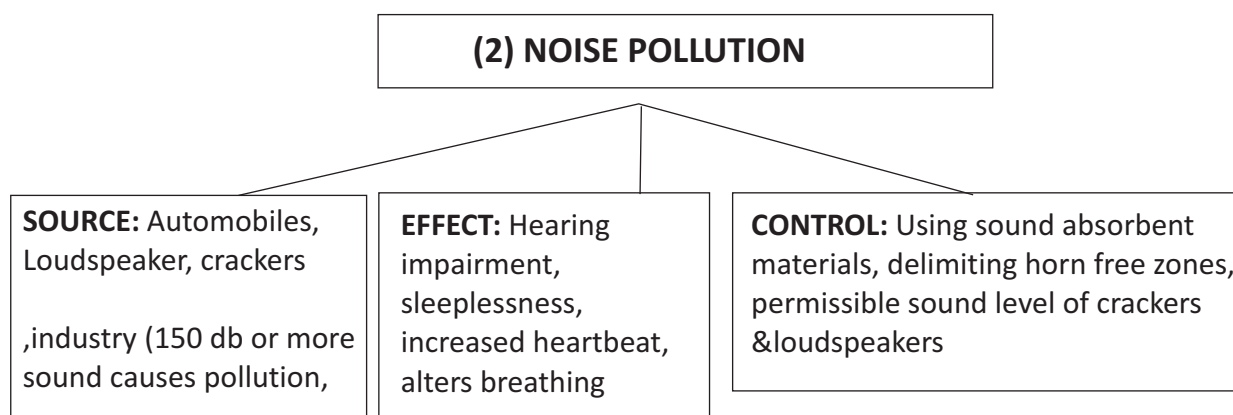
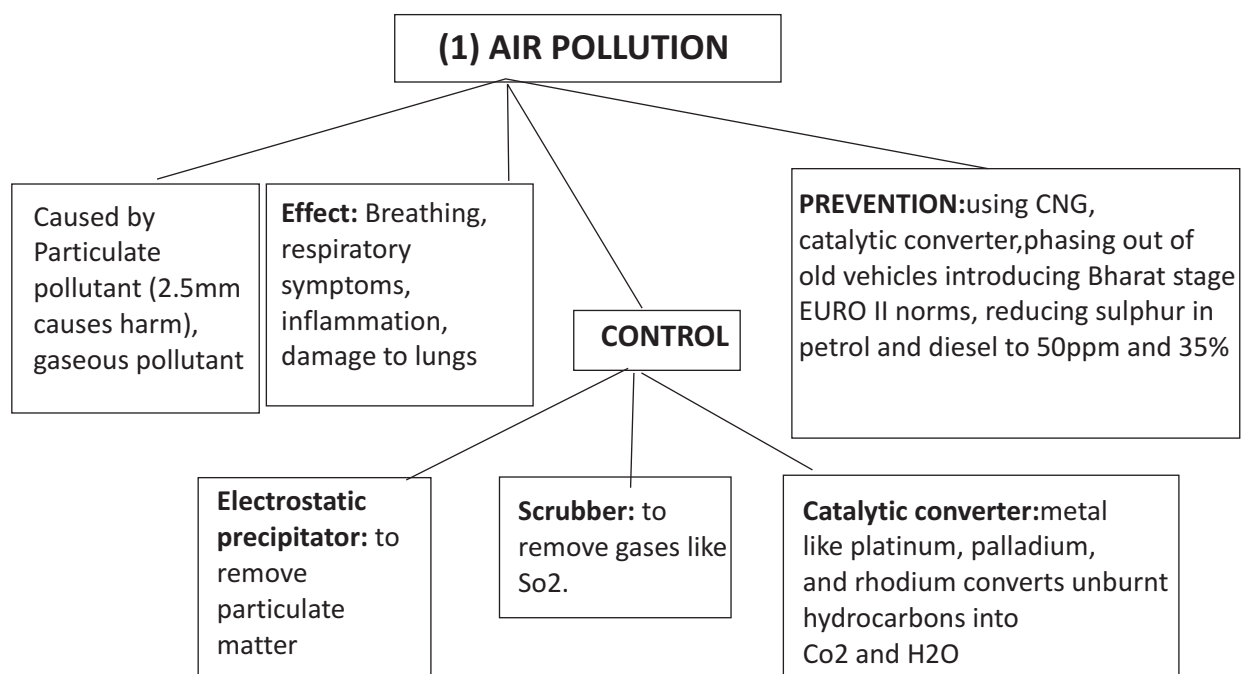


BIOLOGY

CHAPTER:16 ENVIRONMENTAL ISSUES (KEY POINTS)

S.No	Term	Explanation
1	DU	Dobson unit
2	CPCB	Central Pollution Control Board
3	BOD	Biological Oxygen Demand
4	CNG	Compressed Natural Gas
5	FOAM	Friends of Arcata Marsh
6	JFM	Joint Forest Management
7	PIL	Public interest litigation
8	CPCB	Central pollution control board
9	Air prevention & control	1981 Protect & control of air pollution act
10	Environmental(protection)	1986 Protect & control the quality of environment act
11	Water (prevention & control of pollution)act	1974 Protect & control of water pollution to safe guard water resources
12	Chipkho movement	1974 protection of forest
13	Montreal protocol	1989 Control on emission of ozone depleting substances
14	Pollution	Undesirable changes in physical/chemical/biological characteristics of air/water/land
15	Pollutants	Agents which cause pollution
16	Slash and Burn Agriculture (Jhum Cultivation)	Cutting down trees and burn the plant remains. Ash is used as a fertiliser and the land is then used for farming or cattle grazing.
17	Algal Bloom	excessive growth of algae due to presence of nutrient in water
18	Plankton	Free floating aquatic organisms.
19	Bio magnification	increase in concentration of toxic substances at successive trophic levels.
20	Eutrophication	Natural aging of lake by nutrient enrichment
21	Snow blindness	Inflammation of cornea due to high dose of UV-B radiation

CHAPTER:16 ENVIRONMENTAL ISSUES
(FLOW CHART)



BIOLOGY

(4) SOLID WASTES

SOURCE: Municipal wastes, hospital wastes, electronic wastes, pesticides, weedicides, human excreta

EFFECT: causes diseases, soil pollution, kills beneficial insects & microbes

CONTROL: recycling, reuse, incineration, used for land filling, preparing

(5) RADIOACTIVE WASTES

SOURCE: Nuclear energy used for generating electricity

Radiation emitted cause mutations ,genetic disorders in organisms

CONTROL: Storing in a shielded container after sufficient treatment & buried within the sea bottom or rocks about 500m deep below the earth surface.

(6) GREEN HOUSE EFFECT & GLOBAL WARMING

CAUSE: Gases like CO₂, methane, CFC, N₂O
Absorbs solar radiation & increase the atmospheric

ELNino effect—melting of polar ice caps, results in rise in sea level & submerges of coastal areas.

EFFECT: Reducing the emission of greenhouse gases, planting more trees, increasing efficiency of energy usage.

(7) OZONE DEPLETION

SOURCE: CFC released from refrigerator, AC, jetaeroplane degrades the ozone

Effect: UV rays act on CFCs & release Cl- atoms which act as a catalyst & degrade ozone. Causes cataract, damage to DNA, aging of skin, skin cancer
UV –B casus snow blindness & inflammation of cornea.

CONTROL: preventing emission of CFC

(8) SOIL EROSION

CAUSE: Over cultivation, unrestricted grazing, Deforestation, Irrigation without proper drainage of

EFFECT: decreases soil fertility. water logging affect crops & draws salt to the surface of soil.

CONTROL: Planting more trees

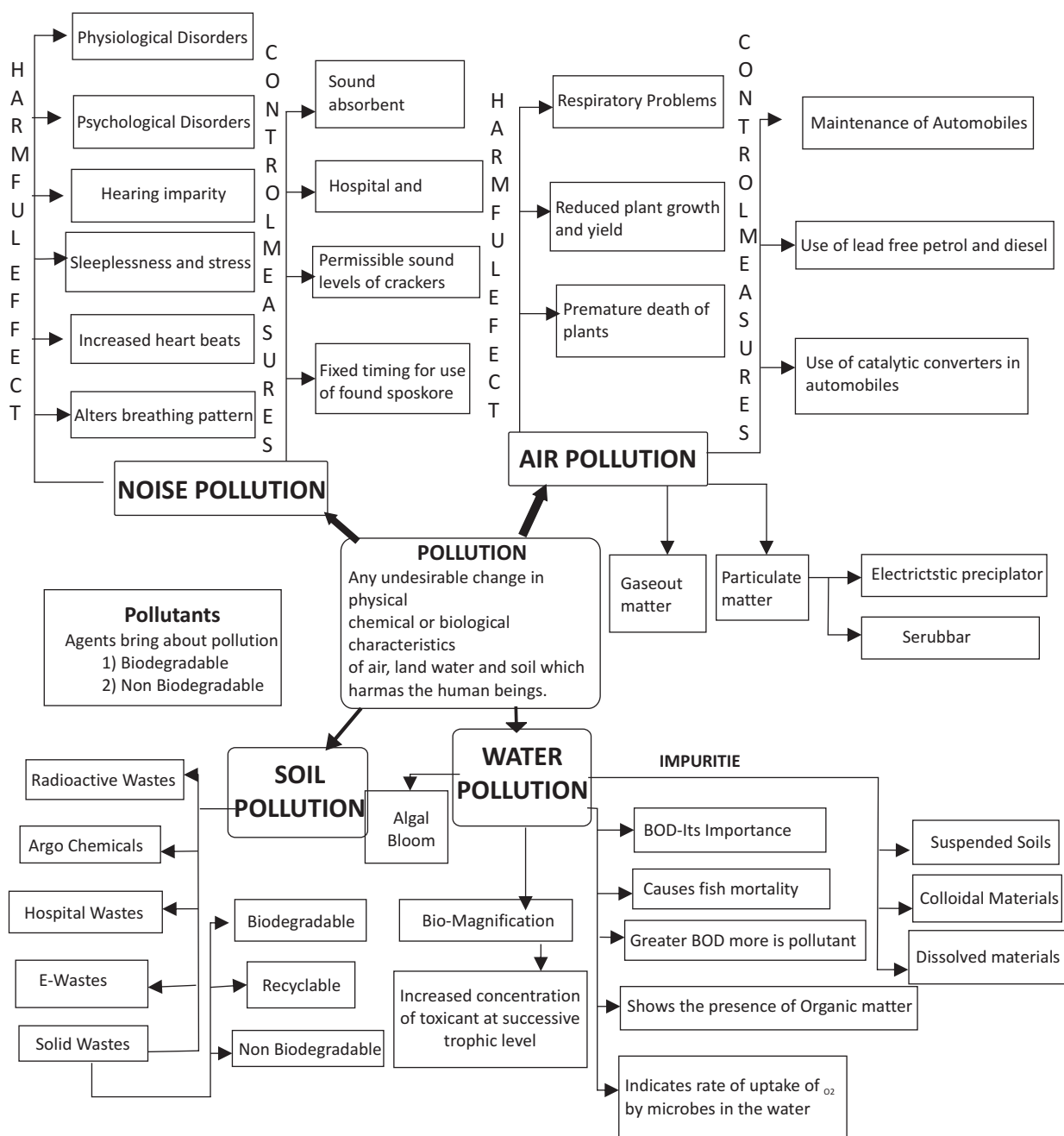
(9) DEFORESTATION

CAUSE: Cutting trees for timber, fire wood
Conversion of forest to agricultural land.
Slash & burn agriculture./jhum

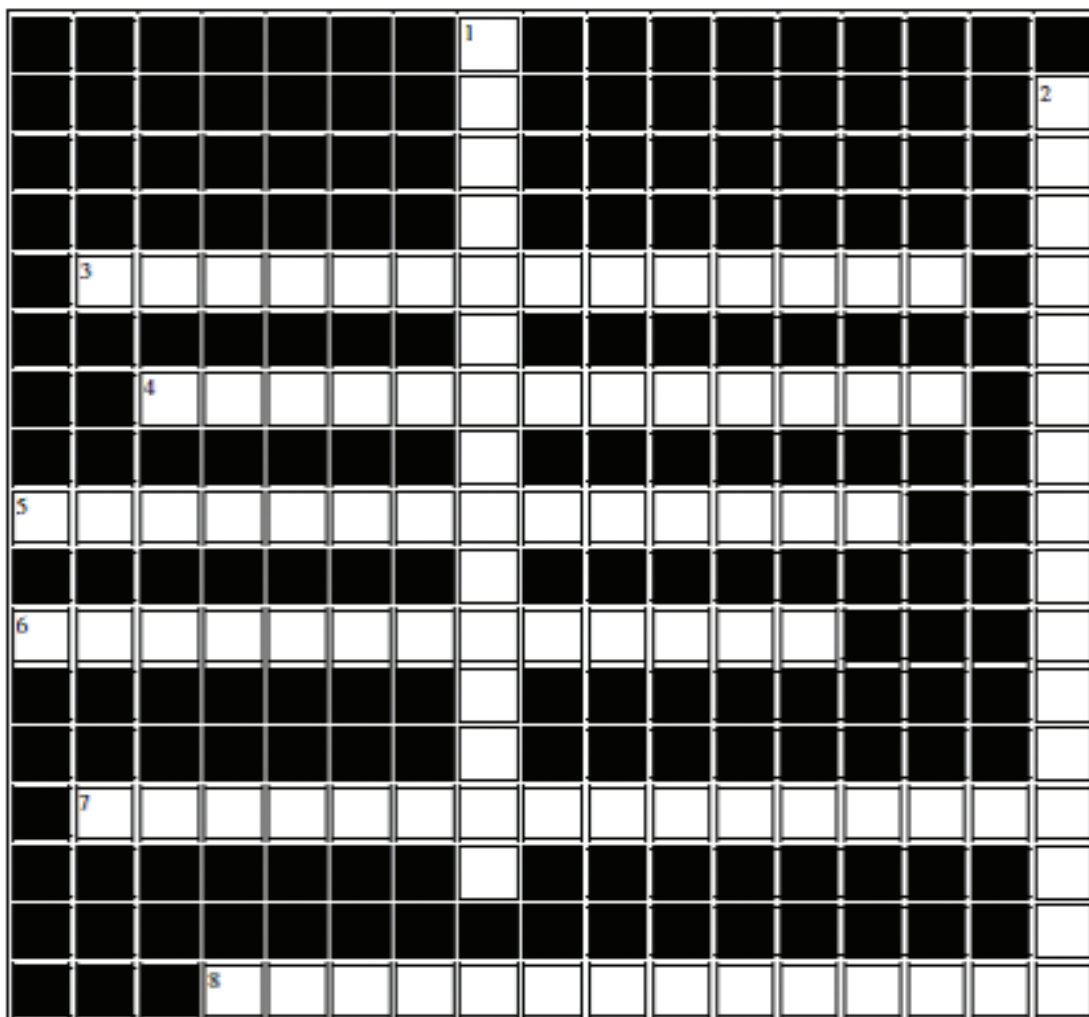
EFFECT: global warming due to excess carbon-dioxide
Loss of biodiversity
Damage to hydrological cycle
Leads to soil erosion
Desertification of land

CONTROL: Reforestation.

