

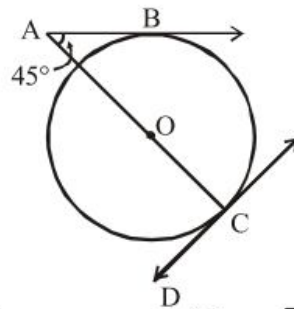
Time Allowed : 3 Hours**Maximum Marks : 80****General Instructions:** 

- I. All questions are compulsory.**
- II. The question paper consists of 40 questions divided into four sections A, B, C and D.**
- III. Section A contains 20 objective questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 8 questions of 3 marks each. Section D contains 6 questions of 4 marks each.**
- IV. There is no overall choice. However, an internal choice has been provided in 2 questions of section A, 2 questions of section B, 3 questions of section C and 3 questions of section D. You have to attempt only one of the alternatives in all such questions.**
- V. Use of calculators is not permitted.**

SECTION - A**(Q. 1 – Q. 10) Multiple choice type questions. Select the correct option.**

1. A, B and C start at the same time in the same direction to run around a circular stadium. A completes a round in 252 seconds, B in 308 seconds and C in 198 seconds, all starting at the same point. After what time will they meet again at the starting point.
(a) 46 min 2 sec (b) 46min (c) 40 min 2 sec (d) 17 sec
2. The string of a kite is 100 m long and it makes an angle of 60° with the horizontal. If there is no slack in the string, find the height of the kite from the ground.
(a) $50\sqrt{3}$ m (b) $100\sqrt{3}$ m (c) $50\sqrt{2}$ m (d) 100m
3. Which among the following is correct?
(a) The ratios of the areas of two similar triangles is equal to the ratio of their corresponding sides.
(b) The areas of two similar triangles are in the ratio of the corresponding altitudes.
(c) The ratio of area of two similar triangles are in the ratio of the corresponding medians.
(d) If the areas of two similar triangles are equal, then the triangles are congruent.
4. What is the area of the rhombus formed by (3, 0), (4, 5), (-1, 4) and (-2, -1) as vertices?
(a) 16 sq. units (b) 32 sq. units (c) 42 sq. units (d) 24 sq. units
5. To draw tangent from an exterior point 'P' to a circle using the centre 'O' of the circle, first we
(a) join P to O.
(b) draw tangent from P to the circle.
(c) draw secant from P which intersects the circle at two points.
(d) draw perpendicular at P to PO.

6. The diagram shows a circle with centre O. Line AB is tangent to the circle at point B and line DC is tangent to the circle at point C. If the radius of the circle is 2 cm, what is the measure of AC ?



- (a) $(2\sqrt{2} + 2)$ cm (b) 1.414 cm (c) $3\sqrt{2}$ cm (d) 2 cm
7. Find the probability for a randomly selected number of 1, 2, 3, 4,.....25 to be a prime number.
- (a) $\frac{4}{25}$ (b) $\frac{7}{25}$ (c) $\frac{8}{25}$ (d) $\frac{9}{25}$
8. A bridge across a river makes an angle of 45° with the river bank as shown in figure. If the length of the bridge across the river is 150 m, find x i.e., AB i.e., width of the river.
- (a) $75\sqrt{2}$ m (b) 150 m (c) $\frac{75}{\sqrt{2}}$ m (d) 75m
9. A factory has 120 workers in January 90 of them are female workers. In February, another 15 male workers were employed. A worker is then picked at random. Calculate the probability of picking a female worker.
- (a) $\frac{3}{4}$ (b) $\frac{4}{9}$ (c) $\frac{2}{3}$ (d) $\frac{1}{2}$
10. If the sum of p terms of an A.P. is q and the sum of q terms is p, then the sum of the p + q terms will be
- (a) 0 (b) p - q (c) p + q (d) $-(p + q)$

(Q. 11 – Q. 15) Fill in the blanks.

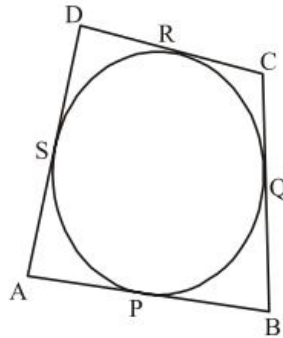
11. If the roots of the equation $(a - b)x^2 + (b - c)x + c - a = 0$ are equal, then the relation of a, b and c is _____ .

OR

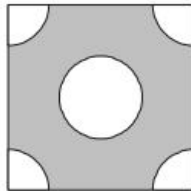
If α and β are the roots of the equation $x^2 + kx + 12 = 0$ such that $\alpha - \beta = 1$, the value of 'k' is _____ .

