

Series :

Code No. 30/1/2

Roll No.

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Candidates must write the code  
on the title page of the answer

- 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 30 questions.
- **Please write down the Serial Number of the question before**

## MATHEMATICS

Time allowed : 3 hours]

[Maximum marks : 100]

### General Instructions:

- All questions are compulsory.
- The question paper consists of **thirty** questions divided in to 4 sections – **A, B, C** and **D**. Section **A** comprises of **ten** questions of **01** marks each, Section **B** comprises of **five** questions of **02** marks each, Section **C** comprises of **ten** questions of **03** marks each and Section **D** comprises of **five** questions of **06** marks each.
- All questions in Section **A** are to be answered in one word, one sentence or as per the exact requirement of the question.
- There is no overall choice. However, internal choice has been provided in one question of 02 marks each, three questions of 03 marks each and two questions of 06 marks each. You have to attempt only one of the alternatives in all such questions.
- In question on construction, drawings should be neat and exactly as per the given measurements.
- Use of calculators is not permitted.

## SECTION – A

Question numbers 1 to 10 carry one mark each.

1. Find the value of  $k$  so that the following system of equations has no solution:

$$3x - y - 5 = 0; 6x - 2y - k = 0.$$

2. The  $n^{\text{th}}$  term of an A.P. is  $6n + 2$ . Find its common difference.

3. In fig. 1,  $AD = 4$  cm,  $BD = 3$  cm and  $CB = 12$  cm, find  $\cot \theta$ .

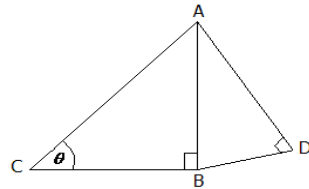


Fig.1

4. Write the zeroes of the polynomial  $x^2 - x - 6$ .

5. If  $\frac{p}{q}$  is a rational number ( $q \neq 0$ ), what is condition on  $q$  so that the decimal representation of

$\frac{p}{q}$  is termination?

6. From a well shuffled pack of cards, a card is drawn at random. Find the probability of getting a black queen.

7. Which measure of central tendency is giving by the  $x$ -coordinate of the point of intersection of the “more than o give” and “less than o give”?

8. In Fig. 2,  $O$  is the centre of a circle. The area of sector  $OAPB$  is  $\frac{5}{18}$  of the area of the circle.

Find  $x$ .

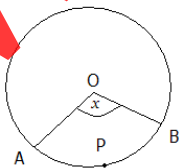


Fig. 2

9. In Fig. 3,  $PQ = 24$  cm,  $QR = 26$  cm,  $\angle PAR = 90^\circ$ ,  $PA = 6$  cm and  $AR = 8$  cm. Find  $\angle QPR$ .

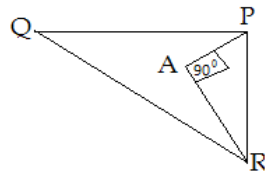


Fig. 3

10. In Fig. 4, P and Q are points on the sides AB and AC respectively of  $\triangle ABC$  such that  $AP = 3.5$  cm,  $PB = 7$  cm,  $AQ = 3$  cm and  $QC = 6$  cm. If  $PQ = 4.5$  cm, find BC.

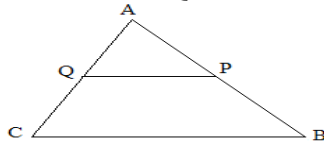


Fig.4

### SECTION - B

Question numbers 11 to 15 carry 2 marks each.

11. For what value of  $p$ , are points  $(2, 1)$ ,  $(p, -1)$  and  $(-1, 3)$  collinear?

12. Without using trigonometrically tables, evaluate the following:

$$\frac{\sin 18^\circ}{\cos 72^\circ} + \sqrt{3}[\tan 10^\circ \tan 30^\circ \tan 40^\circ \tan 50^\circ \tan 80^\circ]$$

13. Find the zeroes of the quadratic polynomial  $6x^2 - 3 - 7x$  and verify the relationship between the zeros and the coefficients of the polynomial.

14. A die is thrown once. Find the probability of getting

(i) An even prime number

(ii) A multiple of 3

15. ABC is an isosceles triangle, in which  $AB = AC$ , circumscribed about a circle. Show that BC is bisected at the point of contact.

OR

In Fig. 5, a circle is inscribed in a quadrilateral ABCD in which  $\angle B = 90^\circ$ . If AD = 23 cm, AB = 29 cm and DS = 5 cm, find the radius (r) of the circle.

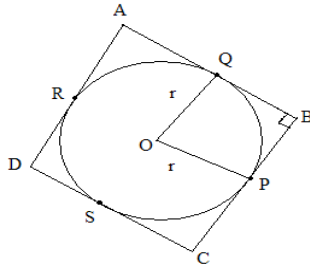


Fig.5

SECTION – C

Question numbers 16 to 25 carry 3 marks each.

