

SAMPLE PAPER-12

Time: 3 Hours

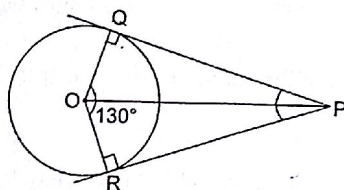
Maximum Marks: 80

General Instructions:

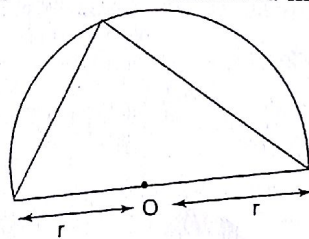
- (i) All questions are compulsory.
- (ii) The question paper consists of 30 questions divided into four sections-A, B, C and D.
- (iii) Section A contains 6 questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each and Section D contains 8 questions of 4 marks each.
- (iv) Use of calculator is not permitted.

SECTION A

1. Write $\frac{3}{8}$ in decimal form. 1
2. Find the roots of equation $\sqrt{2x^2 + 9} = 9$. 1
3. $\triangle ABC \sim \triangle DEF$. If $AB = 4$ cm, $BC = 3.5$ cm, $CA = 2.5$ cm and $DF = 7.5$ cm, then find the perimeter of $\triangle DEF$. 1
4. The angle between two radii of circle is 130° . Find the angle between the tangents at the ends of the radii. 1



5. A single letter is selected at random from the word "PROBABILITY". Find the probability that it is vowel. 1
6. Find the area of largest triangle that can be inscribed in a semi-circle of radius r . 1



SECTION B

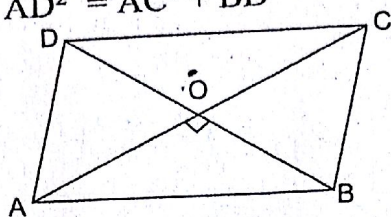
7. If n is an odd integer, then show that $n^2 - 1$ is divisible by 8. 2
8. Find the value of P for which the following equation has two equal roots 2
 $(P - 12)x^2 + 2(P - 12)x + 2 = 0$

OR

For what value of k , the roots of the quadratic equation $x^2 - 4kx + k = 0$ are real and equal?

9. Prove that the sum of the squares of the sides of a rhombus is equal to the sum of the squares of its diagonals, i.e. 2

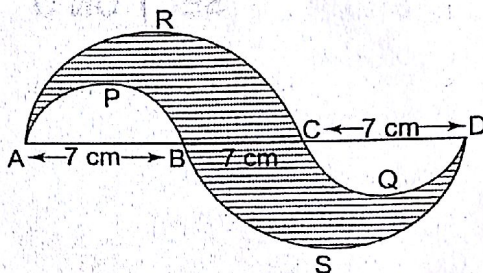
$$AB^2 + BC^2 + CD^2 + AD^2 = AC^2 + BD^2$$



10. Evaluate $\frac{2 \sin^2 63^\circ + 1 + 2 \sin^2 27^\circ}{3 \cos^2 17^\circ - 2 + 3 \cos^2 73^\circ}$ 2

11. Find the value of k , if the points $(k, 3)$, $(6, -2)$ and $(-3, 4)$ are collinear. 2

12. In the figure, APB and CQD are semi-circles of diameter 7 cm each, while ARC and BSD are semicircles of diameter 14 cm each. Find the perimeter of the shaded region. (Use $\pi = \frac{22}{7}$)



SECTION C

13. Three bells toll at intervals of 9, 12, 15 minutes respectively. If they start tolling together after what time will they next toll together? 3
14. If $x^2 + x - 12$ divides $P(x) = x^3 + ax^2 + bx - 84$ exactly, find a and b . 3
15. For what value of a , the pair of linear equations $ax + 3y = a - 3$, $12x + ay = a$ has no solution? 3
16. If 7 times the 7th term of an A.P is equal to the 11 times its 11th term, show that its 18th term is zero. 3

OR

The sum of first 16 terms of an A.P is 112 and sum of its next fourteen terms is 518. Find the A.P.