12. A conical vessel of radius 6 cm and height 8 cm is completely filled with water. A metal sphere is not lowered into the water. The size of the sphere is such that when it touches the inner surface, it just get immersed. The fraction of water that overflows from the conical vessel is _____ .

13. In the given fig., quadrilateral ABCD is circumscribed touching the circle at P, Q, R and S. If AP = 6 cm, BP = 5 cm, CQ = 3 cm and DR = 4 cm, then perimeter of quadrilateral ABCD is _____ .



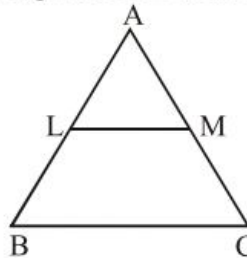
14. From each corner of a square of side 4 cm; a quadrant of a circle of radius 1 cm is cut and also a circle of diameter 2 cm is cut as shown in the figure. Then the area of the remaining portion of the square is _____ .



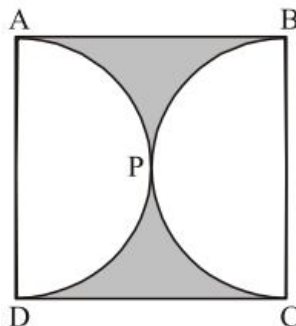
15. If $\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = \frac{-k}{2} + \sec \theta \operatorname{cosec} \theta$. Then the value of k is _____ .

(Q. 16 – Q. 20) Answer the following questions.

16. In the adjoining figure, L and M are mid-points of AB and AC respectively. If LM = 2.3 cm then find BC.



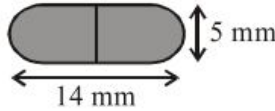
17. If $\tan 2A = \cot (A - 18^\circ)$, where $2A$ is an acute angle, find the value of A .
 18. Find the area of the shaded region in figure, if ABCD is a square of side 14 cm and APD and BPC are semicircles.



OR

In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find the area of the sector formed by the arc

19. A medicine capsule is in the shape of a cylinder with two hemisphere stuck to each of its ends (see fig.). The length of the entire capsule is 14 mm and the diameter of the capsule is 5 mm. Find its surface area.



20. If the mean of the following data is 21.5, find the value of k.

x :	5	15	25	35	45
f :	6	4	3	k	2

SECTION - B

21. Express the number $0.\overline{3178}$ in the form of rational number $\frac{a}{b}$.
22. A factory had 120 workers in January and 90 of them were female workers. In February, another 15 male workers are added. A worker is then picked at random. Calculate the probability of picking a female worker.
23. The sum of the digits of a two digit number is 8. The number obtained by reversing the digits exceeds the original number by 18. Find the given number.

OR

Solve the following pairs of equations by reducing them to a pair of linear equations:

$$\frac{1}{2x} + \frac{1}{3y} = 2 \text{ and } \frac{1}{3x} + \frac{1}{2y} = \frac{13}{6}$$

24. If P (x, y) is any point on the line joining the points A (a, 0) and B (0, b), then show that $\frac{x}{a} + \frac{y}{b} = 1$.
25. If p, q, r are in A.P. then find the value of $p^3 + r^3 - 8q^3$.

OR

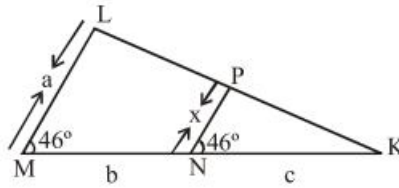
The first and the last terms of an AP are 5 and 45 respectively. If the sum of all its terms is 400, find its common difference.

26. A jar contains only green, white and yellow marbles. The probability of selecting a green marble and white marble randomly from a jar is $\frac{1}{4}$ and $\frac{1}{3}$ respectively. If this jar contains 10 yellow marbles, what is the total number of marbles in the jar ?

SECTION - C

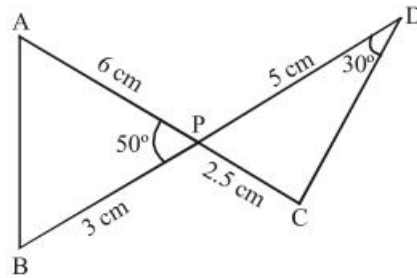
27. Prove that $3 + 2\sqrt{5}$ is irrational.
28. On dividing $x^3 - 3x^2 + x + 2$ by a polynomial g(x), the quotient and remainder were $x - 2$ and $-2x + 4$ respectively. Find g(x).