**CHAPTER:16 ENVIRONMENTAL ISSUES
(CONCEPT MAP)**



**CHAPTER:16 ENVIRONMENTAL ISSUES
(CROSS WORD)**



Across:

3. a cyclical zero waste procedure of cropping
4. caused by UV B RADIATION
5. natural aging of lake
6. terror of West Bengal, problematic aquatic weed
7. natural phenomenon of heating of earth surface
8. caused by CFC

Down:

1. slash and burn cultivation
2. increase in concentration of toxicant at successive toxic level



**CHAPTER:16 ENVIRONMENTAL ISSUES
(QUESTION BANK)**

1. Why should the velocity of air between the plates of an electrostatic precipitator be low?
2. PM2.5 is responsible for causing greatest harm to human health. What is it? How is it harmful?
3. What is the noise level that can cause permanent impairment of hearing ability of human beings?
4. Why was the Montreal Protocol signed?
5. Jhum cultivation has been in practice from earlier days, but its considered more problematic these days. Why?
6. A radiation causes ageing of skin, skin cancer, and inflammation of cornea called snow blindness. It also damages DNA. Name the radiation.
7. Landfills are not much a solution for getting rid of solid wastes. Why?
8. Electrostatic precipitator can remove over 99% particulate matter present in exhaust from a thermal power plant. How?
9. Why is a scrubber used? Which spray is used on exhaust gases passing through a scrubber?
10. There is a sharp decline in dissolved oxygen downstream from the point of sewage discharge. Why? What are its adverse effects?
11. Catalytic converters use expensive metals as catalysts.
 - (a) Name the metals generally used.
 - (b) What precaution should be observed while using catalytic converter?
12. What are e-wastes? Why are they creating more problems in developing countries in comparison to developed countries?
13. Water logging and salinity are some of the problems that have come in the wake of Green revolution. How does water logging create problems of salinity?
14. What is the relationship between BOD, micro-organisms and amount of biodegradable matter?
15. Deforestation is creating a lot of problems in the environment. List the consequences of deforestation.
16. Enlist four harmful effects caused to the humans living in areas having polluted air. Suggest two measures to reduce air pollution.
17. People have been actively participating in the efforts for the conservation of forests.
 - (i) Name the award instituted in respect of Amrita Devi to promote such efforts.
 - (ii) Name the movement launched to protect the trees by hugging them.
 - (iii) Name the step Government of India has undertaken in 1980.s to work closely with the local communities for protecting and managing forests.
18. Pollutant released due to human activities (like effluents from industries and homes) can radically accelerate the ageing process of the water body.
 - (a) Explain how does this process occurs during natural ageing of lake.
 - (b) Give the term used for accelerated ageing of water bodies. Also give the term used for the natural ageing of lake.



19. In Arcata, the town's people have created an integrated waste water treatment process within a natural system. A citizen group called FOAM helps in upkeep of this project.
- (a) What are the main steps in waste water management done in this way?
- (b) .Ecosan. in Kerala and Sri Lanka is also an initiative for water conservation. How?
20. What are the contribution of Ahmed Khan in Bangalore and Ramesh Chandra Dagar in Sonipat?
21. Since the use of polybags has become so rampant in our day to day life, it is impossible to go back to non-plastic era. Today, the plastic menace has spread from cities to small towns and village. They are "Garbage Forever".
- i) What are the harmful effects of using polybags?
- ii) In your opinion, what steps should be taken to solve this problem?
22. Nowadays, we see that people use CDs & DVDs for storing information, movies and songs.
- i) Do you think these things create pollution?
- ii) Which values are expressed, on the basis of information?

**CHAPTER:16 ENVIRONMENTAL ISSUES
(ANSWER KEY)**

S.no	Value point	Marks
1	To allow the dust to fall.	1
2	PM2.5 stands for particulate matter of size 2.5 micrometres or less in diameter. It's responsible for causing greatest harm to human health as it can be inhaled deep into lungs and cause breathing problems.	1m
3	150 dB or more	1m
4	To control emission of ozone depleting substances	1m
5	Enough time gap is not being given for the natural process of recovery of land from the effect of cultivation	1m
6	Ultraviolet B rays (UV-B rays)	1m
7	Landfill sites are getting filled very fast due to large amount of garbage generation. Also underground water resources may get polluted due to seepage of chemicals	1+1=2m
8	Electrode wire at thousand volts, produce corona to release electrons, electrons attach to dust particules giving them net negative charge, charged dust particules attracted/collected by collecting plates which are grounded	1+1=2m
9	To remove gases like sulphur dioxide. Spray of water or lime is used	1+1=2m
10	Following discharge of sewage into river, micro organisms involved in biodegradation of organic matter present in sewage consume more oxygen. This cause mortality of fish and other aquatic creature	



BIOLOGY

11	(a) Catalysts : platinum - palladium and Rhodium (b) Motor vehicles equipped with catalytic converters should use unleaded petrol as lead inactivates the catalysts.	1+1=2m
12	a) Irreparable computers and other electronic wastes. (b) Recycling in developing countries involves manual participation thus exposing workers to toxic substances. In developed countries its mechanised so less dangerous	1+1=2m
13	Water logging draws salt to surface of soil. Salt deposited on land surface as a thin crust or at the roots of the plants	2m
14	Increase in amount of biodegradable matter leads to rapid multiplication of micro organisms to degrade it, thereby increasing BOD level of the water body.	2m
15	Enhanced CO ₂ concentration in atmosphere, Loss of biodiversity ,Soil erosion Desertification ,Disturbed hydrological cycles.	3×1=3m
16	.Breathing problems, irritation and inflammation, Damage to lungs, Premature death. Reduce emission from automobile exhaust , Growing more trees	6×1/2=3m
17	(i) Amrita Devi Bishnoi Wildlife Protection Award. (ii) Chipko movement (iii) Joint Forest Management (JFM).	1+1+1=3m
18	a) The phenomeon is eutrophication. More nutrients in water, aquatic life increases organic remains deposited on lake bottom, lake grows shallower and warmer, gradually transforms into land due to deposition of silt and organic debris. (b) Cultural or Accelerated eutrophication ,Natural ageing is Eutrophication	1+2+3=5
19	a) Conventional sedimentation, filtering and chlorine treatment. Absorption and assimilation of pollutants by algae fungi and bacteria. (b) .Ecosan. derived from ecological sanitation. Handling human excreta using dry composting toilets. Its practical, hygienic and cost effective method.	2+3=5
20	a) Polyblend ,a fine powder of recycled modified plastic is mixed with bitumen & used to lay roads. This increases bitumen water repellent properties & increase road life by a factor of three b) Integrated organic farming is a cyclical, zero waste procedure, where waste from process are cycled in as nutrients for other process. He included bee keeping, dairy management, water harvesting composting and agriculture in s chain of processes.	2+2=4
21	(I) Non degradable, choke our sewage & drainage system, stray cattle eats it & choke its digestive system (II) Using paper,jute,cloth bags. Minimise the use voluntarily. Segregation of biodegradable & non-biodegradable material to safe disposal. Educating people on health risk, production of biodegradable plastic bags by mixing cellulose during their manufacturing.	2+2=4
22	Yes, these contain heavy metals & toxic substances. As the technology is changing these products are replaced by i pods, pen drives. They constitute e-waste.	1+1+2=4

ANSWERS OF CROSS WORD PUZZLES
CHAPTER: 1

S.NO	ACROSS	S.NO	DOWN
1.	CONIDIA	2.	OESTRUS – CYCLE
4.	ZYGOTE	3.	ZOOSPORES
6.	BULBUL	5.	VIVIPAROUS
9.	RHIZOME	7.	CELL DIFFERENTIATION
12.	JUVENILE PHASE	8.	PERICARP
13.	SYNGAMY	10.	ASEXUAL REPRODUCTION
16.	HERMOPHRODITE	11.	SEXUAL REPRODUCTION
17.	REPRODUCTION	14.	EMBRYO GENESIS
18.	MONOECIOUS	15.	BINARY FISSION
21.	ANTHEROZOID	18.	MEIOCYTE
22.	GEMMULE	19.	CLONE
23.	INTERNAL FERTILISATION	20.	STAMINATE
24.	LIFESPAN		

CHAPTER: 2

S.NO	ACROSS	S.NO	DOWN
1	EMBRYO SAC	2	SPOROGENOUS TISSUE
6	POLYEMBRYONY	3.	APOMIXIX
9	PERISPERM	4.	COLEOPTILE
14	GENERATIVE CELL	5	THALAMUS
16	SPOROPOLLENIN	7	TAPETUM
19	INTINE	8	OVARY
20	SYNCARPOUS	10	SCUTELLUM
22		11	TRIPLE FUSION
23	PARTHENOCARPY	12	CLEIOSTOGAMOUS
24	HILUM	13	XENO GAMY
25	SYNERGID	15	STRAWBERRY
	DOWN	17	EMASCULATION
21	CHALAZA	18	ANTIPODALS

S.NO	ACROSS	S.NO	DOWN
3.	MORULA	1.	GRAAFIAN FOLLICLE
5.	ENDOMETRIUM	2.	PLACENTA
7.	SPERMIATION	4.	OXYTOCIN
10.	INFUNDIBULUM	6.	ISTHMUS
12.	MENARCHE	8.	CLEAVAGE
13.	PARTURITION	9.	ANTRUM
15.	ACROSOME	11.	MITOCHONDRIA
20.	SPERMIOGENESIS	14.	SCROTUM
21.	TROPHOBLAST	16.	COLOSTRUM
22.	SERTOLI CELL	17.	CORPUS LUTEUM
23.	LEYDIG CELL	18.	ZONA PELLUCIDA
24.	PERIMETRIUM	19.	MENOPAUSE
25.	OVULATION		

CHAPTER: 4

S.NO	ACROSS	S.NO	DOWN
7.	LACTATIONAL AMENORRHEA	1.	DIAPHRAGM
9.	TUBECTOMY	2.	INVITRO FERTILISATION
10.	LIPPES LOOP	3.	SAHELI
		4.	PROGESTASERT
		5.	INFERTILITY
		6.	STERILISATION
		8.	AMNIOCENTESIS

CHAPTER:5

S.NO	ACROSS	S.NO	DOWN
1.	HAEMOPHILIA	2.	PHENYLKETONURIA
5.	SAHIWAL	3.	VALINE
6.	PUNNETT	4.	HETEROGAMETY
8.	MUTATION	7.	SATIVUM
11.	KLINEFELTER SYNDROME	8.	MORGAN
13.	CHROMOSOME	9.	DROSOPHILA
14.	ALLELES	10.	ANEUPLOIDY
		12.	FACTORS

CHAPTER:6

S.NO.	ACROSS	S.NO.	DOWN
5.	PNEUMOCOCCUS	1.	NUCLEOSIDE
6.	DNA	2.	DYSTROPHIN
8.	HETEROCHROMATIN	3.	LACTOSE
9.	LIGASE	4.	TRANSLATION
12.	HISTONE	5.	POLYMORPHISM
13.	EUCHROMATIN	7.	BACTERIOPHAGE
14.	SPLICING	10.	CISTRON
		11.	URACIL

CHAPTER:7

S.NO	ACROSS	S.NO	DOWN
6.	SPORES	1.	HOMOLOGOUS
7.	PASTEUR	2.	GIRAFFE
8.	PALEONTOLOGY	3.	CONVERGENT
12.	DARWIN	4.	MARSUPIALS
		5.	FOSSIL
		9.	LAMARCK
		10.	GALAPAGOS
		11.	BIGBANG

BIOLOGY



S.NO.	ACROSS	S.NO.	DOWN
1.	WIDAL TEST	2.	TRICHOPHYTON
3.	SALMONELLA TYPHI	3.	SPOROZOITES
7.	MACROPHAGES	4.	PLASMODIUM VIVAX
8.	ELISA TEST	5.	ENTAMOEBA
9.	COLOSTRUM	6.	RHINO VIRUS
10.	ASCARIS		
11.	WUCHERERIA		

S.NO.	ACROSS	S.NO.	DOWN
2.	MICROPROPOGATION	1.	BIOFORTIFICATION
5.	INBREEDING	3.	OUTBREEDING
6.	MOET	4.	TOTIPOTENCY
7.	SPIRULINA		
8.	SCP		
9.	SOMACLONES		

S.NO.	ACROSS	S.NO.	DOWN
4.	CYCLOSPORIN - A	1.	BACILLUS THURIENGENSIS
6.	STREPTOKINASE	2.	PRIONS
7.	FLOCS	3.	PROTEASES
9.	AZOSPIRILLUM	5.	NOSTOC

CHAPTER: 11

S.NO.	ACROSS	S.NO.	DOWN
1.	BACTERIOPHAGE	2.	PRIMERS
6.	RESTRICTION SITE	3.	rDNA
7.	ANNEALING	4.	BIOLISTICS
9.	ELUTION	5.	CLONING VECTORS
13.	ROP	8.	EXONUCLEASE
16.	RECOGNITION SITE	10.	INSERTIONAL
23.	MOLECULAR SCISSORS	11.	MOLECULAR SCISSORS
24.	STICKY ENDS	12.	BACTERIOPHAGE
25.	ENDONUCLEASE	14.	SELECTABLE MARKER
		15.	TRANSFORMANT
		17.	MICROINJECTION
		18.	BIOREACTORS
		19.	DENATURATION
		20.	PRIMERS
		21.	COSMIDS
		22.	ORIGIN

CHAPTER: 12

S.NO.	ACROSS	S.NO.	DOWN
3.	CRY PROTEIN	1.	GMO
5.	GOLDEN RICE	2.	GENE THERAPY
7.	TRANSGENIC	4.	SCID
8.	FLAVR SAVR	6.	Bt
10.	BIOPIRACY	9.	ADA

CHAPTER: 13

S.NO.	ACROSS	S.NO.	DOWN
3.	MORTALITY	1.	EURYTHERMAL
7.	HIBERNATION	2.	AMMENSALISM
9.	HABITAT	4.	ADAPTATION
10.	STENOTHERMAL	5.	ECOLOGICAL NICHE
15.	NATALITY	6.	CARRYING CAPACITY
17.	POPULATION DENSITY	8.	IMMIGRATION
18.	AESTIVATION	11.	EMIGRATION
19.	DIAPAUSE	12.	REGULATORS
		13.	STENOHALINE
		14.	HOMEOSTASIS
		16.	EURYHALINE

CHAPTER: 14

S.NO.	ACROSS	S.NO.	DOWN
2.	FOOD WEB	1.	BIOGEOCHEMICAL CYCLE
6.	MINERALISATION	3.	BIOMASS
8.	ECOLOGICAL PYRAMIDS	4.	PRODUCERS
11.	STRATIFICATION	5.	FOOD CHAIN
12.	PRODUCTIVITY	7.	PIONEER SPECIES
16.	ECOLOGICAL SUCCESSION	9.	ECOSYSTEM
17.	DECOMPOSITION	10.	DETRITIVORES
19.	STANDING STATE	13.	STANDING CROP
20.	SECONDARY PRODUCTIVITY	14.	HERBIVORES
21.	CONSUMERS	15.	SERE
22.	PRIMARY PRODUCTIVITY	18.	DETRITUS

