*This Question Paper contains 12 printed pages.*
***(Section - A, B, C & D)***

Sl.No. 022060

# 18 (E)

**(FEBRUARY-MARCH, 2025)**

---

***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 section should be written in a new page. Write the answers in numerical order.**
7) **Calculator, digital watch or smart watch is not allowed.**
8) **General options are given but for blind students internal option is given for figure/graph based questions.**

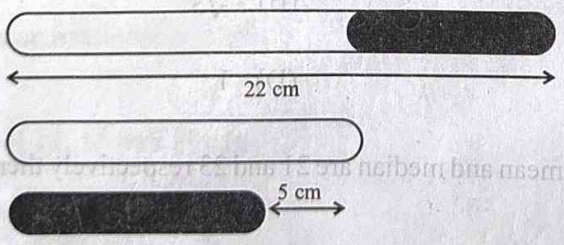
---

## SECTION - A

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

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

1) Two sticks are shown in the following figure. One white and other is of black. From the lengths given in the figure, the length of white stick will be _____ cm. **[1]**




(A) 11 (B) 13.5

(C) 8.5 (D) 6

(For Blind Students Only)

1) If the pair of linear equation with two variables $2x + ky - 8 = 0$ and $x + y - 4 = 0$ has infinite solution then $k =$ _____.

(A) $-2$ (B) 1

(C) 2 (D) $-1$

2) For the quadratic equation $x^2 - 2x + 1 = 0$, value of $x + \frac{1}{x} =$ _____. [1]

(A) $-1$ (B) 1

(C) 2 (D) $-2$

3) For an A.P., if $d = -4$, $a_7 = 4$ then its first term $a =$ _____. [1]

(A) 6 (B) 7

(C) 20 (D) 28

4) The distance between the points $(2, -1)$ and $(-1, -5)$ is _____ units. [1]

(A) 15 (B) 5

(C) 25 (D) 41

5) If $\sin^2\theta = \frac{1}{2}$, then value of $\tan^2\theta =$ _____. [1]

(A) $\frac{1}{\sqrt{3}}$ (B) $\sqrt{3}$

(C) 0 (D) 1

6) For some data, if mean and median are 21 and 23 respectively then mode = _____. [1]

(A) 27 (B) 22

(C) 17 (D) 23

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

7) If $1080 = 2^x \times 3^y \times 5$ then $x - y =$ _____. (2, 0, 3) [1]

8) If $a$ and $b$ are the zeroes of the polynomial $P(x) = x^2 - 2x + 5$ then $a \times b =$ _____. (3, 4, 5) [1]

9) A balanced dice is tossed once. Then the total number of possible outcomes are _____. (6, 12, 36) [1]

10) $\sin 30° =$ _____. $\left(\frac{1}{2}, \frac{1}{\sqrt{2}}, \frac{\sqrt{3}}{2}\right)$ [1]

11) _____ tangents can be drawn from the point lying in the interior of the circle. (2, 1, 0) [1]

12) For a given data 2, 6, 4, 5, 0, 3, 1, 3, 2, 3, mode = _____. (2, 3, 4) [1]

■ **State whether the following statements are true or false : (Questions : 13 to 16) (1 mark each)**

13) $\sqrt{2}$ is an irrational number. [1]

14) HCF of 12, 15 and 21 is 1. [1]

15) $\sqrt{3}x + 5$ is a linear polynomial. [1]

16) The sum of probabilities of 'Event E' and 'Event not E' is 1. [1]

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

17) 1, 1, 1, 2, 2, 2, 3, 3, 3, ---- is an Arithmetic Progression or not? [1]

18) How many tangents can a circle have? [1]

19) If P(A) = 0.65 then find $P(\overline{A})$. [1]

20) For the following frequency distribution find the modal class. [1]

| Class | 1-3 | 3-5 | 5-7 | 7-9 | 9-11 |
|---|---|---|---|---|---|
| Frequency | 7 | 8 | 2 | 2 | 1 |

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

| | A | B |
|---|---|---|
| 21) | Curved surface area of a cylinder | (a) $\frac{1}{3}\pi r^2 h$ |
| 22) | Volume of a cone | (b) $2\pi r^2$ |
| | | (c) $2\pi rh$ |

| | A | B |
|---|---|---|
| 23) | The circumference of a circle with radius $r$ | (a) $\frac{\pi r\theta}{180}$ |
| 24) | The area of a minor sector of a circle of an angle $\theta$ | (b) $2\pi r$ |
| | | (c) $\frac{\pi r^2\theta}{360}$ |

## SECTION - B

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

25) Find the roots of the quadratic equation $x^2 - x - 20 = 0$. [2]

26) Find a quadratic polynomial, the sum and product of whose zeroes are –3 and 2 respectively. [2]

27) If one root of quadratic polynomial $6x^2 + 37x - (P-2)$ is inverse of the other root, then find the value of P. [2]

28) Find $20^{th}$ term of an A.P. : 2, 7, 12, ----. [2]

29) Find the sum of all integers from 51 to 100. [2]

30) Find the coordinates of the point which divides the line segment joining the points (4, –3) and (8, 5) in the ratio 3:1 internally. [2]

31) A circle with centre P, whose diameter is XY. The coordinates of X and Y are (3, –10) and (1, 4). Find the coordinates of P. [2]

32) Prove that $\cos^2\theta - \sin^2\theta = 2\cos^2\theta - 1$. [2]

33) Find the value : $4\cot^2 45° - \sec^2 60° + \sin^2 60° + \cos^2 90°$. [2]

34) The angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of the tower, is 30°. Find the height of the tower. [2]

(For Blind Students Only)

34) Define the terms :

(i) Angle of Elevation

(ii) Angle of Depression

35) Find the total surface area of a cube with edge 6 cm. [2]

