

This Question Paper contains 12 printed pages.

(Section - A, B, C & D)

Sl.No. 58172

12 (E)

(MARCH/APRIL 2022)

Time : 3 Hours]

[Maximum Marks : 80

**Instructions :**

- 1) Write in a clear legible handwriting.
- 2) This question paper has four Sections A, B, C & D and Question Numbers from 1 to 54.
- 3) All Sections are compulsory. General options are given.
- 4) The numbers to the right represent the marks of the question.
- 5) Draw neat diagrams wherever necessary.
- 6) New sections should be written in a new page. Write the answers in numerical order.
- 7) Calculator is not allowed.

**SECTION - A**

- Answer the following as per instruction given (Questions : 1 to 24) (1 mark each). [24]
  - State True or False for questions given below (Questions : 1 to 6).
- 1) All similar triangles are congruent. [1]
  - 2) If  $P(3)=0$ , then  $(x-3)$  is one of the factor of  $P(x)$ . [1]
  - 3) The perpendicular distance of point  $(3, -7)$  from Y-axis is 7. [1]

- 4)  $\sec^2 \theta - \tan^2 \theta = 1$ . [1]
- 5) A circle have infinite tangents at a point of the circle. [1]
- 6) If the perimetre and area of a circle are numerically equal, then the radius of a circle is 2 units. [1]

■ Fill in the blanks with correct option as to make the given statement correct (Questions : 7 to 12).

- 7) LCM (180, 40) = \_\_\_\_\_. (360, 220, 180) [1]
- 8) The product of zeroes of  $P(x) = 6x^2 - 3 - 7x$  is \_\_\_\_\_.  $\left(\frac{1}{2}, -\frac{1}{2}, 1\right)$  [1]
- 9) For a given pair of linear equation in two variables, if  $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$  then equation has \_\_\_\_\_ . (One and only solution, Infinite solution, No solution) [1]
- 10) The value of Discriminant for a given quadratic equation  $x^2 + 6x + 9 = 0$  is \_\_\_\_\_. (72, 0, 36) [1]
- 11) All \_\_\_\_\_ are similar. (Circle, Rectangle, Triangle) [1]
- 12) The area of minor sector having radius  $r$  and angle  $\alpha$  is \_\_\_\_\_. [1]
- $\left(\frac{\pi r^2 \alpha}{180}, \frac{\pi r \alpha}{360}, \frac{\pi r^2 \alpha}{360}\right)$

■ Choose the correct option from the question given below (Questions : 13 to 18).

13) If  $m + n = 14$  and  $m - n = 4$ , then  $m =$  \_\_\_\_\_ . [1]

(A) 18

(B) 10

(C) 9

(D) 56

14) If  $b^2 - 4ac$  \_\_\_\_\_ 0, then quadratic equation has two equal roots. [1]

(A)  $\geq$

(B)  $>$

(C)  $<$

(D)  $=$

15) The distance of point  $A(a, b)$  from origin is \_\_\_\_\_ . [1]

(A)  $\sqrt{a^2 - b^2}$

(B)  $a^2 + b^2$

(C)  $\sqrt{a^2 + b^2}$

(D)  $a^2 - b^2$

16) If tangents PA and PB from a point P to a circle with centre O are inclined to each other at angle of  $80^\circ$ , then  $\angle POA$  is equal to \_\_\_\_\_ . [1]

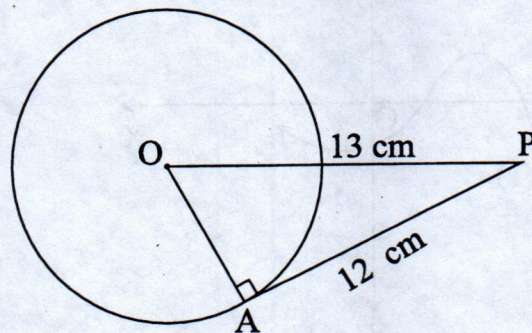
(A)  $50^\circ$

(B)  $60^\circ$

(C)  $70^\circ$

(D)  $80^\circ$

17) Find the radius of a circle from a figure given below : [1]



(A) 25

(B) 5

(C) 13

(D) 12

18) For a given pair of linear equation in two variables  $2x + 3y - 8 = 0$  and  $4x + 6y - 16 = 0$ , the geometrical representation of the pair so formed is \_\_\_\_\_.