CHAPTER: 15

S.NO.	ACROSS	S.NO.	DOWN
2.	FRUGIVOROUS	1.	PAUL EHRLICH
3.	ENDEMISM	4.	HOT SPOT
5.	ROBERT MAY	7.	DAVID TILMAN
6.	DODO	8.	GENETIC
9.	BIOSPHERES	11.	EXSITU
10.	EDWARD WILSON		
12.	ARAVALLI HILLS		

CHAPTER: 16

S.NO.	ACROSS	S.NO.	DOWN
3.	ORGANIC FARMING	1.	JHUM CULTIVATION
4.	SNOW BLINDNESS	2.	BIOMAGNIFICATION
5.	EUTROPHICATION		
6.	WATER HYACINTH		
7.	GREEN HOUSE EFFECT		
8.	OZONE DEPLETION		

PREPARATION FOR EXAMINATION/ EXAMINATION TIPS:

1. Effectively use the text book and the SSM to master each concept and to review your ability to retain the concepts.
2. Attend to your subject teacher carefully in the class and take down the class notes properly.
3. Spend time every day working on the subject matter. Develop the habit of studying and mastering the concept as and when the subject teacher completes teaching a concept.
4. Facilitate understanding while revising the material. This will help you in critical reasoning and enable you to summarize the section in your own words and style.
5. Give yourself regular break as it is an essential part of effective studying and better concentration.
6. Try to move from simple to more abstract so that it is easy to master the different levels in understanding the concept.
7. Practise the last five years question papers to focus on the areas of interest on examiner's point of view.
8. Engage with the support material to help in the learning process. The crossword puzzle given at the end of each chapter is a mind game to test your ability to recapitulate thing learnt.
9. Practice and master on diagrammatic concepts and mind maps which would help you to recollect the concept.
10. Take your own mock tests and self-evaluate your answers or get that explained by the subject teacher to get clarity on scoring points.
11. Practice important diagrams with proper labeling.
12. Budget your time effectively before attempting the question paper.
13. Take good care of your health.
14. Study the Blue print and marking scheme intensely to have an idea as to how an answer script is evaluated.
15. Be positive helpful, cheerful, sensible and responsible.

WISH YOU ALL THE BEST !!!!



BIOLOGY

Series ONS/2

SET-1

रोल नं.
Roll No.

कोड नं. :57/2/1
Code No

परीक्षार्थी कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें ।

Candidates must write the Code on the title page of the answer-book.

- कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ 8 हैं।
- प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए कोड नम्बर को छात्र उत्तर- पुस्तिका के मुख-पृष्ठ पर लिखें।
- कृपया जाँच कर लें कि इस प्रश्न-पत्र में 26 प्रश्न हैं।
- कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, प्रश्न का क्रमांक अवश्य लिखें।
- इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है। प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा। 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे।
- Please check that this question paper contains 8 printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains 26 questions.
- Please write down the Serial Number of the question before attempting it.
- 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 to 10.30 a.m. , the students will read the question paper only and will not write any answer on the answer-book during this period.

जीव विज्ञान (सैद्धान्तिक) BIOLOGY (Theory)

निर्धारित समय: 3 घण्टे

Time allowed : 3 hours

अधिकतम अंक: 70

Maximum Marks : 70

सामान्य निर्देश :

- (i) प्रश्न-पत्र में खण्डों में 26 प्रश्न दिए गए हैं। सभी प्रश्न अनिवार्य हैं।
- (ii) खण्ड- क में प्रश्न संख्या 1 से 5 अति लघु-उत्तरीय प्रश्न हैं। प्रत्येक प्रश्न एक अंक का है।
- (iii) खण्ड- ख में प्रश्न संख्या 6 से 10 लघु-उत्तरीय प्रश्न I प्रकार के हैं। प्रत्येक प्रश्न दो अंकों का है
- (iv) खण्ड- ग में प्रश्न संख्या 11 से 22 लघु-उत्तरीय प्रश्न II प्रकार के हैं। प्रत्येक प्रश्न तीन अंकों का है
- (v) खण्ड- घ में प्रश्न संख्या 23 मूल्य आधारित प्रश्न चार अंकों का है।
- (vi) खण्ड- ङ में प्रश्न संख्या 24 से 26 दीर्घ-उत्तरीय प्रश्न हैं। प्रत्येक प्रश्न पाँच अंकों का है
- (vii) प्रश्न-पत्र में समग्र पर कोई विकल्प नहीं है, फिर भी दो अंकों वाले एक प्रश्न में, तीन बंकों वाले एक प्रश्न में और पाँच अंकों वाले सभी तीनों प्रश्नों में भीतरी चयन-विकल्प दिए गए हैं। प्रत्येक परीक्षार्थी को ऐसे प्रश्नों के दो विकल्पों में से कोई एक प्रश्न हल करना है।

General Instructions:

- (i) There are a total of 26 questions and five sections in the question paper. All questions are compulsory.
- (ii) Section A contains questions number 1 to 5, Very short Answer type questions of one mark each.
- (iii) Section B contains questions number 6 to 10, Short Answer type-I question of two marks each.
- (iv) Section C contains questions number 11 to 22, Short Answer type-II question of three marks each.
- (v) Sections D contains question number 23, Value Based Question of four marks.
- (vi) Section E contains question number 24 to 26, Long Answer type questions of five marks each.
- (vii) There is no overall choice in the question paper, however, an internal choice is provided in one question of two marks, one question of three marks and all three questions of five marks. An examinee is to attempt any one of the questions out of the two given in the question paper with the same question number.

खण्ड-क

SECTION-A

1. दो जंतुओं के नाम बताइए जिनमें मद् चक्र प्रदर्शित होता है।
Name two animals that exhibit Oestrus cycle. 1
2. बिंदु उत्परिवर्तन क्या होता है ? एक उदाहरण दीजिए।
What is point mutation ? Give one example. 1
3. एक एक्सॉन से एक इन्ट्रॉन में भेद करने के लिए एक अंतर बताइए।
Mention one difference to distinguish an exon from an intron. 1
4. एक संदिग्ध AIDS के रोगी में HIV का पता लगाने के लिए आण्विक नैदानिक क्रियाविधि का सुझाव दीजिए।
Suggest a molecular diagnostic procedure that detects HIV in a suspected AIDS patient. 1
5. किसी स्पीशीज के लिए प्रकृति की वहन क्षमता किस बातका संकेत देती है?
What does nature's carrying capacity for a species indicate ? 1

खण्ड-ख
SECTION-B

6. पेशीस्तर और अतःस्तर की स्थिति एवं उनके कार्यों की चर्चा कीजिए। 2

Write the location and functions of Myometrium and Endometrium.

7. परीक्षार्थ क्रॉस (संकरण) से एक व्यष्टि के जीन प्ररूप का निर्धारण करने में कैसे मदद मिलती है? 2

अथवा

डी. एन. ए. बहुरूपता के दो अनुप्रयोग लिखिए।

How does a test cross help to determine the genotype of an individual ?

OR

Mention two application of DNA polymorphism.

8. मधुमक्खी पालन करने के लिए किस प्रकार के क्षेत्र उपयुक्त होते हैं ? इस कार्य के लिए आमतौर से पाली जाने वाली किस्स का वैज्ञानिक नाम लिखिए। 2

What kind of areas are suitable for practicing apiculture ? Write the scientific name of the variety commonly reared for the purpose.

9. संकटापन्न जैव विविधता के संरक्षण के लिए चार उन्नत स्व-स्थाने विधियों का सुझाव दीजिए। 2

Suggest four advanced ex-situ methods to conserve threatened biodiversity.

10. किसी जल निकाय का निम्न BOD स्वच्छ पानी वाले जलीय जीवों की वापसी को सहायता देते हैं। व्याख्या कीजिए। 2

Lower BOD of a water body helps reappearance of clean-water organisms. Explain.

खण्ड-ग

SECTION-C

11. औद्योगिकीकरण के पश्चात, इंग्लैंड में सफेद पंखों वाले शलभों के सीन पर मेलानिनी शलभों की समष्टि की वृद्धि हो गयी। इस कथन की व्याख्या कीजिए। 3

“Post-industrialization, the population of melanised moth increase in England at the expense of white-winged moths.” Provide explanations.

12. पुनर्योगज DNA का पता लगाने के लिए 'अंतपिष्ट निष्क्रियण' विधि को 'प्रतिजैविक प्रतिरोधी' क्रियाविधि की जगह क्यों वरीयता दी जाती है? 3

Why does the 'insertional inactivation' method to detect recombinant DNA is preferred to 'antibiotic resistance' procedure ?

13. पुनर्योगज DNA प्रौद्योगिकी में EcoRI एंजाइम की भूमिका की व्याख्या कीजिए। 3

Explain the role of the enzyme EcoRI in recombinant DNA technology.

14. भ्रूणीय अवस्था का नामांकित आरेख बनाइए जो स्त्री के गर्भाशय के भीतर अंतरोपित हो जाता है। दो नामांकित भागों के कार्य बताइए। 3

Draw a labelled diagram of the embryonic stage that gets implanted in the human uterus. State the function of the two parts labelled.

15. (a) एक पपिक्व 7 कोशिका तथा 8-न्यूक्लियस वाले भ्रूण-कोश का नामांकित आरेख बनाइए। 3

(b) भ्रूण-कोश की कौन सी एक कोशिका दोहरे निषेचन के बाद एंडोस्पर्म बनाती है?

(a) Draw a labelled sketch of a mature 7-celled, 8-nucleate embryo-sac.

(b) Which one of the cell in an embryo-sac produce endosperperm after double fertilization ?

16. जैव विविधता संरक्षण के समर्थन में संकीर्णतः उपयोगी तर्क दिए जाते हैं। इसी उद्देश्य के समर्थन में दिए जाने वाले दो अन्य तर्कों की भी व्याख्या कीजिए। 3

Narrowly utilitarian arguments are put forth in support of biodiversity conservation. Explain the other two arguments that are put forth in support of the same cause.

17. किसी पहाड़ी सीान की सैर करने पर आपके एक मित्र की तबियत अचानक खराब हा गयी और उसे बैचेनी महसूस होने लगी। 3

(a) कोई ऐसे दो रोग लक्षण बताइए जिसके कारण यह ऐलर्जी हो गयी।

(b) किसी ऐलर्जन के प्रति होने वाली शरीर की अनुक्रिया की व्याख्या कीजिए।

© तात्कालिक आराम देने के लिए किन्हीं दो औषधियों के नाम बताइए।

On a visit to a Hill station, one of your friend suddenly became unwell and felt uneasy.

- (a) List two symptoms you would look for to term it to be due allergy.
- (b) Explain the response of the body to an allergen.
- (c) Name two drugs that can be recommended for immediate relief.

18. (a) हर्शे और चेच ने अपने प्रयोग में रेडियो सक्रिय सल्फर और रेडियो सक्रिय फॉस्फोरस का उपयोग क्यों किया ? 3

(b) अंत में वे किस निष्कर्ष पर पहुँचे ? और कैसे ? चर्चा कीजिए।

(a) Why did Hershey and Chase use radioactive sulfur and radioactive phosphorus in their experiment ?

(b) Write the conclusion they arrived at and how.

19. (a) अपने परभक्षियों से बचने के लिए पौधे द्वारा विकसित किन्हीं दो प्रतिरक्षा प्रणाली की व्याख्या कीजिए। 3

(b) परभक्षण और परजीवता में अंतर बताइए।

(a) Explain any two defence mechanisms plants have evolved against their predators.

(b) How does predation differ from parasitism ?

20. मानव रूधिर-वर्ग बहुविकल्पता और सहप्रभाविता का एक आच्छा उदाहरण है। युक्ति संगतता बताइए। 3

Human blood group is a good example multiple allelism and co-dominance. Justify.

21. (a) जीन-उपचार क्या होता है ?

(b) उस क्रियाविधि का वर्णन कीजिए जिसके द्वारा इस प्रकार के किसी रोग का स्थायी रूप से उपचार किया जा सकता है। इस रोग का नाम लिखिए। 3

(a) What is Gene therapy?

(b) Describe the procedure of such a therapy that could be a permanent cure for a disease. Name the disease.

22. समुद्र में जीवसंहति के पिरैमिड एवं ऊर्जा के पिरैमिड के आरेख बनाइए। बनाए गए पिरैमिडों के प्रकारों पर अपने विचार प्रकट कीजिए।

3

अथवा

- (a) निम्नलिखित ग्रीनहाउस गैसों को उनके सकल वैश्विक ऊष्मण में आपेक्षिक योगदान के वृद्धिमान क्रम में लिखिए:
N₂ O₂;CFC;CO₂;C₂H₄
- (b) वैश्विक ऊष्मण का ध्रुवीय बर्फीली चोटियों पर क्या प्रभाव पड़ता है? इसके संभवी पारिस्थितिकीय प्रभाव की चर्चा कीजिए।
Draw a pyramid of biomass and pyramid of energy in sea. Give your comments on the type of pyramids drawn.

OR

- (a) Rearrange the following greenhouse gases in increasing order of their relative contribution to the total global warming:
N₂ O₂;CFC;CO₂;C₂H₄
- (b) What is the effect of global warming on polar ice-caps ? Comment on its possible ecological impact.

खण्ड-घ

SECTION- D

23. आपका/आपकी एक मित्र है जिसके माँ-बाप उसके दिन-प्रतिदिन के मामलों में बहुत दखल देते हैं। वे उसे अभी तक बच्चा ही समझते हैं जिसके कारण वह दुःखी हो जाता/जाती है और हर समय परेशान रहता/रहती है। वह सोचता/सोचती है कि उसके माँ-बाप उसे कुछ मामलों में स्वतंत्र निर्णय लेने का अवसर दें।

- (a) क्या आप अपने मित्र का समर्थन करते हैं और क्यों?
- (b) इस आयु-वर्ग की विशिष्टताएँ लिखिए।
- (c) दो नैदानिक उपाय बताइए।

4

You have a friend whose parents are too indulgent in his /her daily affairs. They think him/her to be still young which makes him/her sad and is upset all the time. As he/ she feels that the parents should give him/her opportunity to take independent decision on some issues.

- (a) Would you support your friend and why ?
- (b) Write the characteristics of this age grup.
- © List two curative measures.



BIOLOGY

खण्ड- ड़

SECTION- E

24. (a) एक मानव प्रतिरक्षा न्यूनता वायरस (HIV) किस प्रकार परपोषी के भीतर प्रतिकृतियन करता है ?
(b) HIV से संक्रमित रोगी अपनी प्रतिरक्षता किस प्रकार खो बैठता है ?
(c) इस रोग के कोई दो लक्षण बताइए।

5

अथवा

अपशिष्ट जल उपचार की प्रक्रिया का वर्णन निम्नलिखित शीर्षकों के अंतर्गत कीजिए :

(a) प्राथमिक उपचार

(b) द्वितीयक उपचार

(a) How does a Human Immunodeficiency Virus (HIV) replicate in a host ?

