

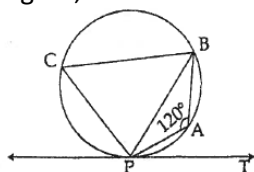
Model Exam

SECTION – I

(Marks 15)

- Note: (i) Answer all the 15 questions.
(ii) Choose the correct answer from the given four alternatives and write the option code and the corresponding answer. 15 x 1 = 15

1. If $\{(7, 11), (5, a)\}$ represents a constant function, then the value of 'a' is :
(a) 7 (b) 11 (c) 5 (d) 9
2. If a, b, c are in A.P then $\frac{a-b}{b-c}$ is equal to :
(a) $\frac{a}{b}$ (b) $\frac{b}{c}$ (c) $\frac{a}{c}$ (d) 1
3. If the n^{th} term of an A.P. is $t_n = 3-5n$, then the sum of the first n terms is :
(a) $\frac{n}{2}[1-5n]$ (b) $n(1-5n)$ (c) $\frac{n}{2}[1+5n]$ (d) $\frac{n}{2}[1+n]$
4. If $x^2+5kx+16=0$ has no real root, then:
(a) $k > \frac{8}{5}$ (b) $k > -\frac{8}{5}$ (c) $-\frac{8}{5} < k < \frac{8}{5}$ (d) $0 < k < \frac{8}{5}$
5. The system of equations $x-4y=8$, $3x-12y=24$
(a) Has infinitely many solutions. (b) has no solution
(c) has a unique solution (d) may or may not have a solution.
6. If A is of order 3×4 and B is of order 4×3 then the order of BA is :
(a) 3×3 (b) 4×4 (c) 4×3 (d) not defined.
7. The x and y intercepts of the line $2x-3y+6=0$, respectively are:
(a) 2, 3 (b) 3, 2 (c) -3, 2 (d) 3, -2
8. Area of the triangle formed by the points (0,0), (2,0) and (0,2) is :
(a) 1 sq. Units (b) 2 sq.units (c) 4 sq.units (d) 8 sq. Units
9. In the figure, if $\angle PAB = 120^\circ$ then $\angle BPT =$



- (a) 120° (b) 30° (c) 40° (d) 60°
10. The perimeter of two similar triangles ΔABC and ΔDEF are 36 cm and 24 cm respectively. If $DE = 10\text{cm}$ then AB is :
(a) 12 cm (b) 20cm (c) 15cm (d) 18 cm
11. $\sin(90^\circ-\theta) \cos \theta + \cos(90^\circ-\theta) \sin \theta =$
(a) 1 (b) 0 (c) 2 (d) -1
12. $9 \tan^2 \theta - 9 \sec^2 \theta =$
(a) 1 (b) 0 (c) 9 (d) -9
13. Curved surface area of solid sphere is 24 cm^2 . If the sphere is divided into two hemispheres, then the total surface area of one of the hemisphere is :
(a) 12 cm^2 (b) 8 cm^2 (c) 16 cm^2 (d) 18 cm^2
14. For any collection of n items, $\sum(x-\bar{x}) =$
(a) $\sum x$ (b) \bar{x} (c) $n\bar{x}$ (d) 0
15. Probability of sure event is:
(a) 1 (b) 0 (c) 100 (d) 0.1

SECTION – II

(Marks 20)

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Note: (i) Answer 10 questions.

(ii) Question No. 30 is Compulsory. Choose any 9 questions from first 14 questions. 10 x 2 = 20

- 16. If $A = \{4,6,7,8,9\}$, $B = \{2,4,6\}$ and $C = \{1,2,3,4,5,6\}$ then find $A \cup (B \cap C)$
- 17. Let $X = \{1, 2, 3, 4\}$. Examine whether the relation given below is a function from X to X or not .Explain.
 $f = \{(2,3) , (1,4) , (2,1) , (3,2) , (4,4) \}$
- 18. Find the 17th term of the A.P: 4, 9, 14.....
- 19. Find the GCD of the following: $m^2-3m -18$, m^2+5m+6 .
- 20. From the quadratic equation whose roots are $7+ \sqrt{3}$ and $7- \sqrt{3}$
- 21. If $A = \begin{pmatrix} 1 & 3 \\ 9 & -6 \end{pmatrix}$ then verify $AI = IA = A$, where I is the unit matrix of order 2.
- 22. The coordinates of the midpoint of the line segment joining the points $(2a+2 ,3)$ and $(4,2b+1)$ are $(2a,2b)$. Find the values of a and b.
- 23. AB and CD are two chords of a circle which intersect each other internally at P. If $CP= 4\text{cm}$, $AP= 8\text{cm}$, $PB= 2\text{cm}$, then find PD.
- 24. Prove the following identity: $\sqrt{\sec^2 \theta + \text{cosec}^2 \theta} = \tan \theta + \cot \theta$
- 25. Find the angular elevation (angle of elevation from the ground level) of the sun when the length of the shadow of a 30m long pole is $10\sqrt{3}$ m.
- 26. A solid right circular cylinder has radius of 14cm and height of 8cm. Find its total surface area.
- 27. How many litres of water will a hemispherical tank hold whose diameter is 4.2 m?
- 28. Find the standard deviation of the first 10 natural numbers.
- 29. Three dice are thrown simultaneously. Find the probability of getting the same number on all the three dice.
- 30. (a) Construct a 2 x3 matrix $A = [a_{ij}]$ whose elements are given by $a_{ij} = |2i - 3j|$

(b) Find the equations of the straight lines parallel to the co-ordinate's axes and passing through the point (3,-4).

