Sample Paper 5

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 quesions of 1 mark each. Any 16 quesitons are to be attempted.*
3. *Section B consists of 20 quersions of 1 mark each. Any 16 quesions are to be attempted.*
4. *Section C consists of 10 quesions 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 quesions are to be attempted.

1. If three points (0, 0) $\left(3,\sqrt{3}\right)$ and (3, λ) form an equilateral triangle, then λ is equal to

(a) 2 (b) – 3 (c) $-\sqrt{3}$ (d) $\sqrt{3}$

2. If the sum of the zeros of the polynomial $f(x) = (k^2 - 14)x^2 - 2x - 12$ is 1, which is one of the possible values of 'k'?

(a) $\sqrt{14}$ (b) –14 (c) 2 (d) ± 4

3. ABCD is a square. F is the mid-point of AB, BE is one-third of BC. If the area of the ΔFBE is 108 sq. cm find the length AC.

(a) $\left(\sqrt{36\sqrt{2}}\right)$ cm (b) $37\sqrt{2}$ cm (c) $\left(36\sqrt{2}\right)$ cm (d) $(36)^2$ cm

4. Express the number $0.\overline{3178}$ in the form of rational number.

(a) $\frac{3178}{99}$ (b) $\frac{3178}{999}$ (c) $\frac{3178}{1000}$ (d) $\frac{999}{3178}$

5. The product of two irrationals is

(a) a rational number (b) an irrational number
(c) either A or B (d) neither A nor B

6. In ΔABC, AB = AC, P and Q are points on AC and AB respectively such that BC = BP = PQ = AQ. Then, ∠AQP is equal to (use π =180º)

(a) $\frac{2\pi}{7}$ (b) $\frac{3\pi}{7}$ (c) $\frac{4\pi}{7}$ (d) $\frac{5\pi}{7}$

7. If the circumference of a circle increases from 4π to 8π, then its area is

(a) halved (b) doubled (c) tripled (d) quadrupled

8. $(1 + \tan\theta + \sec\theta)(1 + \cot\theta - \operatorname{cosec}\theta) =$

(a) 0 (b) 1 (c) 2 (d) –1

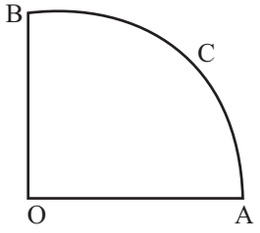
9. If the point $P(p, q)$ is equidistant from the points $A(a + b, b - a)$ and $B(a - b, a + b)$, then

(a) $ap = by$ (b) $bp = ay$ (c) $ap + bq = 0$ (d) $bp + aq = 0$

10. In a classroom, one-fifth of the boys leave the class and the ratio of the remaining boys to girls is 2 : 3. If further 44 girls leave the class, then the ratio of boys to girls is 5: 2. How many more boys should leave the class so that the number of boys equals that of girls?

(a) 16 (b) 24 (c) 30 (d) 36

11. In the adjoining figure, $OACB$ is a quadrant of a circle of radius 7 cm. The perimeter of the quadrant is



(a) 11 cm (b) 18 cm (c) 25 cm (d) 36 cm

12. Let ABC be a triangle and M be a point on side AC closer to vertex C than A. Let N be a point on side AB such that MN is parallel to BC and let P be a point on side BC such that MP is parallel to AB. If the area of the quadrilateral $BNMP$ is equal to $\frac{5}{18}$ of the area of ΔABC, then the ratio AM/MC equals

(a) $\frac{5}{18}$ (b) 6 (c) $\frac{18}{5}$ (d) $\frac{15}{2}$

13. The points $A(-4, -1)$, $B(-2, -4)$, $C(4, 0)$ and $D(2, 3)$ are the vertices of a

(a) Parallelogram (b) Rectangle (c) Rhombus (d) Square

14. For what value of p, the following pair of linear equations in two variables will have infinitely many solutions ?
$px + 3y - (p - 3) = 0$, $12x + py - p = 0$