[1]

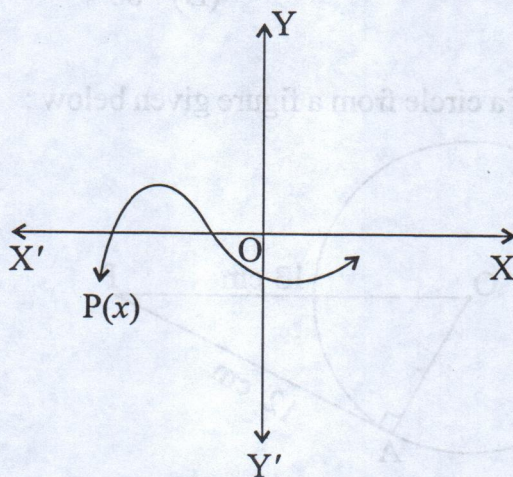
- (A) Intersecting lines                      (B) Coincident lines  
(C) Parallel lines                            (D) None of the given

■ Answer the following in one word or figure (Questions : 19 to 22):

19) What is the HCF of 35 and 22? [1]

20) Which mathematician derived a formula for solving a quadratic equation by the method of completing the square? [1]

21) Find the number of zeroes of  $y = P(x)$  from figure given below : [1]



22) If  $P(E) = 0.63$ , then find the value of  $P(\bar{E})$ . [1]

- Match the pair : (Questions : 23 to 24) [2]

Part - A		Part - B	
23)	The zeroes of $P(x) = 2x - 6$ is	(a)	0
24)	The probability of having -5 as natural number is	(b)	1
		(c)	3

### SECTION - B

- Answer the following briefly with calculation : (Any 9) (Questions : 25 to 37) (2 marks each). [18]

25) Find HCF and LCM of 85 and 136 by prime factorization method. [2]

26) Show that  $3 - \sqrt{5}$  is irrational. [2]

27) Find a quadratic polynomial, the sum and product of whose zeroes are  $\sqrt{2}$  and  $\frac{1}{3}$  respectively. [2]

28) Solve the following pair of linear equations by substitution method. [2]

$$2x + 3y = 13, \quad 4x + 5y = 23.$$

29) In an agriculture field, there are 23 cotton plants in the first row, 21 in the second row, 19 in the third row, and so on. There are 5 cotton plants in the last row. How many rows are there in the agriculture field? [2]

30) Find the sum of first 20 multiples of 7. [2]

31) Find the values of  $y$  for which the distance between the points  $P(3, -2)$  and  $Q(7, y)$  is 4 units. [2]

32) Find the ratio in which the line segments joining the points  $(-3, 10)$  and  $(6, -8)$  is divided by  $(-1, 6)$ . [2]

33) Evaluate:  $\frac{5\cos^2 60^\circ + 4\sec^2 30^\circ - \tan^2 45^\circ}{\sin^2 30^\circ + \cos^2 30^\circ}$ . [2]

34) If  $\sin 6\theta = \cos(2\theta + 10^\circ)$ , where  $6\theta$  is an acute angle, find the value of  $\theta$ . [2]

35) The marks distribution of 30 students in a mathematics examination are given : [2]

Class Interval	10-25	25-40	40-55	55-70	70-85	85-100
Number of students	2	3	7	6	6	6

Find the mode of this data.