2+3

(b) How does an HIV-ubfected patient lose immunity ?

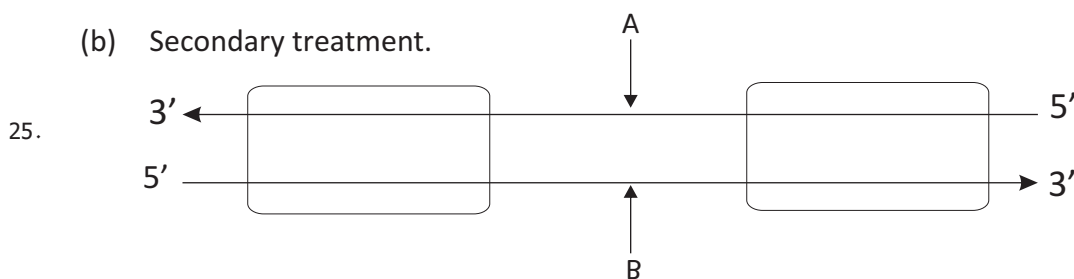
(c) List any two symptoms of this disease.

OR

Describe the process of waste treatment under the following heads:

(a) Primary treatment

(b) Secondary treatment.



(a) ऊपर दिए गए प्रतिकृतियन यूनिट के आरेख में A और B वलयकों को पहचानिए तथा बताइए कि किस आधार पर आपने उन्हें पहचाना है।

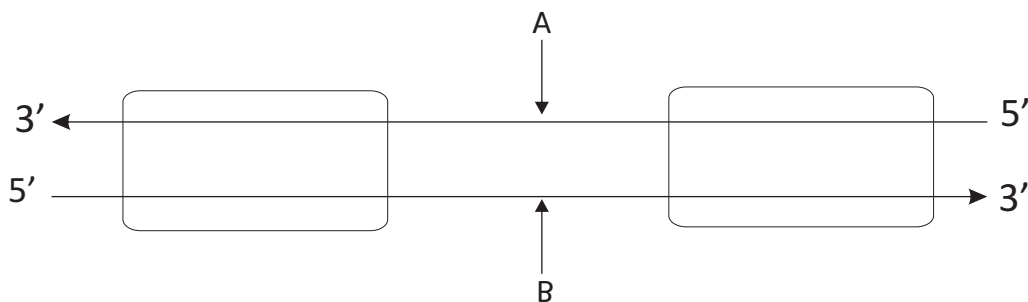
(b) एक बैक्टीरियम में होने वाली प्रतिकृतियन प्रक्रिया में सिग्मा कारक तथा Rho कारक के क्या कार्य हैं?

(c) सुकेन्द्रकियों में RNA पॉलीमरेज I और RNA पॉलीमरेज III के कार्य लिखिए।

5

अथवा

एक प्राक केन्द्रकीय कोशिका में तथा एक सुकेन्द्रकीय केन्द्रक में DN। हेलिक्स की पैकेजिंग का वर्णन कीजिए।



- (a) Identify strands 'A' and 'B' in the diagram of transcription unit given above and write the basis on which you identified them.
- (b) State the functions of Sigma Factor and Rho factor in the transcription process in a bacterium.
- (c) Write the functions of RNA polymerase-I and RNA polymerase-III in eukaryotes.

OR

Describe the packaging of DNA helix in a prokaryotic cell and an eukaryotic nucleus.

- 26 (a) मानव वृषणों में शुक्राणुजनन कहाँ होता है शुक्राणुओं के बनने तक शुक्राणुजनन की प्रक्रिया का वर्णन कीजिए।
- (b) शुक्राणु के स्खलन वाहिनी तक पहुँचने का मार्ग बताइए।

5

अथवा

परागण के अपने संगत वतिक्राय तक पहुँचने के बाद निषेचन होने तक की फूल में होने वाली घटनाओं की व्याख्या कीजिए।

- (a) Where does spermatogenesis occur in human testes? Describe the process of spermatogenesis upto the formation of spermatozoa.
- (b) Trace the path of spermatozoa from the testes upto the ejaculatory duct only.

OR

Explain the events upto fertilization that occur in a flower after the pollen grain has landed on its compatible stigma.



BIOLOGY

Series SSO/C

SET-1

रोल नं.

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Roll No.

कोड नं. :57/1
Code No

परीक्षार्थी कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें ।
Candidates must write the Code on the title page of the answer-book.

- कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ 8 हैं।
- प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए कोड नम्बर को छात्र उत्तर- पुस्तिका के मुख-पृष्ठ पर लिखें।
- कृपया जाँच कर लें कि इस प्रश्न-पत्र में 26 प्रश्न हैं।
- कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, प्रश्न का क्रमांक अवश्य लिखें।
- इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है। प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा। 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे।
- Please check that this question paper contains 8 printed pages.
- Code number given on the right hand side of the question paper should be written on the title paper of the answer-book by the candidate.
- Please check that this question paper contains 26 questions.
- Please write down the Serial Number of the question before attempting it.
- 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 to 10.30 a.m. , the students will read the question paper only and will not write any answer on the answer-book during this period.

जीव विज्ञान (सैद्धान्तिक) BIOLOGY (Theory)

निर्धारित समय: 3 घण्टे

Time allowed : 3 hours

अधिकतम अंक: 70

Maximum Marks : 70

सामान्य निर्देश :

- (I) प्रश्न-पत्र में खण्डों में 26 प्रश्न दिए गए हैं। सभी प्रश्न अनिवार्य हैं।
- (ii) खण्ड- A में प्रश्न संख्या 1 से 5 अति लघु-उत्तरीय प्रश्न हैं। प्रत्येक प्रश्न एक अंक का है।
- (iii) खण्ड- B में प्रश्न संख्या 6 से 10 लघु-उत्तरीय प्रश्न I प्रकार के हैं। प्रत्येक प्रश्न दो अंकों का है।
- (iv) खण्ड- C में प्रश्न संख्या 11 से 22 लघु-उत्तरीय प्रश्न II प्रकार के हैं। प्रत्येक प्रश्न तीन अंकों का है।
- (v) खण्ड- D में प्रश्न संख्या 23 मूल्य आधारित प्रश्न चार अंकों का है।
- (vi) खण्ड- E में प्रश्न संख्या 24 से 26 दीर्घ-उत्तरीय प्रश्न हैं। प्रत्येक प्रश्न पाँच अंकों का है।
- (vii) प्रश्न-पत्र में समग्र पर कोई विकल्प नहीं है, फिर भी 2 अंकों वाले एक प्रश्न में, 3 बंकों वाले एक प्रश्न में और 5 अंकों वाले सभी तीनों प्रश्नों में भीतरी चयन-विकल्प दिए गए हैं। प्रत्येक परीक्षार्थी को ऐसे प्रश्नों के दो विकल्पों में से कोई एक प्रश्न हल करना है।

General Instructions:

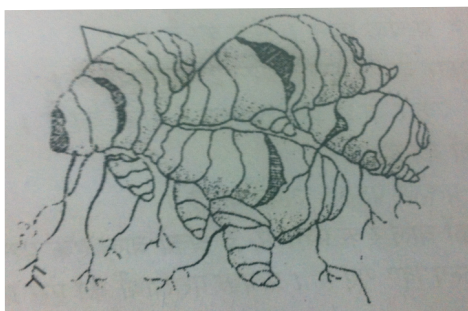
- (i) There are a total of 26 questions and five sections in the question paper. All questions are compulsory.
- (ii) Section A contains questions number 1 to 5, Very short Answer type questions of one mark each.
- (iii) Section B contains questions number 6 to 10, Short Answer type-I question of two marks each.
- (iv) Section C contains questions number 11 to 22, Short Answer type-II question of 3 marks each
- (v) Sections D contains question number 23, Value Based Question of four marks.
- (vi) Section E contains question number 24 to 26, Long Answer type questions of 5 marks each.
- (vii) There is no overall choice in the question paper, however, an internal choice is provided in one question of 2 marks, one question of 3 marks and all three questions of 5 marks. In these questions an examinee is to attempt any one of the two questions out given alternatives.

खण्ड-अ

SECTION-A

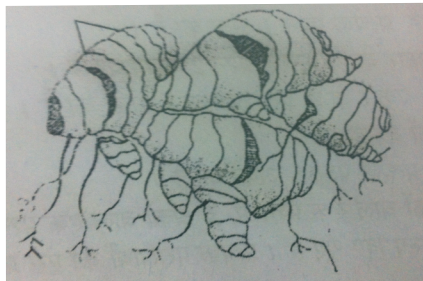
1. उन दो विशिष्ट कोडानों को बताइए जो mRNA की ट्रांसलेशनल इकाई के दोनों तरफ स्थित होते हैं।
Write the two specific codons that a translational unit of m RNA is flanked by one on either sides. 1
2. किलनियों और कुत्तों के बीच पाए जाने वाली पारस्परिक क्रिया किस प्रकार की होती है
State the type of interaction that exists between ticks and dogs. 1
3. क्लाइनेफेल्टर सिंड्रोम से ग्रस्त व्यक्तियों में पाए जाने वाले क्रोमोसोमी (गुणसूत्री) प्रभाव बताइए।
Write the chromosomal defect in individuals affected with Klinefelter's syndrome. 1

4. 1



यहाँ दिए गए चित्र को पहचानिए तथा उस कायिक भाग की चर्चा कीजिए जो उसे जनन में मदद करता है।

Identify the picture and mention the vegetative part that helps it to propagate.



5. सैकरम बारबेरी की तुलना में सैकरम ऑफीसिनेरम का आर्थिक महत्व बताइए। 1
State the economic value of *Saccharum officinarum* in comparison to *S. barberi*.

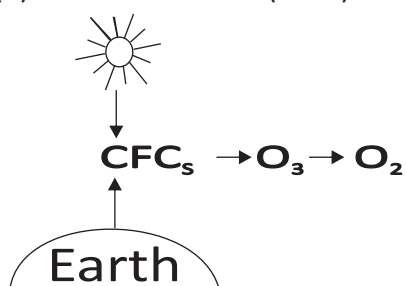
खण्ड-बी
SECTION-B

6. प्रोटीन संश्लेषण में राइबोजाइम और निर्मोचन कारक के कार्य बताइए। 2
State the functions of Ribozyme and release factor in protein synthesis respectively.

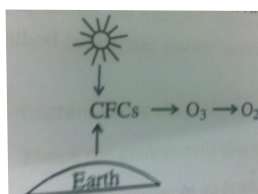
7. निम्नलिखित के कार्य बताइए: 2

- (a) cry 1 AC जीन
(b) RNA व्यतिकरण (RNAi)
Write the functions of
(a) cry 1AC gene
(b) RNA interference (RNAi)

8.



- (a) CFC का पूरा नाम लिखिए।
(b) यह ओजोन को किस प्रकार ऑक्सीजन में निम्नीकृत कर देता है ? 2



- (a) Expand CFC.
(b) How does it reduce ozone to oxygen ?



BIOLOGY

9. स्त्री में कॉर्पस ल्यूटियम की क्या नियति होती है यदि अंडाणु (i) निषेचित हो जाता है या (ii) निषेचित नहीं होता ? 2

अथवा

नरम नारियल के पानी और परिपक्व नारियल की मोटी, सफेद गिरी में अंतर बताइए तथा उनमें गुणसूत्र-संख्या भी बताइए।

What happens to corpus luteum in human female if the ovum is (i) fertilized, (ii) not fertilized ?

OR

Write the difference between the tender coconut water and the thick, white kernel of mature coconut and their ploidy.

10. बोगोनविलिआ के काँते और कुकरबिट के प्रतान (टेंड्रिल) के बीच कारण बताते हुए विकासीय संबंध बताइए। 2

State the evolutionary relationship giving reasons between the thorn of **Bougainvillea** and tendril of cucurbit.

खण्ड-सी

SECTION-C

11. मानवों में ADA न्यूनता का कारण बताइए। आनुवंशिक इंजीनियरिंग से इसके रोगियों को क्या मदद मिली है? 3

Mention the cause of ADA deficiency in human. How has genetic engineering helped patients suffering from it ?

12. शहरी क्षेत्रों में पेयजल की समस्या का प्रमुख कारण यही है कि हम अपने जल-निकायों की सुरक्षा करने में असफल रहे हैं। समझा कर बताइए कि द्रुत गति से होने वाला सुपोषण हमारे जल-निकायों को अवरूद्ध कर देता है जिसके कारण उनकी ऑक्सीजन दायी क्षमता समाप्त हो जाती है। 3

Drinking water problem in our areas is caused mainly because we fail to protect our water bodies. Explain how eutrophication chokes our water bodies to death.

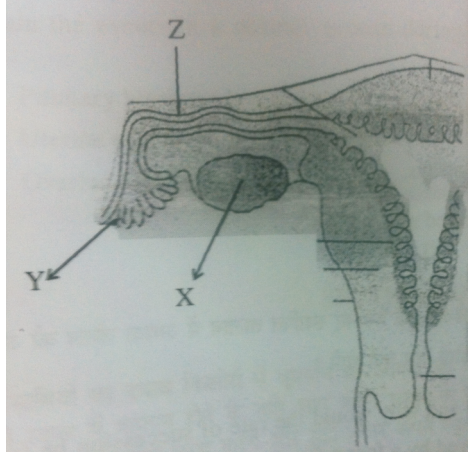
13. (a) सुदम और दुर्दम अर्बुदों (ट्यूमरों) में अंतर बताइए। 3

(b) हाल ही जन्मे बच्चे के लिए नवदुग्ध क्या एक वरदान होता है ?

(a) Differentiate between benign and malignant tumours.

(b) Why is colostrum a boon for the newborn baby ?

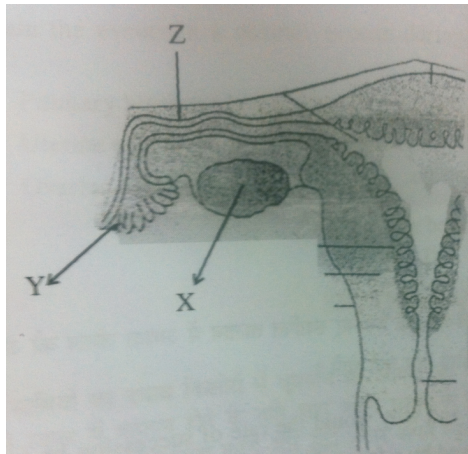
14



उपरोक्त आरेख में स्त्री के जनन-तंत्र का एक भाग दर्शाया गया है।

- (a) उन युग्मक कोशिकाओं का नाम बताइए जिन्हें हाल जन्मी बच्ची में से निकाल लिए गए भाग 'X' से प्राप्त किया गया होगा।
- (b) 'Y' भाग का नाम बताइए तथा उसका कार्य भी बताइए।
- (c) 'Z' भाग का नाम बताइए तथा यहाँ होने वाली घटनाओं की चर्चा कीजिए।

3



This diagram above shows a part of the human female reproductive system.