16. Prove that:  $\frac{\cot A - \cos A}{\cot A + \cos A} = \frac{\operatorname{cosec} A - 1}{\operatorname{cosec} A + 1}$

OR

Prove that:  $(1 + \cot A - \operatorname{cosec} A)(1 + \tan A + \sec A) = 2$

17. Find the 10<sup>th</sup> term from the end of the A.P. 8, 10, 12,.....,126.

18. Represent the following system of linear equations graphically. From the graph. Find the points where the lines intersect y-axis:  $3x + y - 5 = 0$ ;  $2x - y - 5 = 0$ .

19. Find the roots of the following equation:

$$\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}; x \neq -4, 7$$

20. Show that  $2 - \sqrt{3}$  is an irrational number.

21. In Fig. 6, find the perimeter of shaded region where ADC, AEB and BFC are semi – circles on diameters AC, AB and BC respectively.

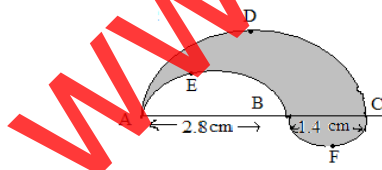


Fig. 6

OR

Find the area of the shaded region in Fig. 7, where ABCD is square of side 14 cm.

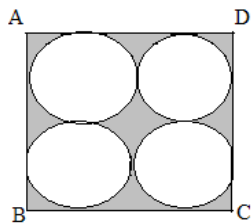


Fig. 7

22. If the distances of  $P(x, y)$  from the points  $A(3, 6)$  and  $B(-3, 4)$  are equal, prove that  $3x + y = 5$ .
23. If the diagonals of a quadrilateral divided each other proportionally, prove that it is a trapezium.

OR

Two  $\triangle ABC$  and  $\triangle DBC$  are on the same base  $BC$  and on the same side of  $BC$  in which  $\angle A = \angle D = 90^\circ$ . If  $CA$  and  $BD$  meet each other at  $E$ , show that  $AE \cdot EC = BE \cdot ED$

24. Construct a  $\triangle ABC$  in which  $AB = 6.5$  cm,  $\angle B = 60^\circ$  and  $BC = 5.5$  cm. Also construct a triangle  $AB'C'$  similar to  $\triangle ABC$ , whose each side is  $\frac{3}{2}$  times the corresponding side of the  $\triangle ABC$ .
25. Determine the ratio in which the line  $3x - 4y - 9 = 0$  divides the line-segment joining the points  $(1, 3)$  and  $(2, 7)$ .

### SECTION - D

**Question numbers 26 to 30 carry 6 marks each.**

26. A statue 1.46 m tall, stands on the top of a pedestal. From a point on the ground, the angle of elevation of the top of the statue is  $60^\circ$  and from the same point, the angle of elevation of the top of the pedestal is  $45^\circ$ . Find the height of the pedestal (use  $\sqrt{3} = 1.73$ )
27. In a class test, the sum of the marks obtained by P in Mathematics and Science is 28. Had he got 3 more marks in Mathematics and 4 marks less in Science, the product of marks obtained in the two subjects would have been 180. Find the marks obtained in the two subjects separately.

OR

The sum of the areas of two squares is  $640 \text{ m}^2$ . If the difference in their perimeters be 64 m, find the sides of the two squares.

28. 100 surnames were randomly picked up from a local telephone directory and the distribution of number of letters of the English alphabet in the surnames was obtained as follows:

No. of letters	1 – 4	4 – 7	7 – 10	10 – 13	13 – 16	16 – 19
Numbers of surnames	6	30	40	16	4	4

Determine the median and mean number of letters in the surnames. Also find the modal size of surnames.

29. Prove that the ratio of the areas of two similar triangles is equal to the ratio of squares of their corresponding sides.

Using the above result, prove the following:

In a  $\triangle ABC$ ,  $XY$  is parallel to  $BC$  and it divides  $\triangle ABC$  into two parts of equal area.

Prove that  $\frac{BX}{AB} = \frac{\sqrt{2}-1}{\sqrt{2}}$ .

30. A bucket made up of a metal sheet is in the form of a frustum of a cone of height 16 cm with diameters of its lower and upper ends as 16 cm and 40 cm respectively. Find the volume of the bucket. Also find the cost of the bucket if the cost of metal sheet used is Rs 20 per 100  $\text{cm}^2$ . (use  $\pi = 3.14$ )

OR

A farmer connects a pipe of internal diameter 20 cm from a canal into a cylindrical tank in his field which is 10 m in diameter and 2 m deep. If water flows through the pipe at the rate of 6 km/h., in how much time will the tank be filled?