29. From given fig. express 'x' in terms of a, b, c.

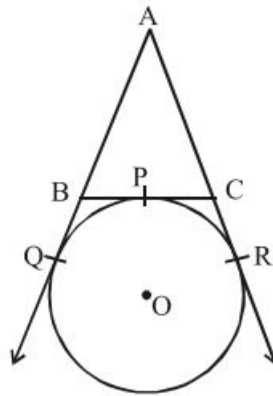


OR

In figure, two line segments AC and BD intersect each other at the point P such that PA = 6 cm, PB = 3 cm, PC = 2.5 cm, PD = 5 cm, $\angle APB = 50^\circ$ and $\angle CDP = 30^\circ$. Then, find the value of $\angle PBA$.



30. In fig. a circle touches the side BC of $\triangle ABC$ at P and touches AB and AC produced at Q and R respectively. If AQ = 5 cm, find the perimeter of $\triangle ABC$.



31. Solve the equations :

$$\frac{5}{x+y} - \frac{2}{x-y} = -1; \frac{15}{x+y} + \frac{7}{x-y} = 10; x+y \neq 0, x-y \neq 0$$

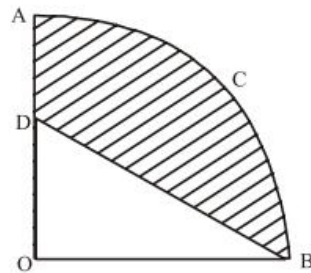
OR

Solve the system of equations :

$$\frac{x}{2} + y = 0.8 \text{ and } \frac{7}{x+y/2} = 10 \text{ and also find the value of } \frac{x}{y}.$$

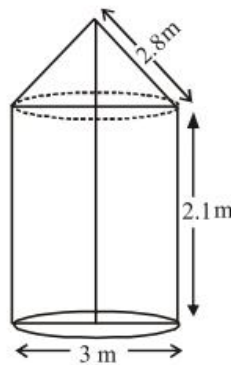
32. Find the area of a triangle with vertices (a, b + c), (b, c + a) and (c, a + b).

33. In the given figure, OACB is a quadrant of a circle with centre O and radius 3.5 cm. If OD = 2 cm, find the area of the shaded region.



34. In figure, a tent is in the shape of a cylinder surmounted by a conical top of same diameter. If the height and diameter of cylindrical part are 2.1 m and 3 m respectively and the slant height of conical part is 2.8 m, find the cost of canvas needed to make the tent if the canvas is available at the rate of ₹ 500/sq. metre.

(Use $\pi = \frac{22}{7}$)



OR

A the largest possible sphere is carved out from a wooden solid cube of side 7 cm. Find the volume of the wood left. (Use $\pi = \frac{22}{7}$).

SECTION - D

35. A boy on horizontal plane finds bird flying at a distance of 100 m from him at an elevation of 30° . A girl standing on the roof of 20 metre high building, finds the angle of elevation of the same bird to be 45° . Both the boy and the girl are on opposite sides of the bird. Find the distance of bird from the girl.

OR

A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88.2 m from the ground. The angle of elevation of the balloon from the eyes of the girl at any instant is 60° . After sometime, the angle of elevation reduces to 30° . Find the distance travelled by the balloon during the interval.

36. The houses of a row are numbered consecutively from 1 to 49. Show that there is a value of x such that the sum of the numbers of the houses preceding the house numbered x is equal to the sum of the numbers of the houses following it. Find this value of x .
37. Roots of the quadratic equation $36x^2 - 12ax + (a^2 - b^2) = 0$ are $\frac{a+b}{c}$ and $\frac{a-b}{c}$. Then, find the value of c .

OR

Find the real roots of the equation $x^{2/3} + x^{1/3} - 2 = 0$.

38. The following table shows marks secured by 140 students in an examination :

Marks	0-10	10-20	20-30	30-40	40-50
No. of Student	20	24	40	36	20

Calculation of mean by Step-deviation method.

OR

The following distribution gives the daily income of 50 workers of a factory.

Daily income (in ₹)	100 – 120	120 – 140	140 – 160	160 – 180	180 – 200	65 – 70	70 – 75	70 – 80
Number of workers	12	14	8	6	10	3	2	8

Convert the distribution above to a less than type cumulative frequency distribution, and draw its ogive.

39. Prove that : $\frac{\cot A + \operatorname{cosec} A - 1}{\cot A - \operatorname{cosec} A + 1} = \frac{1 + \cos A}{\sin A} = \operatorname{cosec} A + \cot A$
40. Construct a tangent to a circle of radius 4 cm from a point on the concentric circle of radius 6 cm and measure its length.