- (a) Name the gamete cells that would be present 'X' if taken from a newborn baby.
- (b) Name 'Y' and write its function.
- (c) Name 'Z' and write the events that take place here.

15. जीवाश्मों का अध्ययन विकास का किस प्रकार समर्थन करता है ? समझाइए।

3

अथवा

हार्डी वाइनबर्ग का साम्य अवस्था का नियम किस बात का संकेत करता है? उन किन्हीं दो कारकों के नाम बताइए जो साम्यता में परिवर्तन ला सकते हैं। इस प्रकार के परिवर्तन आने से क्या घटना हो सकती है?

How does the study of fossils support evolution ? Explain.

OR

What does Hardy-Weinberg Principle of equilibrium indicate ? List any two factors that could alter equilibrium. What would such an alteration lead to ?

16. गोल कृमियों द्वारा होने वाले हिन्हीं दो मानव रोगों के नाम बताइए। इन रोगों को उत्पन्न करने वाले कारकों के नाम बताइए तथा मानवों में इन रोगों के संक्रमण की विधि भी बताइए।

3

Mention any two human diseases caused by round worms. Name their causative agents and their mode of transmission into the human body.

17. (a) एक्सॉनों और इंट्रॉनों में अंतर बताइए।

3

(b) प्लाज्मिड क्या होता है? इसका चयन बैक्टर की भाँति क्यों किया जाता है ?

(a) Differentiate between exons and introns.

(b) What is a plasmid ? Why is it selected as a vector?

18. परिस्थितिक अनुक्रमण क्या होता है? अनुक्रमण की दर एक नए-नए स्थापित तालाब में अथवा जंगल की आग से नष्ट हुए एक वन में से किसमें अधिक तीव्र गति से होगी और क्यों होगी ?

3

What is ecological succession ? Where and why would the rate of succession be faster in newly created pond or a forest destroyed by forest fire ?

19. उच्च उत्पादन करने वाली गाय खाद्य-वृद्धि का एक हल है। MOET प्रौद्योगिकी से गोवृंद की वृद्धि में किस प्रकार सहायता मिलती है ?

3

High yielding cattle is a good solution for food enhancement. How does the MOET technology help to increase the herd size ?



BIOLOGY

20. यदि किसी परिवार में हीमोफिलिया नामक रोग का इतिहास है, तब उसे परिवार की स्त्रियों की अपेक्षा पुरुषों में हीमोफिलिया रोग होने के अधिक संयोग होते हैं। 3

(a) ऐसा क्यों होता है?

(b) इस बीमारी के रोग लक्षण बताइए।

If there is history of haemophilia in the family, the chances of male members becoming haemophilic are more than of the female.

(a) Why is it so ?

(b) Write the symptoms of the disease.

21. उच्च तुंगता वाले हिमालयी क्षेत्र में रहने वाले आदिवासियों को साँस लेने में क्यों दिक्कत होती है? ऐसी स्थिति में जीवित बने रहने के लिए किस प्रकार अनुकूलित हो जाते हैं? 3

Why do tribes who live in high altitude of Himalayas experience discomfort in respiration ? How do they get adapted to survive in such a situation ?

22. पने आर्तव-चक्र के दौरान सामान्य स्त्री में निम्नलिखित दिनों में होने वाली घटनाओं की व्याख्या कीजिए। 3

(a) आठवें दिन से लेकर बारहवें दिन तक पिट्यूटरी कॉर्मोन का स्तर।

(b) तेरहवें दिन से लेकर पंद्रहवें दिन तक गर्भाशय में होने वाली घटनाएँ।

(c) सोलहवें दिन से लेकर तेईसवें दिन तक अंडाशय में होने वाली घटनाएँ।

Explain the events in a normal woman during her menstrual cycle on the following days:

(a) Pituitary hormone levels from 8 to 12 days.

(b) Uterine events from 13 to 15 days.

(c) Ovarian events from 16 to 23 days

खण्ड-D

SECTION-D

23. संगी-साथियों का दबाव किशोरों में धूम्रपान की आदतों को बढ़ावा देने में ऋणात्मक भूमिका अदा करता है। अपने स्कूल में कप्तान होने के नाते आप अपने स्कूल के सीनियर विद्यार्थियों के साथ मिलकर कोई दो ऐसे कार्यक्रम आरंभ करना पसंद करेंगे और इसी प्रकार अपने स्कूल के अधिकारियों के दो ऐसे कार्यक्रम आरंभ करना चाहेंगे जिनसे इस समस्या का सामना किया जा सके। इस कार्य को कार्यक्रम किस प्रकार मदद करेंगे? व्याख्या कीजिए। 4

Peer pressure plays a negative role in triggering smoking habits in adolescents.

As a school captain list any two activities you would like to organize with the help of senior students of your school and any other two activities you would like your school authorities to organize for the students to tackle this problem.

Explain how these activities will help in doing so.



- 23 (a) मूल सिद्धांत (सेन्ट्रल डॉगमा) क्या होता है? इसकी प्रस्तावना किसने की थी?
 (b) यह प्रमाणित करने के लिए कि DNA का प्रतिकृतियन अर्धसंरक्षी होता है, मेसेल्सन और स्टॉल द्वारा किए गए प्रयोग का वर्णन कीजिए।

5

अथवा

- (a) क्रमशः रूधिर समूह 'A' और 'B' वाले एक दंपति के बच्चे का रूधिर समूह 'O' है। एकक्रॉस बनाकर यह समझाइए कि यह किस प्रकार संभव हो सका। साथ ही यह भी दर्शाइए कि इस दंपति के अन्य बच्चों में संभावी रूधिर-समूह क्या हो सकते हैं।
 (b) जनसंख्या में रूधिर-समूह के आनुवंशिक आधार की व्याख्या कीजिए।
 (a) What is Central dogma ? Who proposed it ?
 (b) Describe Meselson and Stahl's experiment to prove that the DNA replication is semi-conservative.

OR

- (a) A couple with blood groups 'A' and 'B' respectively have a child with blood group 'O'. Work out a cross to show how it is possible and probable blood groups that can be expected in their other off-spring.
 (b) Explain the genetic basis of blood groups in human population

25. rDNA प्रौद्योगिकी द्वारा इंसुलिन बनाने के अनुप्रयोग की व्याख्या कीजिए।

5

अथवा

- (a) PCR के एक पूरे चक्र के विभिन्न चरणों का वर्णन कीजिए।
 (b) इस प्रकार का विस्तारित कृषि अनुक्रम किस कार्य के लिए किया जाता है?
 Explain the application of rDNA technology to produce insulin.
 (a) Describe the different steps in one complete cycle of PCR.
 (b) State the purpose of such an amplified DNA sequence

26. (a) ऐंजियोस्पर्मों में माइक्रोस्पोरोजेनेसिस की प्रक्रिया का क्रमागत वर्णन कीजिए।
 (b) दो कोशिका वाली अंतिम सांचना का एक नामांकित आरेख बनाइए।

5

अथवा

- (a) मानव की शुक्रजनक नलिका का काटीय दृश्य बनाए। इस आरेख में निम्नलिखित संरचनाओं का नामांकन कीजिए तथा उसके कार्य बताइए : सर्टोली कोशिका, शक्राणुजननी तथा लीडिग कोशिका
 (b) शक्राणुजनन की प्रक्रिया में पिट्यूटरी और लिंग हॉर्मोनों की भूमिका की व्याख्या कीजिए।
 (a) Describe in sequence the process of microsporogenesis in angiosperms.
 (b) Draw a labelled diagram of a two celled final structure formed.

OR

- (a) Draw a sectional view of a seminiferous tubule of human. Label sertoli cell, spermatogonia and leydig cell on it and write their functions.
 (b) Explain the role of pituitary and sex hormones in the process of spermatogenesis.



BIOLOGY

Series ORS/1/C

कोड नं. :57/1/3
Code No :57/1/3

रोल नं.

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Roll No.

परीक्षार्थी कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें ।
Candidates must write the Code on the title page of the answer-book.

- कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ 8 हैं।
- प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए कोड नम्बर को छात्र उत्तर- पुस्तिका के मुख-पृष्ठ पर लिखें।
- कृपया जाँच कर लें कि इस प्रश्न-पत्र में 30 प्रश्न हैं।
- कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, प्रश्न का क्रमांक अवश्य लिखें।
- इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है। प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा। 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे।
- Please check that this question paper contains 8 printed pages.
- Code number given on the right hand side of the question paper should be written on the title paper of the answer-book by the candidate.
- Please check that this question paper contains 30 questions.
- Please write down the Serial Number of the question before attempting it.
- 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 to 10.30 a.m. , the students will read the question paper only and will not write any answer on the answer-book during this period.

जीव विज्ञान (सैद्धान्तिक) BIOLOGY (Theory)

निर्धारित समय: 3 घण्टे
Time allowed : 3 hours

अधिकतम अंक: 70
Maximum Marks 70



BIOLOGY

सामान्य निर्देशः

- 1- सभी प्रश्न अनिवार्य हैं।
- 2- इस प्रश्न-पत्र में चार खण्ड A, B, C और D हैं। खण्ड A में 8 प्रश्न हैं जिनमें प्रत्येक का एक अंक है, खण्ड B में 10 प्रश्न हैं प्रत्येक के दो अंक हैं, खण्ड C में 9 प्रश्न हैं जिनमें प्रत्येक के तीन अंक हैं तथा खण्ड D में 3 प्रश्न हैं प्रत्येक के पाँच अंक हैं।
- 3- कोई समग्र चयन-विकल्प (ओवरऑल चॉइस) उपलब्ध नहीं है। फिर भी, 2 अंको वाले एक प्रश्न में 3 अंको वाले एक प्रश्न में और 5 अंकों वाले सभी तीनों में भीतरी चयन-विकल्प दिए गए हैं। ऐसे प्रश्नों में विद्यार्थी को केवल एक ही विकल्प का उत्तर देना है।
- 4- जहाँ भी आवश्यक हो, बनाए जाने वाले आरेख साफ-सुथरे तथा समुचित रूप में नामांकित हों।

General Instructions:

- (i) All questions are compulsory.
- (ii) This question paper consists four Sections A, B, C and D. Section A contains 8 questions of one mark each, Section B is of 10 questions of two marks each, Section C is 9 questions of three marks each and Section D is of 3 question of five marks each.
- (iii) There is no overall choice. However, an internal choice has been provided in one question of 2 marks, one question of 3 marks and all the three questions of 5 marks weightage. A student has to attempt only one of the alternatives in such questions.
- (iv) Wherever necessary, the diagrams drawn should be neat and properly labelled.

खण्ड-अ

SECTION-A

1. कोई दो कारण बताइए कि विभिन्न प्रकार के पारितंत्रों में प्राथमिक उत्पादकता भिन्न-भिन्न क्यों होती है। 1
Mention any two reasons why the primary varies in different types of ecosystems.
2. किसी एक लड़के में ADA- अभाव की पहचान हुई है। इसका कोई एक संभव उपचार सुझाइए। 1
A boy has been diagnosed with ADA-deficiency. Suggest any one possible treatment.
3. निम्नलिखित में से किन दो जीवों में निषेचन बाह्य होता है? 1
In which two of the following organisms is the fertilization external?
Bony fishes, ferns, frogs, birds.
अस्थिल मछलियाँ, फर्न, मेंढक, पक्षी।
4. एक ऐसी आंतरगर्भाशयी युक्ति (IUD) का नाम लिखिए जिसका सुझाव आप इसलिए दे सकते हैं कि 1
गर्भाशय ग्रीवा शुक्रणुओं के लिए प्रतिकूल हो जाए।
Name an IUD that you would recommend to promote the cervix hostility to the sperms.
5. डी व्रीज के अनुसार महा-उत्परिवर्तन (सॉल्टेशन) क्या होता है? 1
What is 'saltation' according to de Vries ?
6. निम्नलिखित में से दो सही कथन चुनिए: 1
1- अंग्रेजी के शब्द 'एपिकल्चर का अर्थ है एपिकल (शीर्षस्थ) विभज्योतक संवर्धन।
2- पालक लौह-भरपूर होता है।
3- हरित क्रांति के द्वारा दालों का उत्पादन अधिक होने लगा है।
4- तौरिया सरसों में एफिडों का आग्रसन नहीं सकता।
Identify the two correct statements from the following :
(i) Apiculture means apical meristem culture.
(ii) Spinach is iron-enriched.
(iii) Green revolution has resulted in improved pulse-yields.
(iv) Aphids cannot infest rapeseed mustard.
7. सहप्रभाविता दर्शाने वाले किसी एकसंकर संकरण में F₂ पीढ़ी में कितने प्रकार के लक्षणप्ररूपों 1
की आशा की जाएगी?
How many kinds of phenotypes would you expect in F₂ generation in a monohybrid cross exhibiting co-dominance?

8. अच्छी ओजोन कहाँ होती पाई जाती ? इसे यह नाम क्यों दिया गया ? 1

Where is good ozone present ? Why is it called so ?

खण्ड- बी

SECTION -B

9. आलू के पौधे में एक वायरस (विषाणु) का संक्रमण हो गया है। इससे वायरस-मुक्त आलू पौधों को प्राप्त करने की विधि का नाम लिखिए और उसके विषय में समझाइए। 2

A potato plant is infected with a virus. Name and explain a method to obtain virus-free potato plants from it.

10. जैवविविधता हानि के चार कारणों की सूची दीजिए। 2

अथवा

- उत्प्रेक परिवर्तन में इस्तेमाल किए जाने वाले दो धातुओं के नाम लिखिए। पर्यावरण को स्वच्छ रखने में ये किस प्रकार सहायता करते हैं? 2

List four causes of biodiversity loss.

OR

Name two metals used in a catalytic converter. How do they help in keeping the environment clean ?

11. दूध से दही बनाने के लिए उसमें जामन क्यों मिलाया जाता है ? समझाइए। 2

Why is 'stasrter' added to set the milk into curd ? Explain.

12. किसी एक परजीवी में किन्हीं चार परजीवी अनुकूलनों की सूची बलाइए। 2

List any four parasitic adaptations in a parasite.

13. किसान लोग केले की फसल को बिना बीज बोए उगाते हैं। समझाइए कि पौधे का संचरण किस प्रकार किया जाता है। 2

Banana crop is cultivated by farmers without sowing of seeds. Explain how the plant is propagated.

14. मानवों में अण्डाणु के निषेचन होने के दौरान होने वाली घटनाएँ समझाइए। ऐसा कैसे होता है कि अण्डसणु के भीतर केवल एक ही शुक्राणु प्रवेश कर पाता है? 2

Explain the events that occur during fertilization of an ovum in humans. How is it that only one sperm enters the ovum?



