18 (E)

(MARCH, 2024)

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. Internal 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, digital watch or smart watch is not allowed.

SECTION - A

■ Answer the following as per instruction given (Questions : 1 to 24) (1 mark each).

[24]

■ Choose the correct option from the question given below (Questions : 1 to 6). (1 mark each).

1) For a given pair of linear equations in two variables, if $\dfrac{a_1}{a_2} \neq \dfrac{b_1}{b_2}$ then equation has

_____ solution.   [1]

   (A) One   (B) Two

   (C) Three   (D) No solution

2) If the two roots of quadratic equation $ax^2 + bx + c = 0$ $(a \neq 0)$ are real and equal then _____. [1]

(A) $b^2 - 4ac < 0$ (B) $b^2 - 4ac = 0$

(C) $b^2 - 4ac > 0$,   (D) $b^2 - 4ac \neq 0$

3) For the AP : 4, 10, 16, 22, ... common difference (d) is _____. [1]

(A) 8   (B) 5

(C) 6 .   (D) 12

4) The distance between the points (0, 5) and (–5, 0) is _____. [1]

(A) 5   (B) $5\sqrt{2}$

(C) $2\sqrt{5}$ (D) 10

5) $\sec^2 \theta - \tan^2 \theta = $ _____. [1]

(A) 0   (B) 1

(C) –1   (D) 2

6) For any data $\overline{X} = 25$ and $Z = 25$ then M = _____. [1]

(A) 25   (B) –25

(C) 5   (D) –5

■ **Fill in the blanks with correct option as to make the given statement correct : (Questions : 7 to 12). (1 mark each).**

7) $3 + 2\sqrt{5}$ is a/an _____ number. (rational, irrational, negative integer) [1]

8) The sum of zeroes of quadratic polynomial $4x^2 - 3x - 7$ is _____. $\left(\dfrac{3}{4}, \dfrac{4}{3}, \dfrac{7}{3} \right)$ [1]

9) When a coin is tossed three times, the total number of possible outcomes is _____. (4, 6, 8) [1]

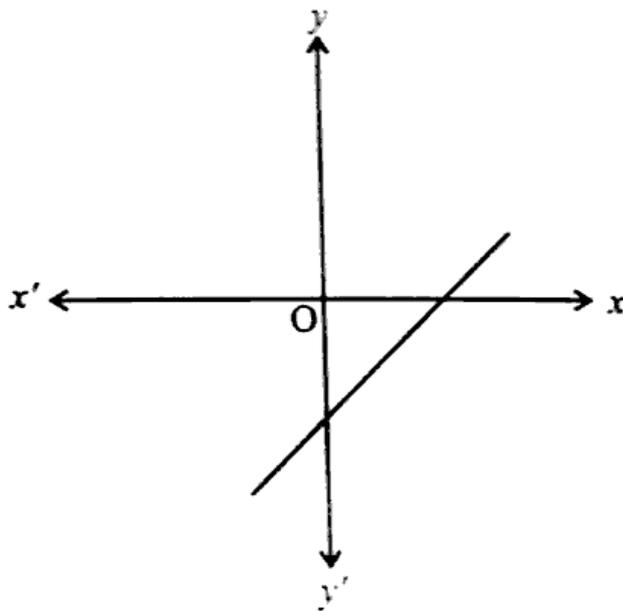10) $\tan\theta \cdot \cot\theta =$ _____ . (−1, 0, 1) [1]

11) A circle can have _____ parallel tangents at the most. (1. 2, 3) [1]

12) Median of −2, −3, 0, 1, 3, 2, 7 is _____ . (−2, 1, 3) [1]

■ State True or False for statements given below : (Questions : 13 to 16). (1 mark each).

13) H.C.F. of 17, 23 and 29 is 1. [1]

14) Number of zeroes of $y = p(x)$ is 2 from figure given below. [1]

15) If the pair of linear equations in two variables are $2x + 3y = 12$ and $3x + 2y = 18$ then $x + y = 5$. [1]

16) The probability of an impossible event is zero (0). [1]

● Answer the following in one sentence or one word or number (Questions 17 to 20). (1 mark each).

17) $a, 2a, 3a, 4a,$ is an Arithmetic Progression or not? [1]

18) How many tangents can be drawn to a circle passing through a point lying inside the circle? [1]

19) A die is thrown once. What is the probability of not getting number 6? [1]

20) Find the mean of First 11 Natural Numbers. [1]

● Match the pairs : (Questions : 21 to 24). (1 mark each). [4]

A	B
21) Base area of hemisphere	(a) $2\pi rh$
22) Volume of a 5 rupee coin	(b) πr^2
	(c) $\pi r^2 h$

A	B
23) Length of an arc of a sector of angle θ	(a) πd
24) Circumference of a circle	(b) πr
	(c) $\dfrac{\pi r \theta}{180}$

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SECTION - B

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

25) Find the zeroes of the quadratic polynomial $x^2 + 7x + 10$. **[2]**

26) Find a quadratic polynomial whose sum and product of its zeroes are $-\frac{1}{4}$ and $\frac{1}{4}$ respectively. **[2]**

27) Find the roots of the quadratic equation $x^2 - 3x - 10 = 0$ by factorisation method. **[2]**

28) Find the 10th term of the AP : 2, 7, 12, ... **[2]**

29) Find the sum of the first 1,000 positive integers. **[2]**

30) Find the distance between the points (2, 3) and (4, 1) using distance formula. **[2]**

31) Find the values of y for which the distance between the points P(2, –3) and Q(10, y) is 10 units. **[2]**

32) If $\sin\theta = \frac{4}{5}$, calculate $\cos\theta$ and $\tan\theta$. **[2]**

33) Evaluate : **[2]**

$\sin 60° \cos 30° + \sin 30° \cos 60°$

34) A tower stands vertically on the ground. From a point on the ground, which is 15 m away from the foot of the tower, the angle of elevation of the top of the tower is found to be 60°. Find the height of the tower.

