

Sample Paper

2

Time : 90 Minutes

Max Marks : 40

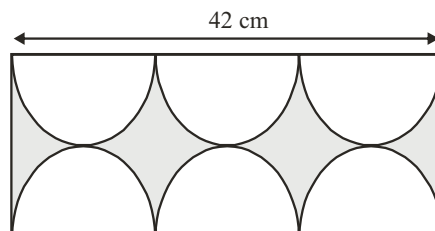
General Instructions

1. The question paper contains three parts A, B and C.
2. Section A consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.
3. Section B consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.
4. Section C consists of 10 questions based two Case Studies. Attempt any 8 questions.
5. There is no negative marking.

SECTION-A

Section A consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.

1. Solve $\frac{\cos \theta}{\operatorname{cosec} \theta + 1} + \frac{\cos \theta}{\operatorname{cosec} \theta - 1} = 2, \theta < 90^\circ$
(a) 0° (b) 30° (c) 45° (d) 60°
2. is equal to $\frac{\tan^2 \theta}{\tan^2 \theta - 1} + \frac{\operatorname{cosec}^2 \theta}{\sec^2 \theta - \operatorname{cosec}^2 \theta}$
(a) 0 (b) 2 (c) $\frac{1}{2 \sin^2 \theta - \cos^2 \theta}$ (d) $\frac{1}{\sin^2 \theta - \cos^2 \theta}$
3. If 5θ and 4θ are acute angles satisfying $\sin 5\theta = \cos 4\theta$, then $2 \sin 3\theta - \sqrt{3} \tan 3\theta$ is equal to
(a) $\sin 2\theta$ (b) $\frac{1}{2}$ (c) $\frac{1}{\sqrt{3}}$ (d) 0
4. Determine the value of k for which the following system of equations becomes consistent : $7x - y = 5, 21x - 3y = k$.
(a) $k = 15$ (b) $k = 11$ (c) $k = 4$ (d) $k = \frac{11}{2}$
5. A railway half -ticket costs half the full fare but the reservation charges are the same on a half ticket as on full ticket. One reserved first class ticket from station A to station B costs ₹ 2125. Also, one reserved first class ticket and one reserved half first class ticket from A to B costs ₹ 3200. Find the full fare from station A to B and also the reservation charges for a ticket.
(a) ₹ 1100, ₹ 15 (b) ₹ 2100, ₹ 25 (c) ₹ 1000, ₹ 25 (d) ₹ 2000, ₹ 40
6. Mrs. Vidya bought a piece of cloth as shown in the figure. The portion of the cloth that is not coloured consists of 6 identical semi-circles.



Find the area of the coloured portion.

- (a) 144 cm^2 (b) 126 cm^2 (c) 195 cm^2 (d) 243 cm^2

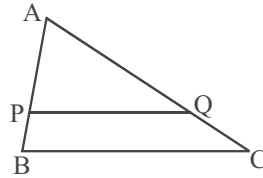
7. A factory has 120 workers in January, 90 of them are female workers. In February, another 15 male workers were employed. A worker is then picked at random. Calculate the probability of picking a female worker.

- (a) $\frac{3}{4}$ (b) $\frac{4}{9}$ (c) $\frac{2}{3}$ (d) $\frac{1}{2}$

8. When 2^{256} is divided by 17, then remainder would be

- (a) 1 (b) 16 (c) 14 (d) None of these

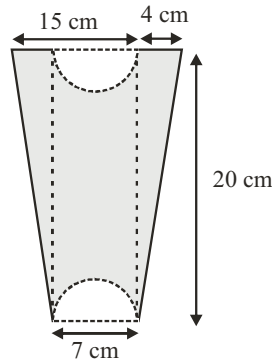
9. In the given figure, P and Q are points on the sides AB and AC respectively of a triangle ABC . PQ is parallel to BC and divides the triangle ABC into 2 parts, equal in area. The ratio of $PA : AB =$