BIOLOGY

15. ट्रांसलेशन प्रक्रिया के दौरान t-RNA का चार्जिंग होना क्यों आवश्यक होता है? 2
Why is charging of t-RNA necessary during translation process?
16. किसी एक प्रत्यूजक का नाम लिखिए और उससे उद्भासित होने पर मानव शरीर में क्या अनुक्रिया होती है, लिखिए। 2
Name an allergen and write the response of the human body when exposed to it.
17. एरिथ्रोजाइलम कोका से प्राप्त होने वाली औषध का नाम लिखिए और बताइए कि मानव शरीर पर इसके क्या प्रभाव होते हैं। 2
Name the drug obtained from *Erythroxyllum coca* and write its effect on the human body.
18. मवेशियों में अंतःप्रतनन का महत्व समझाइए। 2
Explain the importance of inbreeding in cattle.

खण्ड-C

SECTION C

19. मॉर्गन ने ड्रोसोफ़िला पर कई द्विसंकर संकरण किए और पाया कि F_2 -अनुपात प्रत्याशित मेंडेलीय अनुपात से भिन्न-भिन्न आए। एक उदाहरण की सहायता से उसकी इन खोजों के विषय में समझाइए। 3
Morgan carried out several dihybrid crosses in *Drosophila* and found F_2 -ration deviated very significantly from the expected Mendelian ratio. Explain his findings with the help of an example.
20. किसी ट्रांसक्रिप्शन (अनुलेखन) इकाई में निर्लेखित के पाए जाने का सीन और उनकी भूमिका के विषय में एक योजना आरेख की सहायता से समझाइए: प्रोमोटर (उत्प्रेरक), संरचनात्मक जीन, अंतकारी। 3
With the help of a schematic diagram, explain the location and the role of the following in a transcription unit:
Promoter, Structural gene, Terminator.
21. डार्विन के मत के अनुसार नए स्वरूपों के प्रकट होने की दर उनके जीवन-चक्रों के साथ जुड़ी होती है। समझाइए। 3
According to the Darwinian theory, the rate of appearance of new forms is linked to their life cycle. Explain.



BIOLOGY

22. एक प्ररूपी बायोगैस संयंत्र का नामांकित आरेख बनाइए।

3

अथवा

(a) निम्नलिखित रोगों के उत्पन्नकर्ता जीवों के नाम लिखिए:

- (i) श्लीपद
- (ii) दद्रु (दाद)
- (iii) अमीबिएसिस

(b) इस प्रकार के रोगों के नियंत्रण में सार्वजनिक स्वास्थ्य रक्षा किस प्रकार सहायक हो सकती है?

3

Draw a labelled sketch of a typical biogas plant.

OR

(a) Name the causative organisms for the following diseases:

- (i) Elephantiasis
- (ii) Ringworm
- (iii) Amoebiasis

(b) How can public hygiene help control such diseases ?

23. आपकी बस्ती के कुछ निवासियों ने व्यवसाय लाभ के लिए कुछ छोटे पैमाने वाले औद्योगिक/ व्यापारिक क्रियाकलाप सीपित किए हैं जैसे कि विकृतिविज्ञान प्रयोगशालाएँ तथा वस्त्र रंगने के केंद्र जिसके लिए उन्होंने नगरपालिका अधिकारियों “कोई आपत्ति नहीं” सर्टिफिकेट नहीं ले रखे थे।

3

A few residents in your locality, for business going, have established small-scale industrial / commercial activities such as pathological labs and fabric dyeing centres without obtaining 'No objection certificates' from municipal authorities.

Would you support these activities ? Give any three reasons in support of your answer.

24. (a) शिम्बों के परिपक्व बीज गैर-एल्बुमिनी होते हैं। तब क्या यह मान लिया जा सकता है कि शिम्बों में दोहरा निषेचन नहीं होता? अपने उत्तर को समझाइए।

3

(b) द्विबीजपत्री (मटर) तथा एकबीजपत्री (घास फैमिली) के भ्रूणों में क्या-क्या अंतर होते हैं, सूची बनाइए।

(a) Mature seeds of legumes are non-albuminous. Then, can it be assumed that double fertilisation does not occur in legumes ? Explain your answer.

(b) List the differences between the embryos of dicot (pea) and monocot (grass family).



BIOLOGY

25. किसी क्लोनिंग वाहक में 'क्लोनिंग स्थल' क्या होते हैं। उनकी भूमिका समझाइए। में ऐसे किन्हीं दो सीलों के नाम लिखिए। 3

What are 'cloning sites' in a cloning vector? Explain their role. Name any two such sites in pBR32

26. पोषी पादप तथा उसके उस भाग का नाम लिखिए जिसको मेलॉइडोगाइन इन्कोग्निटा संक्रमित करता है। 3
पोषी पादप में ds-RNA के उत्पादन में ऐग्रोबैक्टीरियम की भूमिका समझाइए।

Name the host plant and its part that *Meloidogyne incognita* infects. Explain the role of *Agrobacterium* in the production of ds-RNA in the host plant.

27. एक भयंकर दुर्घटना में घटना स्थल से, झुलसे और बदशक्ल हुए अनेक मृत शरीर पाए गए? 3
जिनको पहचाना जाना अत्यंत कठिन था। उस तकनीक का नाम लिखिए एवं उसके विषय में समझाइए जिसकी सहायता से अधिकारीगण मृत जनों की पहचान कर सकें और उन्हें उनके अपने-अपने रिश्तेदारों को सौंप सकें।

Following a severe accident, many charred- disfigured bodies are recovered from the site making the identification of the dead very difficult. Name and explain the technique that would help the authorities to establish the identity of the dead to be able to hand over the dead to their respective relatives.

खण्ड-D

SECTION D

28. "DNA प्रतिकृति अर्धसंरक्षी होती है" एक सिद्धांत को प्रस्तावित करने वाले वैज्ञानिकों के तथा सिद्ध करने वालों के नाम लिखिए। इसे प्रयोगों के आधार पर किस प्रकार सिद्ध किया गया था? समझाइए। 5

अथवा

- (a) मानवों में वर्णांधता (रंगांधता) एक लिंग-सहलग्न विशेषक है। इस विषय को एक संकर की सहायता से समझाइए।
- (b) मानवों में बच्चे के लिंग का निर्धारण पिता द्वारा होता है न कि माँ के द्वारा। इसके विषय में समझाइए। 5

'DNA replication is semi-conservative.'" Name the scientists who proposed it and who proved it. How was it proved experimentally? Explain

OR

- (a) Colourblindness in humans is a sex-linked trait. Explain with the help of a cross.
- (b) In human being, the sex of the child is determined by the father and not by the mother. Explain.

- 29 मापवों में शुक्राणुजनन घटनाओं को योजना रूप में दर्शाए तथा उनके विषय में समझाइए। 5

अथवा

- आवृतबीजी फूल उभयलिंगाश्रयी हो सकते, अनुन्मील्य-परागणी हो सकते हैं या उनमें स्व-निषेच्यता (आत्म-असंगतता) हो सकती है। इनमें से प्रत्येक के विशिष्ट लक्षणों का वर्णन कीजिए और बताइए कि इनमें से कौन-से एक प्रकार के फूल क्रमशः अंतःप्रजनन तथा बाह्यप्रजनन को बढ़ावा देते हैं। 5

Schematically represent and explain the events of spermatogenesis in humans.

OR

Angiosperm flowers may be monoecious , cleistogamous or show self-incompatibility. Describe the characteristic features of each one of them and state which one of these flowers promotes invreeding and outbreeding respectively.

30. (a) किसी थलीय पारितंत्र में फॉस्फोरस चक्रण एक सरलीकृत मॉडल का आरेख बनाइए। 5
(b) पारितंत्रों में इस प्रकार के चक्रों का महत्व लिखिए।

अथवा

- (a) जैवविविधता के संरक्षण के पक्ष में अल्पतः उपयोगी, व्यापकतः उपयोगी तथा नैतिक तर्क क्या हैं, समझाइए।
(b) कुछ निश्चित क्षेत्रों को “ अधिस्थलों ” की संज्ञा देना जैवविविधता संरक्षण की ओर एक कदम क्यों कहा जाता है? भारत के किन्हीं दो अधिस्थलों के नाम लिखिए । 5
(a) Draw a simplified model of phosphorus cycling in a terrestrial ecosystem.
(b) Write the importance such cycles in ecosystems.

OR

- (a) Explain the narrowly utilitarian, broadly utilitarian and ethical arguments in favour of conservation of biodiversity.
(b) How is designation of certain areas as hotspots a step towards biodiversity conservation? Name any two hotspots in India.

Series ORS/2

कोड नं. :57/2/3
Code Noरोल नं.
Roll No

परीक्षार्थी कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें ।
Candidates must write the Code on the title page of the answer-book.

- कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ 11 हैं।
- प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए कोड नम्बर को छात्र उत्तर- पुस्तिका के मुख-पृष्ठ पर लिखें।
- कृपया जाँच कर लें कि इस प्रश्न-पत्र में 30 प्रश्न हैं।
- कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, प्रश्न का क्रमांक अवश्य लिखें।
- इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है। प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा। 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे।
- Please check that this question paper contains 8 printed pages.
- Code number given on the right hand side of the question paper should be written on the title paper of the answer-book by the candidate.
- Please check that this question paper contains 30 questions.
- **Please write down the Serial Number of the question before attempting it.**
- 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 to 10.30 a.m. , the students will read the question paper only and will not write any answer on the answer-book during this period.

जीव विज्ञान (सैद्धान्तिक)
BIOLOGY (Theory)

निर्धारित समय: 3 घण्टे
Time allowed : 3 hours

अधिकतम अंक: 70
Maximum Marks : 70

सामान्य निर्देशः

- 1- सभी प्रश्न अनिवार्य हैं।
- 2- इस प्रश्न-पत्र में चार खण्ड A,B,C और D हैं। खण्ड A में 8 प्रश्न हैं जिनमें प्रत्येक का एक अंक है, खण्ड B में 10 प्रश्न हैं प्रत्येक के दो अंक हैं, खण्ड C में 9 प्रश्न हैं जिनमें प्रत्येक के तीन अंक हैं तथा खण्ड D में 3 प्रश्न हैं प्रत्येक के पाँच अंक हैं।
- 3- कोई समग्र चयन-विकल्प (ओवरऑल चॉइस) उपलब्ध नहीं है। फिर भी, 2 अंको वाले एक प्रश्न में 3 अंको वाले एक प्रश्न में और 5 अंको वाले सभी तीनों में भीतरी चयन-विकल्प दिए गए हैं। ऐसे प्रश्नों में विद्यार्थी को केवल एक ही विकल्प का उत्तर देना है।
- 4- जहाँ भी आवश्यक हो, बनाए जाने वाले आरेख साफ-सुथरे तथा समुचित रूप में नामांकित हों।

General Instructions:

- (i) All questions are compulsory.
- (ii) This question paper consists four Sections A, B, C and D. Section A contains 8 questions of one mark each, Section B is of 10 questions of two marks each, Section C is 9 questions of three marks each and Section D is of 3 question of five marks each.
- (iii) There is no overall choice. However, an internal choice has been provided in one question of 2 marks, one question of 3 marks and all the three questions of 5 marks weightage. A student has to attempt only one of the alternatives in such questions.
- (iv) Wherever necessary, the diagrams drawn should be neat and properly labelled.

खण्ड-A

SECTION-A

1. कोहेन तथा बोयेर द्वारा रचित सबसे पहले कृत्रिम पुनर्योगज DNA अणु के दो घटकों के नाम लिखिए। 1

Write the two components of the first artificial recombinant DNA molecule constructed by Cohen and Boyer

2. उस स्रोत जीवधारी का वैज्ञानिक नाम लिखिए जिससे सबसे पहली ऐंटीबायोटिक बनायी गयी थी। 1

Give the scientific name of the source organism from which the first antibiotic was produced.

3. दात्र कोशिका अरक्तता से पीड़ित किसी व्यक्ति में सामान्य लाल रक्त कोशिकाएँ लम्बी और दात्र आकृति की क्यों हो जाती हैं 1

Why do normal red blood cells become elongated sickle shaped structures in a person suffering from sickle cell anaemia ?

4. किसी आवृतबीजी के परिपक्व भ्रूण-कोष में पाए जाने वाले सूत्राकार उपकरण (तंतुरूप समुच्चय) का कार्य बताइए। 1

State the function of filiform apparatus found in mature embryo sac of an angiosperm.

5. नाभिकीय ऊर्जा के प्रदूषकारी न होते हुए भी बिजली उत्पादन के लिए इसके इस्तेमाल पर भारी आयांकाएँ बनी हुई हैं, ऐसा क्यों ? 1

In spite of being non-polluting, why are there great apprehensions in using nuclear energy for signing for generating electricity ?

6. मॉन्ट्रीसल प्रोटोकॉल पर हस्ताक्षर करने का उद्देश्य बताइए। 1

State the purpose of signing the Montreal Protocol.

7. उन एंजाइमों के नाम लिखिए जिनका इस्तेमाल क्रमशः जीवाणु कोशिकाओं के तथा कवक कोशिकाओं के DNA के पृथक्करण के लिए किया जाता है। 1

Write the names of the enzymes that are used for isolation of DNA from bacterial and fungal cells respectively for Recombinant DNA Technology.



BIOLOGY

8. उन परपोषी कोशिकाओं का नाम लिखिए जिनके भीतर विजातीय DNA प्रवेश करने के लिए सूक्ष्म अंत-क्षेपण तकनीक इस्तेमाल की जाती है। 1
- Name the host cells in which micro-injection technique is used to introduce an alien DNA.

खण्ड B

SECTION-B

9. आनुवंशिक कूट के मुख्य पहलुओं में से एक यह है कि यह बैक्टीरिया से लेकर मानवों तक सभी में लगभग सार्वत्रिक होता है। इस नियम के दो अपवाद बताइए। यह भी लिखिए कि कुछ कूटों को अपहासित क्यों कहा जाता है। 2
- One of the salient features of the genetic code is that it is nearly universal from bacteria to humans. Mention two exceptions to this rule. Why are some codes said to be degenerate?
10. “अपनयन सिंड्रोम” किसे कहते हैं ? इसके कोई दो विशिष्ट रोगलक्षण लिखिए। 2
- What is “withdrawal syndrome” ? List any two symptoms it is characterised by.
11. एक उपयुक्त उदाहरण की सहायता से विलोमानुक्रमी न्यूक्लियोटाइड अनुक्रम के विषय में समझाइए। 2
- Explain palindromic nucleotide sequence with the help of a suitable example.
12. फसली पौधों में कृत्रिम संकरण कराने में कौन-कौन से दो चरण अनिवार्य हैं, सूची बनाइए, और वे ऐसा क्यों हैं, यह भी लिखिए। 2
- List the two steps that are essential for carrying out artificial hybridization in crop plants and why.
13. केवल पौधों से एक-एक उदाहरण लेकर समझाइए कि सहभेजिता तथा सहोपकारिता (पस्परहितता) में क्या अंतर है। 2
- Differentiate between commensalism and mutualism by taking one example each from plants only.
14. (a) ओजोन परत के रिक्तीकरण का क्या कारण रहा है, लिखिए।
(b) ऐसा होने से मानव शरीर पर पड़ सकने वाले कोई दो दुष्प्रभाव बताइए। 2
- (a) State the cause of depletion of ozone layer.
(b) Specify any two ill-effects that it can cause in the human body.