[2]

35) 2 cubes each of volume 125 cm³ are joined end to end. Find the volume of the resulting cuboid.

[2]

36) A juice seller was serving his customers using glasses as shown in the figure. The inner diameter of the cylindrical glass was 5 cm, but the bottom of the glass had a hemispherical raised portion which reduced the capacity of the glass. If the height of a glass was 10 cm. Find the apparent capacity of the glass. (Use $\pi = 3.14$). [2]
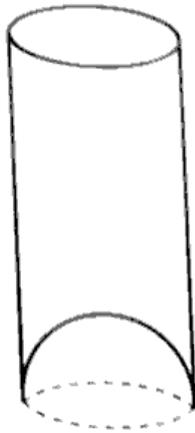
Figure

37) Find Median for the classical distribution data when $n = 53, l = 60, cf = 22, f = 7$ and $h = 10$.

[2]

SECTION - C

■ **Answer the following questions any 6 from 38 to 46. (9 questions). (3 marks each).**

[18]

38) Solve the following pair of linear equations by the substitution method.   [3]

$$2x + 3y = 11$$
$$2x - 4y = -24$$

39) Solve the following pair of linear equations by elimination method.   [3]

$$3x - 5y - 4 = 0$$
$$9x = 2y + 7$$

40) Find the sum of the first 40 positive integers divisible by 7.   [3]

41) Find the coordinates of a point A, where AB is the diameter of a circle whose centre is (2, –3) and B(1, 4).   [3]

42) Find the coordinates of the points of trisection of the line segment joining (4, –1) and (–2, –3). https://www.gujaratboardonline.com   [3]

43) Prove that "The lengths of tangents drawn from an external point to a circle are equal.   [3]

44) Two concentric circles are of radii 41 cm and 40 cm. Find the length of the chord of the larger circle which touches the smaller circle.   [3]

45) The following table shows the ages of the patients admitted in a hospital during a year: [3]

Age (in years)	5-15	15-25	25-35	35-45	45-55	55-65
Number of patients	6	11	21	23	14	5

Find the mode of the data given above.

46) A Piggy bank contains hundred 50 p coins, fifty ₹ 1 coins, twenty ₹ 2 coins and ten ₹ 5 coins. If it is equally likely that one of the coins will fall out when the bank is turned upside down, what is the probability that the coin : [3]

   i) Will be a 50 p coin?

   ii) Will not be a ₹ 5 coin?

   iii) Will be a ₹ 1 coin?

SECTION - D

■ **Answer the following questions any 5 from 47 to 54 (8 Questions) with calculation :**
(4 marks each). [20]

47) State Basic proportionality theorem and prove it. [4]

48) A girl of height 90 cm is walking away from the base of a lamp-post at a speed of 1.2 m/s. If the lamp is 3.6 m above the ground, find the length of her shadow after 4 seconds. [4]

49) The altitude of a right triangle is 7 cm less than its base. If the hypotenuse is 13 cm, find the other two sides. [4]

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50) A manufacturer of TV sets produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find : [4]

i) the production in the 1ˢᵗ year.

ii) the production in the 10ᵗʰ year.

iii) the total production in first 7 years.

51) The table below shows the daily Expenditure on food of 25 households in a locality. [4]

Daily Expenditure (in ₹)	100-150	150-200	200-250	250-300	300-350
Number of Households	4	5	12	2	2

Find the mean daily Expenditure on food by a suitable method.

52) If the median of the distribution given below is 28.5, find the values of x and y. [4]
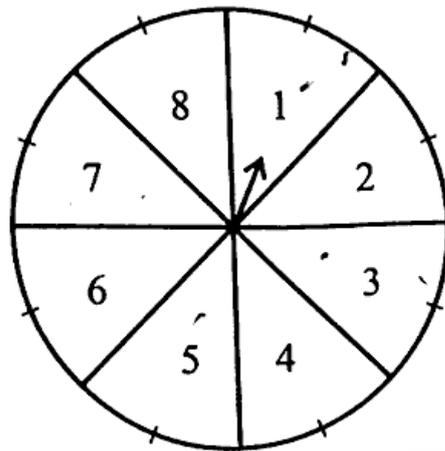
Class Interval	Frequency
0 - 10	5
10 - 20	x
20 - 30	20
30 - 40	15
40 - 50	y
50 - 60	5
Total	60

53) One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting : **[4]**

  i)   A red face card.

  ii)   The jack of hearts.

  iii) An ace of black colour

  iv)   Not an ace

54) A game of chance consists of spinning an arrow which comes to rest pointing at one of the numbers 1, 2, 3, 4, 5, 6, 7, 8 (see the Figure) and these are equally likely outcomes. What is the probability that it will point at **[4]**

  i)   8?

  ii)   an odd number?

  iii) a number greater than 2?

  iv)   a number less than 9?