CODE : S9MA1

Roll No. .....

# KENDRIYA VIDYALAYA SANGATHAN, PATNA REGION

# SESSION ENDING EXAMINATION, 2017-18

## CLASS - IX

## MATHEMATICS

Sl. No. 2734

TIME - 3 HOURS ] [ MAX. MARKS - 80

**General Instructions :**

(i) **All questions are compulsory.**

(ii) **The question paper consists of 30 questions divided into four sections : A, B, C and D.**

(iii) **Section A consists of 6 questions of 1 mark each, Section B consists of 6 questions of 2 marks each, Section C consists of 10 questions of 3 marks each and Section D consists of 9 questions of 4 marks each.**

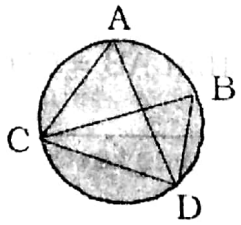
(iv) **There is no overall choice. However, an internal choice has been provided in four questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.**

(v) **Use of calculator is not permitted.**

### SECTION - A

**Question numbers 1 to 6 carry 1 mark each.**

1. Find the probability of getting a prime numbers when we throw a die.
2. Find the angle B in the figure if $\angle A = 60°$.




3. Find the area of an equilateral triangle using Heron's formula if its side is 'a'.
4. Find the radius of sphere whose surface area is 154 sq. cm.
5. Rationalise the denominator of $\frac{1}{7+3\sqrt{2}}$.
6. If (3, –2) is the solution of equation $3x - py - 7 = 0$. Find the value of p.

[Turn Over

## SECTION – B

**Question numbers 7 to 12 carry 2 marks each.**

7. Find the value of k if a polynomial $p(x) = x^{2018} - 2kx + 1 = 0$ is divided by $x - 1$.

8. Two opposite angles of a parallelogram are $(3x - 2)^\circ$ and $(63 - 2x)^\circ$. Find all angles of the parallelo-gram.

9. If P and Q are any two points lying on the sides DC and AD respectively of a parallelogram ABCD. Show that ar(APB) = ar(BQC).

10. The height of an equilateral triangle measures $9\sqrt{3}$ cm. Find its area.

11. The circumference of base of a cone is 220/7 cm and its slant height is 13 cm. Find the volume of cone.

12. If the mean of the data : 3, 6, m, 7, 8, 10 is 7, find the value of m.

## SECTION – C

**Question numbers 13 to 22 carry 3 marks each.**

13. If $\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}} = a + b\sqrt{6}$, find a and b.

***OR***

Express $0.12\overline{3}$ in the form of $\frac{p}{q}$, where p and $q \neq 0$ are integers.

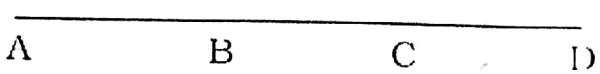
14. Factorise : $27p^3 - \frac{1}{216} - \frac{9}{2}p^2 + \frac{1}{4}p$

***OR***

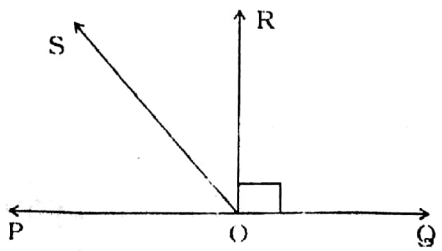
Factorise : $x^2 + x^2y^2 + y^4$

15. Divide $3x^4 - 4x^3 + 3x - 1$ by $x + 1$ and hence verify the remainder using remainder theorem.

16. In the figure, if AC = BD, prove that AB = CD

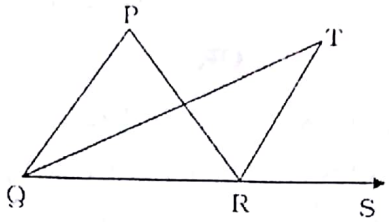



17. POQ is a line. Ray OR ⊥ PQ. OS is another ray lying between rays OP and OR. Prove that $\angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$

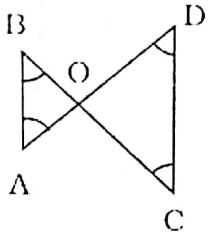


**OR**

In the given figure, the side QR of $\Delta$ PQR is produced to a point S. If the bisector of $\angle$PQR and $\angle$PRS meet at point T. Then prove that $\angle OTR = \frac{1}{2} \angle QPR$



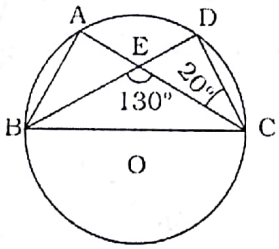

18. In Fig., $\angle B < \angle A$ and $\angle C < \angle D$. Show that AD < BC.




19. In a triangle ABC, E is the mid-point of median AD. Show that $(BED) = \frac{1}{4} ar(ABC)$.

**OR**

In a figure A B C D are four points on a circle. AC and BD intersect at point E such that $\angle BEC = 130°$ and $\angle ECD = 20°$. Find $\angle BAC$.




20. Sides of a triangle are in the ratio 12:17:25 and its perimeter is 540 cm. Find its area.

21. Prove that a cyclic parallelogram is a rectangle.

22. 1500 families with 2 children were selected randomly and the following data were recorded.

| No. of girls in a family | 2 | 1 | 0 |
|---|---|---|---|
| No. of family | 475 | 814 | 211 |

Compute the probability of a family, chosen at random having

(i) 2 girls (ii) 1 girl (iii) No girl

## SECTION – D

**Question numbers 23 to 30 carry 4 marks each.**

23. Represent $\sqrt{13}$ on a number line.

24. Prove that $(a + b + c)^3 - a^3 - b^3 - c^3 = 3(a + b)(b + c)(c + a)$

**OR**

Factorise using factor theorem $x^3 - 23x^2 + 142x - 120$

25. The taxi fare in a city is as follows : For the first kilometre, the fare is Rs. 8 and for the subsequent distance it is Rs. 5 per km. Taking the distance covered as x km and total fare Rs. y, write a linear equation for this information, and draw its graph.

26. Mark the points A (2, 2) B (2, –2) C (–2, –2 ) and D (–2, 2) on the graph paper and join these in order and hence identify the figure so obtained. Also find the area of the figure.

27. State and prove the Mid-point theorem.

***OR***

Prove that parallegram on the same base and between the same parallel are equal in area.

28. Construct a $\Delta ABC$, in which $\angle A = 30°$, $\angle C = 90°$ and AB + BC + CA = 11 cm.

29. The surface area of a sphere of radius 5 cm is five times the area of the curved surface of a cone of radius 4 cm. Find the height and the volume of the cone $\left(\text{Taking } \pi = \frac{22}{7}\right)$

***OR***

A village, having a population of 4000, requires 150 litres of water per head per day. It has a tank measuring 20m × 20m × 6m. For how many days will the water of this tank last ?

30. 100 surnames were randomly picked up from a local telephone directory and a frequency distribution of the number of letters in the English alphabet in the surnames was found as follows :

| Number of letters | 1-4 | 4-6 | 6-8 | 8-12 | 12-20 | Total |
|---|---|---|---|---|---|---|
| Number of surnames | 6 | 30 | 44 | 16 | 4 | 100 |

(i) Draw a histogram to depict the given information.

(ii) Write the class interval in which the maximum number of surname lies.

❖ ❖ ❖ ❖