15. अमेरिका कम्पनी एलि लिल्ली ने पुनर्योगज DNA प्रौद्योगिकी द्वारा इंसुलिंग का किस प्रकार उत्पादन किया था, समझाइए।

2

Explain how Eli Lilly, an American company, produced insulin by recombinant DNA Technology.

16. नीचे एक रूपदा रज्जुक दिया गया है। उसके अनुरूपी कोडीकरण और इन सकने वाले mRNA रज्जुको को उनकी ध्रुवता सहित लिखिए।

2

3' ATGCATGCATGCATGCATGC5'

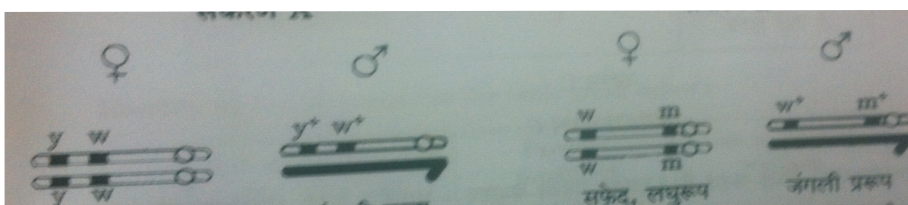
अथवा

नीचे दिए जा रहे चित्रों का अध्ययन कीजिए और पूछे जा रहे प्रश्न का उत्तर दीजिए :

2

संकरण A

संकरण B



पीला, सफेद

जंगली प्ररूप

सफेद लघुरूप

जंगली प्ररूप

पहचानकर बताइए कि किस संकरण में जीनों के बीच की सहलग्नता शक्ति उच्चतर है। अपने उत्तर के समर्थन में कारण बताइए।

A template strand is given below. Write down the corresponding coding strand and the mRNA strand that can be formed, along with their polarity.

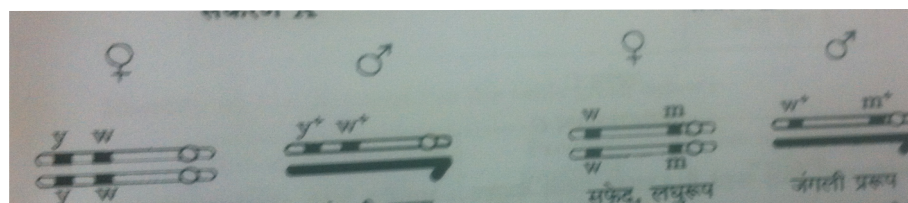
3' ATGCATGCATGCATGCATGC5'

OR

Study the figures given below and answer the question.

Cross A

Cross B



Identify in which of the crosses is the strength of linkage between the genes higher. Give reasons in support of your answer.

17. न्यूक्लियोसोम का एक नामांकित आरेख बनाइए। कोशिका के भीतर यह कहा मापी जाती है?

2

Draw a labelled diagram of nucleosome. Where is it found in a cell ?

18. किन्हीं ऐसे दो जीवधारियों के नाम और निहित परिघटना लिखिए जिनमें बिना निषेचन हुए ही मादा युग्मक में परिवर्धन होकर नए जीव बन जाते हैं।

2

Name any two organisms and the phenomenon involved where the female gamete undergoes development to form new organisms without fertilization.

खण्ड C

SECTION- C

19. “जैव-प्रबलीकरण” किसे कहते हैं ? इसका महत्व बताइए। भारतीय कृषि संस्थान का इसमें क्या योगदान रहा है, दो उदाहरणों की सहायता से इसे बताइए।

3

What is “biofortification” ? Write its importance. Mention the contribution of India Agricultural Research Institute towards it with the help of two examples.

20. (a) पौलीमरेज चेन रिप्लिकेशन (PCR) में निहित तीन चरण क्या-क्या हैं, सूची बनाइए।

3

(b) Taq पौलीमरेज के स्रोत जीव का नाम लिखिए। PCR में इस एंजाइम की विशिष्ट भूमिका क्या है, समझाइए।

(a) List the three steps involved in Polymerase Chain Reaction (PCR).

(b) Name the source organism of Taq polymerase. Explain the specific role of this enzyme in PCR.

21. नीचे दी जा रही तालिका में a, b, c, d, e तथा f को पहचानिए, वे क्या हैं।

3

जीव का वैज्ञानिक नाम	बनाया गया उत्पाद	मानव कल्याण में उपयोग
स्ट्रेप्टोकोककस	स्ट्रेप्टोकाइनेज जिसे बाद में रूपांतरित किया गया	a
b	साइक्लोस्पोरिन A	c
मोनैस्कस परपूरियस	b	e
लैटोबैसिलस	f	दूध को दही में बदल देता है

Identify a, b, c, d, e and f in the table given below :

Scientific Name of the organism	Product produced	Use in human welfare
<i>Streptococcus</i>	Streptokinase That was later modified	a
b	Cyclosporin A	c
<i>Monascus purpureus</i>	b	e
<i>Lactobacillus</i>	f	sets milk into curd

22. प्लाज्मोडियम के उस स्वरूप का नाम लिखिए जो मानव शरीर में प्रविष्ट हुआ करता है। मानव शरीर में इसके जीवन-चक्र की विभिन्न अवस्थाएँ समझाइए।

3

अथवा

- (a) कोलोस्ट्रम (नवस्तन्य) तथा टीकाकरणों से नवजात को प्रदान होने वाली प्रतिरक्षा के प्रकार का नाम लिखिए और कारण बताते हुए उसके विषय में समझाइए।
- (b) निम्नलिखित में पाए जाने वाले ऐंटीबॉडी (प्रतिपिंड) के प्ररूप का नाम लिखिए:
- (i) कोलोस्ट्रम में पाए जाने वाले
- (ii) मानव शरीर में एलर्जनों की अनुक्रिया से बनने वाले

3

Name the form of Plasmodium that gains entry into the human body.
Explain the different stages of its life-cycle in the human body.

OR

- (a) Name and explain giving reasons, the type of immunity provided to the newborn by the colostrum and vaccinations.
- (b) Name the type of antibody.
(I) Present in colostrum
(ii) produced in response to allergens in human body.
23. (a) उस वैज्ञानिक का नाम लिखिए जिसने एक ऐसे अपनुकूलक अणु की अभिधारणा की थी जो प्रोटीन संश्लेषण में सहायता कर सकता है।
(b) एक आरेख की सहायता से इस अणु की संरचना का वर्णन कीजिए। प्रोटीन संश्लेषण में इसकी भूमिका का उल्लेख कीजिए। 3
- (a) Name the scientist who postulated the presence of an adapter molecule that can assist in protein synthesis.
- (b) Describe its structure with the help of a diagram. Mention its role in protein synthesis.
24. मानव शुक्रणु का आरेख इनाइए। इसमें केवल उन भागों का नामांकन कीजिए एवं उन्हीं के कार्यों का वर्णन भी कीजिए, जो मादा युग्मक तक पहुँचने उसमें प्रवेश करने में शक्राणु की सहायता करते हैं। 3
Draw a diagram of a human sperm. Label only those parts along with their functions, that assist the sperm to reach and gain entry into the female gamete.
25. उस शल्य-चिकित्सा विधि का नाम लिखिए और समझाइए जिसके द्वारा मानव नरों और मादाओं में जनन नियंत्रण किया जा सकता है। इसका एक लाभ और एक अलाभ बताइए।
Name and explain the surgical method advised to human males and female as a means of birth control. Mention its one advantage and one disadvantage.



26. वायु-परागित तथा कीट-परागित फूलों में क्या-क्या भिन्नताएँ होती हैं। लिखिए। प्रत्येक प्रकार का एक-एक उदाहरण दीजिए।

3

Write the differences between wind-pollinated and insect-pollinated flowers. Give an example of each type.

27. इस समय दिल्ली की वायु की गुणवत्ता उससे कहीं ज्यादा उन्नत हो गयी है जितनी कि 1997 से पहले हुआ करती थी। ऐसा होना बहुत ज्यादा सचेतन मानव प्रयासों का परिणाम है। आपसे कहा जा रहा है कि आप अपनी बस्ती में एक जागरूकता कार्यक्रम चलाएँ जिसमें आप उन चरणों पर टिप्पणी करेंगे जो दिल्ली सरकार ने वायु गुणवत्ता को सुधारने के लिए उठाए थे।

3

- (a) अपनी कोई दो टिप्पणियाँ लिखिए।
- (b) ऐसा कोई दो विधियों की सूची इनाइए जिन्हें आप अपने कार्यक्रम में शामिल करना चाहेंगे ताकि वायु की अच्छी गुणवत्ता बनाए रखना सुनिश्चित किया जा सके।
- (c) ऐसे कोई दो मूल्य बताइए जिन्हें आपका कार्यक्रम आपकी बस्ती में रहने वाले लोगों में पैदा करेगा।

Presently, air quality of Delhi has significantly improved in comparison to what existed before 1997. This is the result of a lot of conscious human efforts. You are being asked to conduct an awareness programme in your locality wherein you will comment on the steps taken by Delhi Government to improve the air quality.

- (a) Write any two of your comments.
- (b) List any two ways that you would include in your programme so as to ensure the maintenance of good quality of air.
- (c) State any two values your programme will inculcate in the people of your locality.



BIOLOGY

**खण्ड D
SECTION D**

28. (a) प्राथमिक तथा द्वितीयक पारिस्थितिक अनुक्रमणों में विभेद कीजिए। 5
- (b) प्रकृति में होते रहने वाले शुष्कतारंभी अनुक्रमणों के विभिन्न चरण समझाइए।

अथवा

- (a) जैवविविधता के संरक्षण की क्यों आवश्यकता है ?
- (b) जैवविविधता के हास के लिए उत्तदायी किन्हीं दो विधियों के नाम लिखिए और उनके विषय में समझाइए। 5
- (a) Differentiate between primary and secondary ecological successions.
- (b) Explain the different steps of xerarch succession occurring in nature.

OR

- (a) Why is there a need to conserve biodiversity ?
- (b) Name and explain any two ways that are responsible for loss of biodiversity.
29. मानवों में थैलेसीमिया पैदा करने वाले जीन का प्ररूप और उसके पाए जाने का सीन लिखिए। इस रोग के होने का कारण और इसके रोगलक्षण लिखिए। इस रोग की तुलना में दात्र कोशिका अरक्तता किस प्रकार भिन्न होती है ? 5

अथवा

- (a) हार्डी-वीनबर्ग सिद्धांत का वर्णन कीजिए।
- (b) आनुवंशिक साम्य को प्रभावित करने वाले किन्हीं चार कारकों की सूची बनाइए।
- (c) संस्थापक प्रभाव का वर्णन कीजिए। 5

Write the type and location of the gene causing thalassemia in humans.
State the cause and symptoms of the disease. How is sickle cell anaemia different from this disease ?

OR

- (a) Describe Hardy-Weinberg Principle.
- (b) List any four factors which affect genetic equilibrium.
- (b) Describe founder effect.

- 30 (a) उन सूक्ष्मजीवों की श्रेणी का नाम लिखिए जो वाहित मल में प्राकृतिक रूप में हुआ करते हैं और मल-उपचार के दौरान उसे कम प्रदूषित बना देते हैं।
- (b) वाहित मल के द्वितीयक उपचार के दौरान होने वाले विभिन्न चरणों के विषय में समझाइए।

अथवा

- (a) मानवों में पाए जाने वाले किन्हीं चार लसीकाभ अंगों के नाम लिखिए एवं उनके विषय में समझाइए।
- (b) नाम लिखे गए लसीकाभ अंगों का कारण बताते हुए प्राथमिक अथवा द्वितीयक लसीकाभ अंगों में वर्गीकृत कीजिए।
- (a) Name the category of microbes occurring naturally in sewage and making it less polluted during the treatment.
- (b) Explain the different steps involved in the secondary treatment of sewage.

OR

- (a) Name and explain any four lymphoid organs present in humans.
- (b) Categorise the named lymphoid organs as primary or secondary lymphoid organs, giving reasons.



BIOLOGY

Series: SSO/1/C

SET-1

कोड नं. :57/1/1

रोल नं.
Roll No

परीक्षार्थी कोड को उत्तर-पुस्तिका के मुख-पृष्ठ पर अवश्य लिखें।
Candidates must write the Code on the title page of the answer-book.

- कृपया जाँच कर लें कि इस प्रश्न-पत्र में मुद्रित पृष्ठ 8 हैं।
- प्रश्न-पत्र में दाहिने हाथ की ओर दिए गए कोड नम्बर को छात्र उत्तर-पुस्तिका के मुख-पृष्ठ पर लिखें।
- कृपया जाँच कर लें कि इस प्रश्न-पत्र में 26 प्रश्न हैं।
- कृपया प्रश्न का उत्तर लिखना शुरू करने से पहले, प्रश्न का क्रमांक अवश्य लिखें।
- इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है। प्रश्न-पत्र का वितरण पूर्वाह्न में 10.15 बजे किया जाएगा। 10.15 बजे से 10.30 बजे तक छात्र केवल प्रश्न-पत्र को पढ़ेंगे और इस अवधि के दौरान वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे।
- Please check that this question paper contains 8 printed pages.
- Code number given on the right hand side of the question paper should be written on the title paper of the answer-book by the candidate.
- Please check that this question paper contains 26 questions.
- Please write down the Serial Number of the question before attempting it.
- 15 minute time has been allotted to read this question paper. The question paper will be distributed at 10.15 a.m. From 10.15 to 10.30 a.m. , the students will read the question paper only and will not write any answer on the answer-book during this period.

