

Sample Paper

2

Time : 90 Minutes

Max Marks : 40

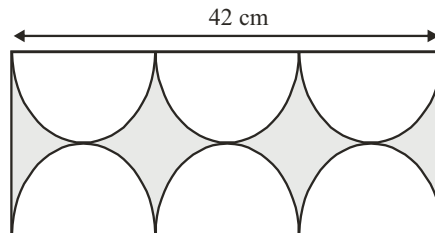
General Instructions

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.

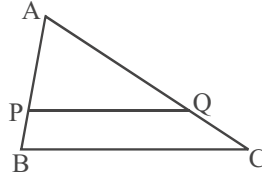
1. If $\tan^2\theta = 1 - a^2$, then the value of $\sec\theta + \tan^3\theta \operatorname{cosec}\theta$ is
(a) $(2 - a^2)$ (b) $(2 - a^2)^{1/2}$ (c) $(2 - a^2)^{2/3}$ (d) $(2 - a^2)^{3/2}$
2. Mrs. Vidya bought a piece of cloth as shown in the figure. The portion of the cloth that is not coloured consists of 6 identical semi-circles.



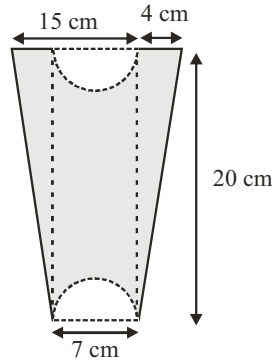
Find the area of the coloured portion.

- (a) 144 cm^2 (b) 126 cm^2 (c) 195 cm^2 (d) 243 cm^2
3. 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) $\frac{1}{2}$
4. When 2^{256} is divided by 17, then remainder would be
(a) 1 (b) 16 (c) 14 (d) None of these
5. Which of the following is true if following pair of linear equations has unique solution?
 $3x - 2y = -8$
 $(2m - 5)x + 7y - 6 = 0$
(a) $m = \frac{11}{4}$ (b) $m = -\frac{11}{4}$ (c) $m \neq -\frac{11}{4}$ (d) $m \neq \frac{11}{4}$

6. 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) $(\sqrt{2}-1) : 1$
7. 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
8. 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) $2 : 1$
9. 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) $\frac{1}{3}$
10. 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
11. The sum of exponents of prime factors in the prime-factorisation of 196 is
- (a) 3 (b) 4 (c) 5 (d) 2
12. 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
13. If $x = r \sin A \cos C$, $y = r \sin A \sin C$, $z = r \cos A$, then
- (a) $r^2 = x^2 + y^2 + z^2$ (b) $r^2 = 2xy$ (c) $r^2 = x + y + z$ (d) $r^2 = y^2 + z^2 + 2xy$
14. 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.

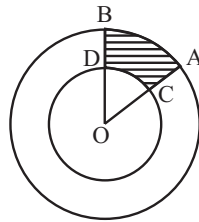
15. Given $\triangle ABC \sim \triangle DEF$, if $AB = 2DE$ and area of $\triangle ABC$ is 56 cm^2 , find the area of $\triangle DEF$.
 (a) 14 sq.cm (b) 5 sq.cm (c) 18 sq.cm (d) 56 sq.cm
16. For what values of k will the following pair of linear equations have infinitely many solutions?
 $kx + 3y - (k - 3) = 0$
 $12x + ky - k = 0$
 (a) $k = 4$ (b) $k = 3$ (c) $k = 6$ (d) $k = 2$
17. Given that L.C.M. (91, 26) = 182, then H.C.F. (91, 26) is
 (a) 13 (b) 26 (c) 17 (d) 9
18. One card is drawn from a well shuffled deck of 52 cards.
 I. The probability that the card will be diamond, is $1/2$.
 II. The probability of an ace of heart is $1/52$.
 III. The probability of not a heart is $3/4$.
 IV. The probability of king or queen is $1/26$.
 Which of the statement(s) is/are true?
 (a) I and II (b) II and III (c) III and IV (d) None of these
19. If $p \sin \theta + q \cos \theta = a$ and $p \cos \theta - q \sin \theta = b$, then $\frac{p+a}{q+b} + \frac{q-b}{p-a} =$
 (a) 1 (b) $a^2 + b^2$ (c) 0 (d) 2
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.

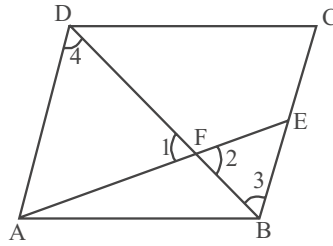
21. If $x = a(\operatorname{cosec} \theta + \cot \theta)$ and $y = \frac{b(1 - \cos \theta)}{\sin \theta}$, then $xy =$
 (a) $\frac{a^2 + b^2}{a^2 - b^2}$ (b) $a^2 - b^2$ (c) ab (d) $\frac{a}{b}$
22. If the mid point of the line joining (3, 4) and (k, 7) is (x, y) and $2x + 2y + 1 = 0$. Find the value of k.
 (a) 10 (b) -15 (c) 15 (d) -10
23. 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) $1/2$
24. 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
25. 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