(a) 6 (b) -6 (c) 0 (d) 2

15. If a circular grass lawn of 35m in radius has a path 7m wide running around it on the outside, then the area of the path is

(a) 1450 m^2 (b) 1576 m^2 (c) 1694 m^2 (d) 3368 m^2

16. $9 \sec^2 A - 9 \tan^2 A =$

(a) 1 (b) 9 (c) 8 (d) 0

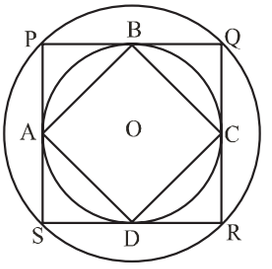
17. Three - digit numbers formed by using digits 0, 1, 2 and 5 (without repetition) are written on different slips with distinct number on each slip, and put in a bowl. One slip is drawn at random from the bowl. The probability that the slip bears a number divisible by 5 is

(a) $\frac{5}{9}$ (b) $\frac{4}{9}$ (c) $\frac{2}{3}$ (d) $\frac{1}{3}$

18. The value of $0.\overline{235}$ is :

(a) $\frac{233}{900}$ (b) $\frac{233}{990}$ (c) $\frac{235}{999}$ (d) $\frac{235}{990}$

19. The figure below shows two concentric circles with centre *O*. *PQRS* is a square inscribed in the outer circle. It also circumscribes the inner circle, touching it at point *B*, *C*, *D* and *A*. The ratio of the perimeter of the outer circle to that of polygon *ABCD* is



(a) $\frac{\pi}{4}$ (b) $\frac{3\pi}{2}$ (c) $\frac{\pi}{2}$ (d) π

20. Let *P* be an interior point of a ΔABC. Let *Q* and *R* be the reflections of *P* in *AB* and *AC*, respectively. If *Q*, *A*, *R* are collinear, then $\angle A$ equals

(a) 30° (b) 60° (c) 90° (d) 120°

SECTION-B

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

21. If α and β are the zeros of the polynomial $f(x) = x^2 + ax - b$, find the polynomial having zeros $\frac{1}{\alpha}$ and $\frac{1}{\beta}$.

(a) $abx^2 + bx - a$ (b) $x^2 - \frac{a}{b}x - \frac{1}{b}$ (c) $abx^2 - bx + a$ (d) $x^2 - \frac{b}{a}x + \frac{1}{a}$

22. 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

23. Triangle ABC is an isosceles triangle right angled at B. ΔADB and ΔAEC are equilateral triangle then.

(a) Area (ΔABD) = $\frac{1}{2}$ Area (ΔCAE) (b) Area (ΔABD) = Area (ΔCAE)

(c) Area (ΔABD) = 3 Area (ΔCAE) (d) 2Area (ΔABD) = Area (ΔCAE)

24. A polynomial of degree 7 is divided by a polynomial of degree 4. Degree of the quotient is

(a) less than 3 (b) 3 (c) more than 3 (d) more than 5

25. 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)

26. A girl calculates that the probability of her winning the first prize in a lottery is 0.08. If 6000 tickets are sold, how many tickets has she bought?

(a) 40 (b) 240 (c) 480 (d) 750

27. $\frac{2\tan 30°}{1-\tan^2 30°} =$

(a) cos 60° (b) sin 60° (c) tan 60° (d) sin 30°

28. If the value of a quadratic polynomial p(x) is 0 only at x = –1 and p(–2) = 2, then the value of p(2) is

(a) 18 (b) 9 (c) 6 (d) 3

29. If the sector of a circle of diameter 10 cm subtends an angle of 144° at the centre, then the length of the arc of the sector is

(a) 2π cm (b) 4π cm (c) 5π cm (d) 6π cm

30. x and y are two non-negative numbers such that $2x + y = 10$. The sum of the maximum and minimum values of $(x + y)$ is