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(Marks 45)

Note: (i) Answer 9 questions:

(ii) Question No. 45 is Compulsory. Select any 8 questions from the first 14 questions. 9 x 5 = 45.

- 31. Use Venn diagrams to verify De Morgan's law for set difference $A \setminus (B \cap C) = (A \setminus B) \cup (A \setminus C)$.
- 32. A function $f: [1, 6) \rightarrow R$ is defined as follows:
$$f(x) = \begin{cases} 1+x, & 1 \leq x < 2 \\ 2x-1, & 2 \leq x < 4 \\ 3x^2 -10, & 4 \leq x < 6 \end{cases}$$
 (Here, $[1, 6) = \{ x \in R : 1 \leq x < 6 \}$)
Find the values of
(a) $f(5)$ (b) $f(3)$
(c) $f(1)$ (d) $f(2) - f(4)$ (e) $2f(5) - 3f(1)$
- 33. Find the total area of 14 squares whose sides are 11 cm, 12cm, 13cm ,.....24cm.
- 34. The speed of a boat in still water is 15 km/hr. It goes 30km upstream and returns downstream to the original point in 4 hrs 30 minutes. Find the speed of the stream.
- 35. Simplify: $\frac{a^2 -16}{a^3 -8} \times \frac{2a^2 -3a -2}{2a^2 +9a +4} \div \frac{3a^2 -11a -4}{a^2 +2a +4}$
- 36. If $A = \begin{pmatrix} 3 & 2 \\ -1 & 4 \end{pmatrix}$ $B = \begin{pmatrix} -2 & 5 \\ 6 & 7 \end{pmatrix}$ and $C = \begin{pmatrix} 1 & 1 \\ -5 & 3 \end{pmatrix}$ Verify that $A(B+C) = AB+AC$.

- 37. Find the area of the quadrilateral formed by the points $(-4 , -2)$, $(-3,-5)$, $(3,-2)$ and $(2,3)$.
- 38. Find the equation of the perpendicular bisector of the straight line segment joining the points $(3,4)$ and $(-1,2)$
- 39. State and Prove Basic Proportionality theorem.
- 40. A person in an helicopter flying at a height of 500m, observes two objects lying opposite to each other on either bank of a river. The angles of depression of the objects are 30° and 45° . Find the width of the river. ($\sqrt{3}=1.732$)
- 41. The perimeter of the ends of a frustum of a cone are 44cm and 8.4π cm. If the depth is 14cm, then find its volume.

42. Using Clay, a student made a right circular cone of height 48cm and base radius 12 cm. Another student reshapes it in the form of a sphere. Find the radius of the sphere.

43. Calculate the standard deviation of the following data:

| | | | | | |
|---|---|----|----|----|----|
| X | 3 | 8 | 13 | 18 | 23 |
| f | 7 | 10 | 15 | 10 | 8 |

44. Two unbiased dice are rolled once. Find the probability of getting :

- (a) a sum 8 (b) a doublet (c) a sum greater than 8.

45. (a) If S_1 , S_2 and S_3 are the sum of first n , $2n$ and $3n$ terms of a geometric series respectively, then prove that $S_1(S_3 - S_2) = (S_2 - S_1)^2$.
(OR)

(b) If α and β are the roots of the equation $3x^2 - 4x + 1 = 0$ form a quadratic equation whose roots are $\frac{\alpha^2}{\beta}$

and $\frac{\beta^2}{\alpha}$.

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SECTION – IV
(Marks 20)

Note: Answer both the questions choosing either of the alternatives:

2 x 10 = 20

46. (a) Draw a circle of radius 3cm, From an external point 7cm away from its centre, construct the pair of tangents to the circle and measure their lengths.

(OR)

(b) Construct a cyclic quadrilateral ABCD with AB= 7cm, $\angle A = 80^\circ$, AD= 4.5cm and BC= 5cm.

47. (a) Draw the graph of $y = 2x^2$ and hence solve $2x^2 + x - 6 = 0$

(OR)

(b) The cost of the milk per litre is ₹ 15. Draw the graph for the relation between the quantity and cost. Hence find:

- (i) The proportionally constant.
(ii) The cost of 3 litres of milk.

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