जीव विज्ञान (सैद्धान्तिक) BIOLOGY (Theory)

निर्धारित समय: 3 घण्टे

Time allowed : 3 hours

अधिकतम अंक: 70

Maximum Marks : 70

सामान्य निर्देश :

- (i) प्रश्न-पत्र में खण्डों में 26 प्रश्न दिए गए हैं। सभी प्रश्न अनिवार्य हैं।
- (ii) खण्ड- क में प्रश्न संख्या 1 से 5 अति लघु-उत्तरीय प्रश्न हैं। प्रत्येक प्रश्न एक अंक का है।
- (iii) खण्ड- ख में प्रश्न संख्या 6 से 10 लघु-उत्तरीय प्रश्न I प्रकार के हैं। प्रत्येक प्रश्न दो अंकों का है।
- (iv) खण्ड- ग में प्रश्न संख्या 11 से 22 लघु-उत्तरीय प्रश्न II प्रकार के हैं। प्रत्येक प्रश्न तीन अंकों का है।
- (v) खण्ड- घ में प्रश्न संख्या 23 मूल्य आधारित प्रश्न चार अंकों का है।
- (vi) खण्ड- ङ में प्रश्न संख्या 24 से 26 दीर्घ-उत्तरीय प्रश्न हैं। प्रत्येक प्रश्न पाँच अंकों का है।
- (vii) प्रश्न-पत्र में समग्र पर कोई विकल्प नहीं है, फिर भी दो अंकों वाले एक प्रश्न में, तीन बंकों वाले एक प्रश्न में और पाँच अंकों वाले सभी तीनों प्रश्नों में भीतरी चयन-विकल्प दिए गए हैं। प्रत्येक परीक्षार्थी को ऐसे प्रश्नों के दो विकल्पों में से कोई एक प्रश्न हल करना है।

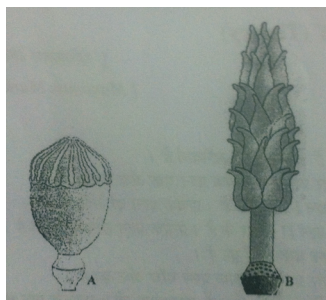
General Instructions:

- (i) There are a total of 26 questions and five sections in the question paper. All questions are compulsory.
- (ii) Section A contains questions number 1 to 5, Very short Answer type questions of one mark each.
- (iii) Section B contains questions number 6 to 10, Short Answer type-I question of two marks each.
- (iv) Section C contains questions number 11 to 22, Short Answer type-II question of three marks each.
- (v) Section D contains question number 23, Value Based Question of four marks.
- (vi) Section E contains question number 24 to 26, Long Answer type questions of five marks each.
- (vii) There is no overall choice in the question paper, however, an internal choice is provided in one question of two marks, one question of three marks and all three questions of five marks. An examinee is to attempt any one of the questions out of the two given in the question paper with the same question number.

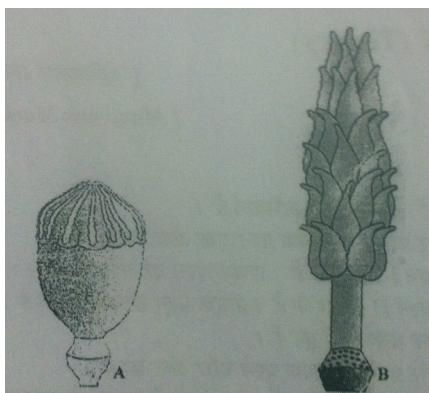
खण्ड-क

SECTION-A

1. सुकेन्द्रकी में उस एंजाइम का नाम बताइए जो hn RNA का अनुलेखन (ट्रांसक्रिप्शन) करता है।
Name the enzyme that transcribes hn RNA in eularyotes.
2. कस्कूटा और गुडहल के पौधों के बीच पारस्परिक क्रिया को आप क्या नाम देंगे
Name the interaction that exists between Cuscuta and shoe-flower plant.
3. टर्नर सिंड्रोम के क्रोमोसोमीय विकार क्या है? बताइए।
State the chromosomal defect in individuals with turner's syndrome.
- 4.



यहाँ दिए गए दो चित्रों में पैपेवर (A) और माइकेलिया (B) के पुष्पों के जायांग (स्ट्रीकेसर) दर्शाए गए हैं। इनके अंडाशयों की संरचना में अंतर बताइए।



These pictures show the gynaecium of (A) Papaver and (B) Michellia flowers. Write the difference in the structure of their ovaries.

5. ऐपिस इंडिका के आर्थिक महत्व की चर्चा कीजिए।
Mention the economic value of Apis Indica.

खण्ड-ख

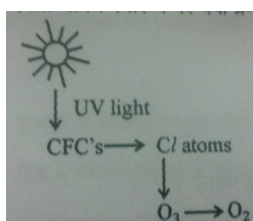
SECTION-B

6. शार्क पृथुतापी है और ध्रुवीय भालू तनुतापी। बताइए कि इससे शार्क को क्या फायदा और ध्रुवीय भालू की क्या सीमाएँ हैं।

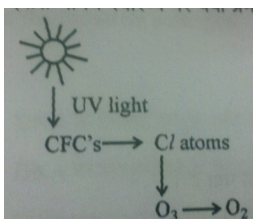
Shark is eurythermal while polar bear is stenothermal. What is the advantage the former has and what is the constraint the later has?

7. E-co RI क्या हैं? बताइए कि EcoRI किस प्रकार एक्सोन्यूक्लियेज से भिन्न होता है।

- 8.



- (a) ओजोन के निम्नीकरण के पश्चात होने वाले दुष्प्रभाव क्या हैं?
(b) इससे मानव स्वास्थ्य पर क्या प्रभाव पड़ता है ?



- a) What are the after effects of the degradation of ozone ?
b) How does it affect human health ?

BIOLOGY

9. एक निःसंतान दम्पति 'टेस्ट ट्यूब बेबी प्रोग्राम के लिए राजी हो गए हैं। गर्भधारण करने के लिए इस पद्धति में अपनाए जाने वाले मूलभूत चरणों की सूची बनाइए।

अथवा

- केले को अनिषकफलनी फल कहा जाता है, जबकि टर्की को अनिषकजननी कहा जाता है। क्यों?
childless couple has agreed for a test tube baby programme. List only the basic steps the procedure would involve to conceive the baby. 2

OR

Banana fruit is said to be parthenocarpic where as turkey is said to be parthenogenetic. Why ?

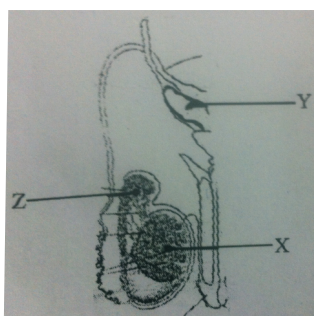
10. शकरकंद और आलू (ट्यूबर) समवृत्ति अंग हैं अथवा समजात अंग ? अपने उत्तर की पुष्टि के लिए कारण बताइए। 2
Is sweet potato analogous or homologous to potato tuber ? Give reasons to support your answer.

खण्ड-ग

SECTION-C

11. PCR में Taq पॉलीमरेज को बरीयता दी जाती है? इस एंजाइम के स्रोत की चर्चा कीजिए। 3
Why is Taq polymerase preferred in PCR ? Mention the source of this enzyme.
12. हमारे किसान आज भी DDT का उपयोग करते हैं। इससे सीनीय पक्षी-समष्टि पर किस प्रकार दुष्प्रभाव पड़ता है? 3
Our farmers still use DDT. How is this affecting the local bird population ?
13. बताइए कि HIV के कारण AIDS के पीड़ित व्यक्ति का प्रतिरक्षा-तंत्र किस प्रकार भंग हो जाता है। 3
How does the HIV breakdown the immune system of the AIDS patient ?

14.

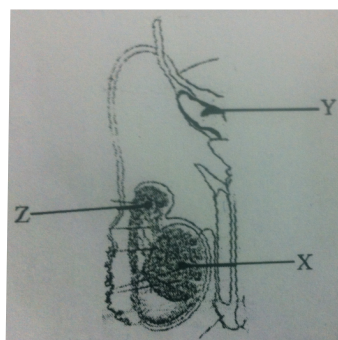


उपरोक्त आरेख में मानव का नर जनन-तंत्र (केवल एक तरफ का) दर्शाया गया है।

(a) 'X' की पहचान कीजिए तथा शरीर के भीतर उसकी स्थिति बताइए।

(b) सहायक ग्रंथि 'Y' का नाम बताइए तथा उसके स्राव का नाम भी बताइए।

(b) 'Z' का नाम तथा उसका कार्य बताइए।



The above diagram shows human male reproductive system (one side only).

- Identify 'X' and write its location in the body.
- Name the accessory gland 'Y' and its secretion.
- Name and state the function of 'Z'.

15. इंग्लैण्ड में श्वेत और काले रंग के शलभों के प्राकृतिक वरण में औद्योगिकरण की क्या भूमिका रही ? 3

अथवा

विकास के संदर्भ में उड़न गिलहरी और उड़न फैलैन्जर के बीच समानता का क्या अर्थ समझते हैं?

How did industrialization play a role in Natural Selection of light and dark coloured moth in England ?

OR

What do you infer from the resemblance flying squirrel and flying phalanger with reference to their evolution.

16. एक व्यक्ति अमीबीय पेचिस (अमीबता) से ग्रस्त है। उन रोग लक्षणों को सूचीबद्ध कीजिए जिनसे इस संक्रमण की पुष्टि की जा सकती हो। इस संक्रमण के कारक रोगजनक का नाम बताइए। 3

A patient is down with Amoebiasis. List the symptoms that confirm this infection. Name the causative pathogen.

17. (a) DNA के टेम्प्लेट रज्जुक और कोडिंग रज्जुक में अंतर बताइए।
(b) DNA के प्रतिकृतियन के लिए ऊर्जा के स्रोत का नाम बताइए। 3

- Differentiate between a template strand and coding strand of DNA.
- Name the source of energy for the replication of DNA.

18. मरूद्भिद् पर्यावास में होने वाले उस पादप-अनुक्रमण की व्याख्या कीजिए जब तक चरमोत्कर्ष समुदाय तक नहीं पहुँच जाता । 3

Explain succession of plants in xerophytic habitat until it reaches climax community.

19. गन्ने की एक फसल किसी वायरस से संक्रमित हो गयी है। इससे वायरस मुक्त गन्ना-फसल किस प्रकार विकसित की जा सकती ? इस प्रणाली की व्याख्या कीजिए। 3

A sugarcane has been affected by virus. How can a virus free cane be developed from it ? Explain the procedure.

20. RNA की तुलना में DNA क्यों बेहतर आनुवंशिक पदार्थ है ? 3

Why is DNA a better genetic material when compared to RNA ?

21. एक अपरदाहारी किस प्रकार अपघटक से भिन्न होता है ? प्रत्येक का उदाहरण देते हुए व्याख्या कीजिए: 3

How does a detritivore differ from a decomposer ? Explain with an example each.

21. आर्तव चक्र के दौरान निम्नलिखित दिनों में एक में एक सामान्य स्त्री में होने वाली घटनाओं की व्याख्या कीजिए:

- (a) 13 वें से लेकर 16 वें दिन तक अंडाशय के भीतर होने वाली घटना
(b) 16 वें से लेकर 23 वें दिन तक अंडाशय के भीतर पाए जाने वाले हॉर्मोनों का स्तर
(c) 24वें से लेकर 29 वें दिन तक गर्भाशय के भीतर होने वाली घटनाएँ

Explain the events in a normal woman during her menstrual cycle on the following days.

- (a) Ovarian event from 13-15 days
(b) Ovarian hormones level from 16 to 23 days
(c) Uterine events from 24 to 29 days



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खण्ड- घ

23. एक इक्कीस वर्षीय युवा दुर्घटना मे मृत्यु को प्राप्त हो गया। उसके माता-पिता उसके अंगों को दान देने के लिए तत्पर हो गए। उन दो अति आवश्यक चिकित्सकीय चरणों की सूची बनाइए, जो किसी अंग के प्रतिरोपण करने से पहले लिए जाने जरूरी होते हैं। कभी-कभी प्रत्यारोपण कुछ मामलों में क्यों अस्वीकृत हो जाता है ? अंग दान को प्रोत्साहित करने के लिए आप अपने स्वास्थ्य-क्लब के सदस्यों के साथ क्या विचार-विमर्श करना चाहेंगे?

4

A youth in his twenties met with an accident and succumbed to the injuries. His parents agreed to donate his organs. List any two essential clinical steps to be undertaken before any organ transplant. Why is the transplant rejected sometimes ? What views would you share with your health club members to promote organ donation

खण्ड- ङ

SECTION-E

24. प्रतिकृति द्विशाख की सहायता से DNA प्रतिकृतियन की प्रक्रिया की व्याख्या कीजिए।

अथवा

- (a) एक समयुग्मजी लंबे और गोल बीजों वाले तथा एक बौने और झुर्रीदार बीजों वाले उद्यान मटर के पौधों के बीच द्विसंकर संकरण कराया गया।
- (i) इस संकरण से प्राप्त F1 संतति के फीनोटाइप और जीनोटाइप के बारे में लिखिए।
- (ii) F1 संतति द्वारा बनने वाले विभिन्न प्रकार के युग्मक बताइए।
- (iii) इस संकरण से प्राप्त F2 पीढ़ी के फीनोटाइपों और उसके अनुपातों की चर्चा कीजिए और साथ ही मेण्डल द्वारा दी गयी व्याख्या भी लिखिए।
- (b) मॉर्गन द्वारा ड्रोसोफिला में किए गए तथा मेंडल द्वारा मटर के पौधों में किए गए द्विसंकर संकरणों के F2 संतति के प्रेक्षणों में क्या अंतर थे? कारण बताते हुए व्याख्या कीजिए।

5

Explain the process of DNA replication with the help of a replicating fork.

OR

- (a) Dihybrid cross between two garden pea plant one homozygous tall round seed and the other dwarf with wrinkled seeds was carried.
- (i) Write the genotype and phenotype of the F1 progeny obtained from this cross.
- (ii) Give the different types of gametes of the F1 progeny.
- (iii) Write the phenotypes and its ratios of the F2 generation obtained in this cross along with the explanation provided by Mendel.
- (b) How were the observations of F2 progeny of dihybrid crosses in Drosophila by Morgan different from that of Mendel carried in pea plants ? Explain giving reasons.



BIOLOGY

25. Bt कपास उत्पन्न करने में प्रयुक्त जैवप्रौद्योगिकी के अनुप्रयोग की व्याख्या कीजिए

अथवा

जब तक वेक्टर और DNA स्रोत को न काटा जाए, अलग हुए खंडों को अलग न किया जाए, तथा जोड़ा न जाए तब तक वांछित पुनर्योजी वेक्टर अणु को उत्पन्न नहीं किया जा सकता ।

- (a) वांछित DNA क्रमों को किस प्रकार काटा जाता है?
- (b) काटे गए खंडों को अलग करने की तकनीक की व्याख्या कीजिए।
- (c) इस प्रकार निर्मित पुनर्योजी वेक्टर DNA अणु से किस प्रकार जुड़ जाते हैं ?

Explain the application of biotechnology in producing Bt cotton

OR

Unless the vector and source DNA are cut, fragments separated and joined, the desired recombinant vector molecule cannot be created.

- (a) How are the desirable DNA sequences cut ?
- (b) Explain the technique used to separate the cut fragments.
- (c) How are the resultant fragments joined to the vector DNA molecule ?

26. मानव-अंडाणु का निषेचन किस सिल पर होता है ? इसके बाद कोरकपुटी (ब्लास्टोसिस्ट) के अंतर्गमन तक होने वाली घटनाओं की क्रमवार सूची बनाइए।

5

अथवा

- (a) द्विबीजपत्री पुष्प के निषेचित भ्रूण का आरेख बनाइए। इसके सभी कोशिकीय संघटकों का नामांकन कीजिए।
- (b) इस भ्रूणकोष से उत्पन्न एक परिपक्व भ्रूण के परिवर्धन की व्याख्या कीजिए।

Mention the site of fertilization of a human ovum. List the events that follow in sequence until the implantation of the blastocyst.

OR

- (a) Draw a diagram of a fertilized embryo sac of a dicot flower. Label all its cellular components.
- (b) Explain the development of a mature embryo from this embryo sac.