(a) 6 (b) 9 (c) 10 (d) 15

31. $\sin 2A = 2 \sin A$ is true when A =

(a) 0° (b) 30° (c) 45° (d) 60°

32. Given that $\frac{1}{7} = 0.\overline{142857}$, which is a repeating decimal having six different digits. If x is the sum of such first three positive integers n such that $\frac{1}{n} = 0.\overline{abcdef}$, where a, b, c, d, e and f are different digits, then the value of x is

(a) 20 (b) 21 (c) 41 (d) 42

33. For an event E, P (E) + $P(\overline{E}) = q$, then

(a) $0 \le q < 1$ (b) $0 < q \le 1$ (c) $0 < q < 1$ (d) None of these

34. A boat travels with a speed of 15 km/hr in still water. In a river flowing at 5 km/hr, the boat travels some distance downstream and then returns. The ratio of average speed to the speed in still water is

(a) 8 : 3 (b) 3 : 8 (c) 8 : 9 (d) 9 : 8

35. Which of the following relationship is the correct ?

(a) $P(E) + P(\overline{E}) = 1$ (b) $P(\overline{E}) - P(E) = 1$

(c) $P(E) = 1 + P(\overline{E})$ (d) None of these

36. $\frac{1 - \tan^2 45°}{1 + \tan^2 45°} =$

(a) tan 90° (b) 1 (c) sin 45° (d) 0

37. The sum of two numbers is 528 and their H.C.F. is 33, then find the number of pairs of numbers satisfying the above conditions.

(a) 4 (b) 5 (c) 6 (d) 2

38. A man can row a boat in still water at the rate of 6 km per hour. If the stream flows at the rate of 2 km/hr, he takes half the time going downstream than going upstream the same distance. His average speed for upstream and down stream trip is

(a) 6 km/hr (b) 16/3 km/hr

(c) Insufficient data to arrive at the answer (d) none of the above

39. $\frac{2 \tan 30°}{1 + \tan^2 30°} =$

(a) sin 60° (b) cos 60° (c) tan 60° (d) sin 30°

40. The unit digit in the expression $55^{725} + 73^{5810} + 22^{853}$ is

(a) 0 (b) 4 (c) 5 (d) 6

SECTION-C

Case Study Based Questions:

Section C consists of 10 quesions of 1 mark each. Any 8 quesions 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) $\frac{3}{5}$

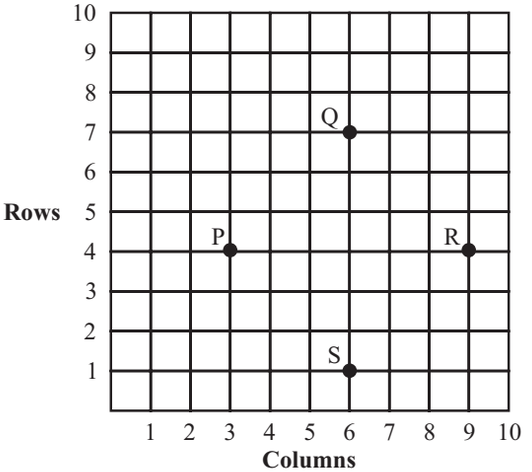
45. Find the value of k. If α and β be the zeroes of given polynomials.

(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

In a classroom, 4 friends are seated at the points P, Q, R and S as shown in figure.
Then answer the following questions.



46. The coordinate of P is :

(a) (4, 3) (b) (3, 4) (c) (6, 1) (d) (6, 7)

47. The distance of PQ is :

(a) $3\sqrt{2}$ unit (b) 4 unit (c) $2\sqrt{3}$ unit (d) 6 unit

48. The distance of PR is :

(a) 7 unit (b) $6\sqrt{2}$ unit (c) 6 unit (d) 5 unit

49. The name of quadrilateral is :

(a) Square (b) Rectangle (c) Rhombus (d) Parallelogram

50. The mid point of QS is :

(a) (5, 4) (b) (7, 4) (c) (6, 2) (d) (6, 4)