36) The height and the diameter of a base of a cone are 6 cm and 5 cm respectively. Find the slant height of the cone. [2]

37) If for some frequency distribution $l = 40$, $f_1 = 7$, $f_0 = 3$, $f_2 = 6$ and $h = 15$. Then find the mode. [2]

## SECTION - C

■ **Answer the following questions: (any 6) (Questions : 38 to 46) (3 marks each).[18]**

38) Alok has some Pigeons and Cows. The total number of their eyes is 120 and total number of their legs is 180. How many Pigeons and Cows the Alok has? [3]

39) Solve the linear pair of equations in two variables $x + y = 5$, $2x - 3y = 4$ by elimination method. [3]

40) If the sum of first 7 terms of an A.P. is 49 and that of 17 terms is 289, find the sum of first 20 terms. [3]

41) Find the coordinates of the points which divide the line segment joining A(–2, 2) and B(2, 8) into four equal parts. [3]

42) Show that the points (1, 7), (4, 2), (–1, –1) and (–4, 4) are the vertices of a square. [3]

43) Prove that : The tangent at any point of a circle is perpendicular to the radius through the point of contact. [3]

(For Blind Students Only)

43) State whether the following statements are true or false.

(i) The tangents drawn at the ends of a diameter of a circle are parallel.

(ii) The perpendicular at the point of contact to the tangent to a circle passes through the centre.

(iii) The parallelogram circumscribing a circle is a rhombus.

44) Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle. [3]

(For Blind Students Only)

44) Define :

(i) Tangent of a circle

(ii) Secant of a circle

(iii) Point of contact of a circle

45) The following data gives the information on the observed lifetimes (in hours) of 225 electrical components : [3]

| Lifetime (in hours) | 0-20 | 20-40 | 40-60 | 60-80 | 80-100 | 100-120 |
|---|---|---|---|---|---|---|
| Frequency | 10 | 35 | 52 | 61 | 38 | 29 |

Determine the modal lifetimes of the components.

46) A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be - [3]

(i) red?

(ii) white?

(iii) not green?

## SECTION - D

■ **Answer the following questions (Any 5) (Questions : 47 to 54) with calculations : (4 marks each).** **[20]**

**47)** Prove that : If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio. **[4]**

(For Blind Students Only)

**47)** Write the following conditions for the similarity of two triangles.

(i) AAA (Angle, Angle, Angle)

(ii) AA (Angle - Angle)

(iii) SSS (Side - Side - Side)

(iv) SAS (Side - Angle - Side)

**48)** E and F are points on the sides PQ and PR respectively of a $\Delta PQR$. For each of the following cases, state whether $EF \| QR$. **[4]**

(i) PE = 3.9cm, EQ = 3cm, PF = 3.6cm and FR = 2.4cm.

(ii) PE = 4cm, QE = 4.5cm, PF = 8cm and RF = 9cm.

(For Blind Students Only)

**48)** Fill in the blanks using the correct word given in brackets :

(i) All circles are _____ (congruent, similar)

(ii) All squares are _____ (similar, congruent)

(iii) All _____ triangles are similar. (isosceles, equilateral)

(iv) All right angled triangles are _____. (similar, congruent)

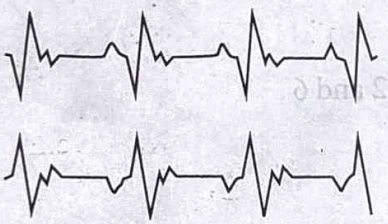
**49)** Find two consecutive positive integers, sum of whose squares is 365. **[4]**

**50)** Ramkali saved ₹5 in the first week of a year and then increased her weekly savings by ₹1.75. If in the $n^{th}$ week, her weekly savings become ₹20.75 find $n$. **[4]**

51) The table below gives the percentage distribution of female teachers in the primary schools of rural areas of various states and union territories (U.T.) of India. Find the mean percentage of female teachers. [4]

| Percentage of female teachers | Number of States/U.T. |
|---|---|
| 15-25 | 6 |
| 25-35 | 11 |
| 35-45 | 7 |
| 45-55 | 4 |
| 55-65 | 4 |
| 65-75 | 2 |
| 75-85 | 1 |

52) Heart Rate: Heart rate is one of the body's "Vital Signs" of health. It measures the number of times the heart beats or contracts per minute. While a normal heart rate does not guarantee that a person is free from health problems, it is useful benchmark for identifying many health problems.



30 women were examined by AIIMS doctors and the number of heart beats per minute was recorded and the Summary was given as follows :

| Number of Heart Beats per minute | Number of Women |
|---|---|
| 65-68 | 2 |
| 68-71 | 4 |
| 71-74 | 3 |
| 74-77 | 8 |
| 77-80 | 7 |
| 80-83 | 4 |
| 83-86 | 2 |

Answer the following from the above information :

(i) How many women have heart beat in range of 68-77. [1]

(ii) What is the median class of heart beats per minute for these women? [1]

(iii) Find the mode for the heart beat per minute for these women. [2]

(For Blind Students Only)

52) The following table gives the literacy rate (in percentage) of 35 cities. Find the mean literacy rate.

| Literacy rate (in%) | Number of Cities |
|---|---|
| 45-55 | 3 |
| 55-65 | 10 |
| 65-75 | 11 |
| 75-85 | 8 |
| 85-95 | 3 |

53) A die is thrown once. Find the probability of getting : [4]

(i) a prime number

(ii) a number lying between 2 and 6

(iii) an odd number

(iv) 7

54) One card is drawn from a well-shuffled deck of 52 cards. Find the Probability of getting [4]

(i) a king of red colour

(ii) the jack of hearts

(iii) a spade

(iv) a red face card