- (a) 1 : 1 (b) $(\sqrt{2}-1) : \sqrt{2}$ (c) $1 : \sqrt{2}$ (d) $(\sqrt{2}-1) : 1$

10. The figure given shows two identical semi-circles cut out from a piece of coloured paper.

Find the area of the remaining piece of paper (Use $\pi = \frac{22}{7}$)



- (a) 296.1 cm^2 (b) 265.4 cm^2 (c) 221.5 cm^2 (d) 201.7 cm^2

11. In what ratio does the point $(-2, 3)$ divide the line-segment joining the points $(-3, 5)$ and $(4, -9)$?

- (a) 2 : 3 (b) 1 : 6 (c) 6 : 1 (d) 2 : 1

12. A box contains a number of marbles with serial number 18 to 38. A marble is picked at a random. Find the probability that it is a multiple of 3.

- (a) $\frac{3}{5}$ (b) $\frac{7}{20}$ (c) $\frac{3}{4}$ (d) $\frac{1}{3}$

13. The area of a right angled triangle is 40 sq. cm. and its perimeter is 40 cm. The length of its hypotenuse is

- (a) 16 cm (b) 18 cm (c) 17 cm (d) Data insufficient

14. The sum of exponents of prime factors in the prime-factorisation of 196 is

- (a) 3 (b) 4 (c) 5 (d) 2

15. A drain cover is made from a square metal plate of side 40 cm having 441 holes of diameter 1 cm each drilled in it. Find the area of the remaining square plate.

- (a) 1250.5 cm^2 (b) 1253.5 cm^2 (c) 1240.2 cm^2 (d) 1260.2 cm^2

16. Which of the following statement is true?
 (a) Every point on the number line represents a rational number.
 (b) Irrational numbers cannot be represented by points on the number line.
 (c) $\frac{22}{7}$ is a rational number.
 (d) None of these.
17. Given $\triangle ABC \sim \triangle DEF$, if $AB = 2DE$ and area of $\triangle ABC$ is 56 cm^2 , find the area of $\triangle DEF$.
 (a) 14 sq.cm (b) 5 sq.cm (c) 18 sq.cm (d) 56 sq.cm
18. Given that L.C.M. (91, 26) = 182, then H.C.F. (91, 26) is
 (a) 13 (b) 26 (c) 17 (d) 9
19. One card is drawn from a well shuffled deck of 52 cards.
 I. The probability that the card will be diamond, is $\frac{1}{2}$.
 II. The probability of an ace of heart is $\frac{1}{52}$.
 III. The probability of not a heart is $\frac{3}{4}$.
 IV. The probability of king or queen is $\frac{1}{26}$.
 Which of the statement(s) is/are true?
 (a) I and II (b) II and III (c) III and IV (d) None of these
20. In what ratio is the line segment joining the points (3, 5) & (-4, 2) divided by y-axis?
 (a) 3 : 2 (b) 3 : 4 (c) 2 : 3 (d) 4 : 3

SECTION-B

Section B consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.