17. Draw a triangle ABC with side $BC = 7$ cm, $\angle B = 45^\circ$, $\angle A = 105^\circ$. Then construct another triangle whose sides are $\frac{3}{4}$ times the corresponding sides of ΔABC . 3
18. Find the value of x if 3

$$4 \left(\frac{\sec^2 59^\circ - \cot^2 31^\circ}{3} \right) - \frac{2}{3} \sin 90^\circ + 3 \tan^2 56^\circ \times \tan^2 34^\circ = \frac{x}{3}$$

OR

Prove that $\left(\tan \theta + \frac{1}{\cos \theta}\right)^2 + \left(\tan \theta - \frac{1}{\cos \theta}\right)^2 = \frac{2(1 + \sin^2 \theta)}{1 - \sin^2 \theta}$

19. From the top of a vertical tower, the angles of depression of two cars, in the same straight with the base of the tower at an instant, are found to be 45° and 60° . If the cars are 100 m apart and on the same side of the tower, find the height of the tower. (Use $\sqrt{3} = 1.73$) 3
20. The mean of the following frequency distribution is 62.8 Find the missing frequency f : 3

Class	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	5	8	f	12	7	8

21. All face cards are removed from the pack of cards. A card is drawn at random. Find the probability that the card drawn is (a) an ace card, (b) a black card, (c) a spade card. 3
22. The radii of the circular end of a bucket of height 15 cm are 14 cm and r cm ($r < 14$ cm). If the volume of the bucket is 5390 cm^3 , then find the value of r . [use $\pi = \frac{22}{7}$] 3

SECTION D

23. If α and β are the zeroes of the quadratic polynomial $f(x) = x^2 + x - 2$, find the value of $\left(\frac{1}{\alpha} - \frac{1}{\beta}\right)$. 4
24. Solve graphically the pair of linear equations 4
 $2x + y = 8, \quad x + 1 = 2y$
 Also, find the coordinates of the points where the lines represented by the above equations meets the x -axis.
25. Prove that if a line drawn parallel to one side of a triangle intersecting the other two sides, then it divides the two sides in same ratio. 4
26. Prove that opposite sides of a quadrilateral circumscribing a circle subtended supplementary angles of the centre of the circle. 4
27. If $\frac{\cos \alpha}{\cos \beta} = m, \quad \frac{\cos \alpha}{\sin \beta} = n$ show that $(m^2 + n^2) \cos^2 \beta = n^2$. 4
28. If $P(x, y)$ is any point on the line joining the point $A(a, 0)$ and $B(0, b)$, then show that $\frac{x}{a} + \frac{y}{b} = 1$. 4

OR

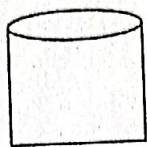
If the point $(a, 0)$, $(0, b)$ and $(1, 1)$ are collinear, show that $\frac{1}{a} + \frac{1}{b} = 1$.

29. The median of the following data is 20.75. Find the missing frequencies x and y , if the total frequency is 100. 4

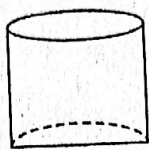
Class Interval	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Frequency	7	10	x	13	y	10	14	9

Jay Pravesh, a juice seller has set-up his juice shop. He has three types of glasses of inner diameter 5 cm to serve the customers. The height of the glasses is 10 cm. (Use $\pi = 3.14$)

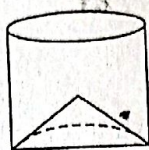
4



Type A
(A glass with a plane bottom)



Type B
(A glass with hemispherical raised base)



Type C
(A glass with conical raised bottom of height 1.5 cm)

He decided to serve the customers in 'A' type of glasses.

- (i) Find the volume of glass of type A.
- (ii) Which glass has the minimum capacity?
- (iii) Which mathematical concept is used in above problem?
- (iv) By choosing a glass of type A, which value is depicted by juice seller?