36) One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting: [2]

i) a spade

ii) a red face card

37) Find Mean of data for one classical distribution data in the symbols [2]

$$a = 50, \quad \sum f_i u_i = -36, \quad \sum f_i = 35 \quad \text{and} \quad h = 10.$$

**SECTION - C**

- Answer the following as asked with calculation : (Any 6) (Questions : 38 to 46)  
(3 marks each). [18]

38) Ravi scored 40 marks in a test, getting 3 marks for each right answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks been deducted for each incorrect answer, then Ravi would have scored 50 marks. How many questions were there in the test? [3]

39) Solve the following pair of equation by reducing them to a pair of linear equations: [3]

$$6x + 3y = 6xy$$

$$2x + 4y = 5xy$$

40) An express train takes 1 hour less than a passenger train to travel 132 km between Gandhinagar and Vadodara (without taking into consideration the time they stop at intermediate stations). If the average speed of the express train is 11 km/h more than that of the passenger train, find the average speed of the two trains. [3]

41) Find the roots of the following equation. [3]

$$\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}, (x \neq -4, 7)$$

42) Prove that :

[3]

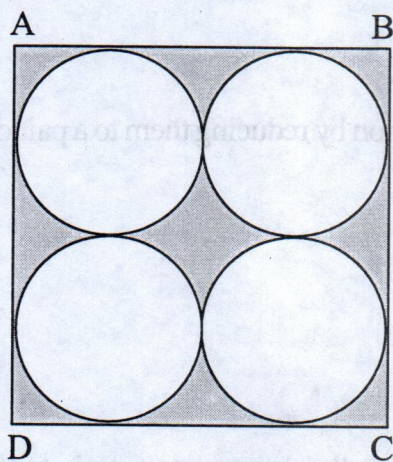
$$(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$$

43) Prove that "The lengths of tangents drawn from an external point to a circle are equal".

[3]

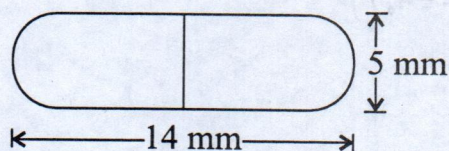
44) Find the area of the shaded region in given figure, where ABCD is a square of side 14 cm.

[3]



45) A 20 m deep well with diameter 7 m is dug and the earth from digging is evenly spread out to form a platform 22 m by 14 m. Find the height of the platform. [3]

46) A medicine capsule is in the shape of a cylinder with two hemispheres stuck to each of its ends. The length of the entire capsule is 14 mm and the diameter of the capsule is 5 mm. Find its surface area. [3]





**SECTION - D**

- Answer the following questions any 5 from 47 to 54 (8 questions) with calculation  
(4 marks each) [20]

47) Prove that "The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides". [4]

48) In  $\Delta PQR$  if  $\angle Q = 90^\circ$ , then prove that  $PR^2 = PQ^2 + QR^2$ . [4]

49) Construct a tangent to a circle of radius 4 cm from a point on the concentric circle of radius 6 cm. Write steps of construction. [4]

50) Draw a triangle  $XYZ$  with side  $YZ = 5$  cm,  $XY = 4$  cm and  $\angle XYZ = 60^\circ$ . Then construct a triangle whose sides are  $\frac{4}{5}$  of the corresponding sides of the triangle  $XYZ$ . (Steps of construction not required) [4]

51) 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  $60^\circ$ . After some time, the angle of elevation reduces to  $30^\circ$ . Find the distance travelled by the balloon during the interval. [4]

52) From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are  $30^\circ$  and  $60^\circ$ , respectively. If the bridge is at a height of 3 m from the banks, find the width of the river. [4]

- 53) A container, is in the form of a frustum of a cone of height 16 cm with radii of its lower and upper ends as 8 cm and 20 cm, respectively. Find the cost of the milk which can completely fill the container, at the rate of ₹ 20 per litre. ( $\pi = 3.14$ )

[4]

- 54) The median of the following data is 525. Find the values of  $f_1$  and  $f_2$ .

[4]

Class Interval	Frequency
0 - 100	2
100 - 200	5
200 - 300	$f_1$
300 - 400	12
400 - 500	17
500 - 600	20
600 - 700	$f_2$
700 - 800	9
800 - 900	7
900 - 1000	4
Total	100