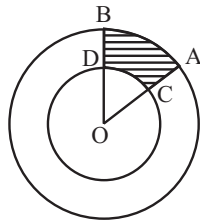
21. Find an acute angle θ , when $\frac{\cos \theta - \sin \theta}{\cos \theta + \sin \theta} = \frac{1 - \sqrt{3}}{1 + \sqrt{3}}$
 (a) 0° (b) 15° (c) 30° (d) 60°
22. If $x = a(\operatorname{cosec} \theta + \cot \theta)$ and $y = \frac{b(1 - \cos \theta)}{\sin \theta}$, then $xy =$
 (a) $\frac{a^2 + b^2}{a^2 - b^2}$ (b) $a^2 - b^2$ (c) ab (d) $\frac{a}{b}$
23. Which of the following is not correct?
 (a) If the diagonals of a quadrilateral divide each other proportionally, then it is a trapezium.
 (b) The line segments joining the mid-points of the adjacent sides of a quadrilateral form a parallelogram.
 (c) If corresponding sides of two similar triangles are in the ratio 4 : 5, then corresponding medians of the triangles must be in the ratio 4 : 5.
 (d) None of the above
24. Find a point on the x-axis which is equidistant from the points (5, 4) and (-2, 3).
 (a) (2, 0) (b) (0, 3) (c) (-2, 2) (d) (3, 0)
25. Find the point of trisection of the line joining the points (-2, -19) and (5, 4).
 (a) (2, -3) (b) (1, 2) (c) $\left(\frac{1}{3}, -\frac{34}{3}\right)$ (d) $\left(\frac{8}{3}, \frac{11}{3}\right)$
26. If the mid point of the line joining (3, 4) and (k, 7) is (x, y) and $2x + 2y + 1 = 0$. Find the value of k.
 (a) 10 (b) -15 (c) 15 (d) -10

27. For which value of p , will the lines represented by the following pair of linear equations be parallel

$$3x - y - 5 = 0$$

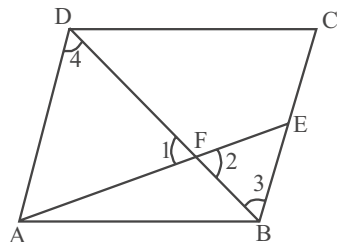
$$6x - 2y - p = 0$$

- (a) all real values except 10 (b) 10
(c) $5/2$ (d) $1/2$
28. If ABC and EBC are two equilateral triangles such that D is mid-point of BC, then the ratio of the areas of triangles ABC and BDE is
(a) 2 : 1 (b) 1 : 2 (c) 1 : 4 (d) 4 : 1
29. If $\left(\frac{a}{3}, 4\right)$ is the midpoint of the line segment joining A(-6, 5) and B(-2, 3), then what is the value of 'a'?
(a) -4 (b) -12 (c) 12 (d) -6
30. A fair die is thrown once. The probability of getting a composite number less than 5 is
(a) $\frac{1}{3}$ (b) $\frac{1}{6}$ (c) $\frac{2}{3}$ (d) 0
31. ABC is an isosceles triangle in which $AB = AC = 10$ cm, $BC = 12$ cm. PQRS is a rectangle inside the isosceles triangle. Given $PQ = SR = y$ cm and $PS = QR = 2x$ cm, then $x =$
(a) $6 - \frac{3y}{4}$ (b) $6 + 6y$ (c) $6 + \frac{4y}{3}$ (d) $\frac{7x+8y}{4}$
32. If the zeroes of the polynomial $f(x) = k^2x^2 - 17x + k + 2$, ($k > 0$) are reciprocal of each other than value of k is
(a) 2 (b) -1 (c) -2 (d) 1
33. The figure shows two concentric circles with centre O and radii 3.5 m and 7 m. If $\angle BOA = 40^\circ$, find the area of the shaded region.



- (a) $\frac{77}{6} \text{ cm}^2$ (b) $\frac{76}{5}$ (c) $\frac{73}{6}$ (d) None of these
34. If $\cot \theta = \left(\frac{15}{8}\right)$, then evaluate $\frac{(2 + 2 \sin \theta)(1 - \sin \theta)}{(1 + \cos \theta)(2 - 2 \cos \theta)}$
(a) 1 (b) $\frac{225}{64}$ (c) $\frac{156}{7}$ (d) -1
35. If a letter is chosen at random from the letter of English alphabet, then the probability that it is a letter of the word 'DELHI' is
(a) $\frac{1}{5}$ (b) $\frac{1}{26}$ (c) $\frac{5}{26}$ (d) $\frac{21}{26}$
36. What is the largest number that divides 70 and 125, leaving remainders 5 and 8 respectively?
(a) 13 (b) 9 (c) 3 (d) 585