26. 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
27. 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) $\frac{7x+8y}{4}$
28. 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
29. A class of 20 boys and 15 girls is divided into n groups so that each group has x boys and y girls. Values of x , y and n respectively are
 (a) 3, 4 and 8 (b) 4, 3 and 6 (c) 4, 3 and 7 (d) 7, 4 and 3
30. 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
31. The points (a, b) , (a^1, b^1) and $(a - a^1, b - b^1)$ are collinear if
 (a) $ab = a^1b^1$ (b) $ab^1 = a^1b$ (c) $a = b$ (d) $a^1 = b^1$
32. 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
33. 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) $\frac{21}{26}$
34. What is the largest number that divides 70 and 125, leaving remainders 5 and 8 respectively?
 (a) 13 (b) 9 (c) 3 (d) 585
35. Find area of minor segment made by a chord which subtends right-angle at the centre of a circle of radius 10 cm.
 (a) 24.5 cm^2 (b) 25.5 cm^2 (c) 24.5 cm^2 (d) 28.5 cm^2

36. 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
37. If $P = (2, 5)$, $Q = (x, -7)$ and $PQ = 13$, what is the value of 'x'?
- (a) 5 (b) 3 (c) -3 (d) -5
38. If $(\sec^2\theta)(1 + \sin\theta)(1 - \sin\theta) = k$, then find the value of k .
- (a) $\sin\theta$ (b) $\sec\theta$ (c) 1 (d) $\cot\theta$
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

Soniya and Anuj are students of class X and they given a polynomial such that "If one zero of the polynomial $3x^2 - 8x + 2k + 5$ is four times the other $4x^2 - 12x + 3k + 8$.

Then, answer the following questions.

41. Find the sum of zeroes.
- (a) 3 (b) 4 (c) $\frac{12}{3}$ (d) $\frac{12}{5}$
42. For quadratic polynomial $ax^2 + bx + c$, $a \neq 0$, write the formula to find product of zeroes.
- (a) $\frac{b}{a}$ (b) $-\frac{b}{a}$ (c) $-\frac{c}{a}$ (d) $\frac{c}{a}$
43. If α and β be the zeroes of given polynomial. Then, what is the relation between α and β ?
- (a) $\alpha + \beta = 4$ (b) $\alpha\beta = 4$ (c) $\beta = 4\alpha$ (d) $\alpha^2 = 16\beta$
44. If α and β be the zeroes of the given polynomial, then find value of α .
- (a) $\frac{1}{5}$ (b) $\frac{7}{4}$ (c) $\frac{2}{5}$ (d) $\frac{3}{5}$

45. Find the value of k . If α and β be the zeroes of given polynomials.

- (a) $\frac{56}{75}$ (b) $-\frac{56}{75}$ (c) $\frac{75}{56}$ (d) $\frac{65}{75}$

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

OMR ANSWER SHEET

Sample Paper No –

- ★ Use Blue / Black Ball pen only.
- ★ Please do not make any stray marks on the answer sheet.
- ★ Rough work must not be done on the answer sheet.
- ★ Darken one circle deeply for each question in the OMR Answer sheet, as faintly darkend / half darkened circle might be rejected.

Start time : _____	End time _____	Time taken _____
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1. Name (in Block Letters)

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2. Date of Exam

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3. Candidate's Signature

SECTION-A

1. (a) (b) (c) (d) 2. (a) (b) (c) (d) 3. (a) (b) (c) (d) 4. (a) (b) (c) (d) 5. (a) (b) (c) (d) 6. (a) (b) (c) (d) 7. (a) (b) (c) (d) 8. (a) (b) (c) (d)	9. (a) (b) (c) (d) 10. (a) (b) (c) (d) 11. (a) (b) (c) (d) 12. (a) (b) (c) (d) 13. (a) (b) (c) (d) 14. (a) (b) (c) (d) 15. (a) (b) (c) (d) 16. (a) (b) (c) (d)	17. (a) (b) (c) (d) 18. (a) (b) (c) (d) 19. (a) (b) (c) (d) 20. (a) (b) (c) (d)
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SECTION-B

21. (a) (b) (c) (d) 22. (a) (b) (c) (d) 23. (a) (b) (c) (d) 24. (a) (b) (c) (d) 25. (a) (b) (c) (d) 26. (a) (b) (c) (d) 27. (a) (b) (c) (d) 28. (a) (b) (c) (d)	29. (a) (b) (c) (d) 30. (a) (b) (c) (d) 31. (a) (b) (c) (d) 32. (a) (b) (c) (d) 33. (a) (b) (c) (d) 34. (a) (b) (c) (d) 35. (a) (b) (c) (d) 36. (a) (b) (c) (d)	37. (a) (b) (c) (d) 38. (a) (b) (c) (d) 39. (a) (b) (c) (d) 40. (a) (b) (c) (d)
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SECTION-C

41. (a) (b) (c) (d) 42. (a) (b) (c) (d) 43. (a) (b) (c) (d) 44. (a) (b) (c) (d)	45. (a) (b) (c) (d) 46. (a) (b) (c) (d) 47. (a) (b) (c) (d) 48. (a) (b) (c) (d)	49. (a) (b) (c) (d) 50. (a) (b) (c) (d)
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No. of Qns. Attempted		Correct		Incorrect		Marks	
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Page for Rough Work