37. The diagonal BD of a parallelogram ABCD intersects the segment AE at the point F, where E is any point on the side BC. Then



- (a) $\frac{EF}{FA} = \frac{FB}{AB}$
 - (b) $DF \times EF = FB \times FA$
 - (c) $DF \times EF = (FB)^2$
 - (d) None of these
38. If $P = (2, 5)$, $Q = (x, -7)$ and $PQ = 13$, what is the value of 'x'?
- (a) 5
 - (b) 3
 - (c) -3
 - (d) -5
39. What is the largest number that divides 245 and 1029, leaving remainder 5 in each case?
- (a) 15
 - (b) 16
 - (c) 9
 - (d) 5
40. If p, q are two consecutive natural numbers, then H.C.F. (p, q) is
- (a) p
 - (b) q
 - (c) 1
 - (d) pq

SECTION-C

Case Study Based Questions:

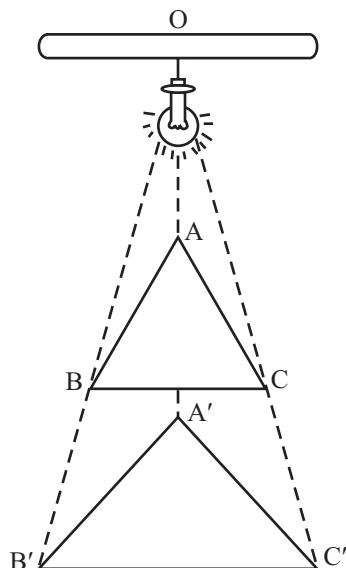
Section C consists of 10 questions of 1 mark each. Any 8 questions are to be attempted.

Q 41. - Q 45 are based on case study-I

Case Study-I

Place a lighted bulb at a point O on the ceiling and directly below it a table in classroom. Place ΔABC shape cardboard parallel to the ground between the lighted bulb and the table. Then a shadow of $\Delta A'B'C'$ is cast on the table such that $\Delta ABC \sim \Delta A'B'C'$ shown in figure.

If $AB = 5$ cm, $A'B' = 15$ cm; $B'C' = 12$ cm,
 $AC = 3$ cm, $\angle B' = 60^\circ$ and $\angle A = 80^\circ$.



Answer the following questions.

41. Length of $A'C'$ is :

- (a) 3 cm (b) 4 cm (c) 9 cm (d) 12 cm

42. Length of BC is :

- (a) 4 cm (b) 12 cm (c) 3 cm (d) 15 cm

43. Measure of $\angle A'$ is :

- (a) 60° (b) 80° (c) 180° (d) 40°

44. Find the measure of $\angle B$.

- (a) 60° (b) 40° (c) 80° (d) 180°

45. Find the measure of $\angle C$.

- (a) 60° (b) 40° (c) 80° (d) 180°

Q 46 - Q 50 are based on case study-II

Case Study-II

A two digit number is obtained by either multiplying sum of the digits by 8 and adding 1 or by multiplying the difference of the digits by 13 and adding 2.

If x be the digit in ten's place and y be the digit at unit place with $x > y$, then answer the following questions.

46. Find the equation corresponding to multiplying sum of the digits by 8 and adding 1.

- (a) $2x - 7y = 1$ (b) $2x + 7y = 4$ (c) $2x - 7y = 4$ (d) $2x + 7y = 1$

47. Find the equation corresponding to multiplying the difference of the digits by 13 and adding 2.

- (a) $14y - 3x = 2$ (b) $3x - 14y = 4$ (c) $14x - 3y = 2$ (d) $3y - 14x = 6$

48. What is the value of x ?

- (a) 2 (b) 3 (c) 4 (d) 5

49. What is the value of y ?

- (a) 0 (b) 1 (c) 3 (d) 4

50. What is the number ?

- (a) 21 (b) 31 (c) 41 (d) 51