12 (E)

(FEBRUARY-MARCH, 2026)

Time : 3 Hours]   *[Maximum Marks : 80*

Instructions :

1) This question paper has four Sections A, B, C & D and Question Numbers from 1 to 54. All Sections are compulsory.

2) General options are given but for blind students internal option is given for figure/graph based questions.

3) Question numbers 9(B), 32(B), 43(B), 44(B), 49(B), 50(B), 51(B) and 53(B) in this question paper are only for blind students.

4) The numbers on the right represent the marks of the Section.

5) New Sections should be written on a new page. Write the answers in numerical order.

6) Draw neat diagrams wherever necessary.

7) Calculator, digital watch or smart watch is not allowed.

8) Write in a clear legible handwriting.

SECTION - A

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

(Each correct answer carries 1 mark.)   **[24]**

■ Choose the correct option for the questions given below: (Questions : 1 to 6)

1) Given that HCF (306, 657) is 2m–1, $m =$ _____.

   (A) 7   (B) 9

   (C) 5   (D) 10

2) If two zeros of cubic polynomial $ax^3 + bx^2 + cx + d$ are 0 then the third zero will be _____.

   (A) $\dfrac{c}{a}$ (B) $\dfrac{-b}{a}$

   (C) $\dfrac{-d}{a}$ (D) $\dfrac{b}{a}$

3) The lines are _____ for a pair of linear equation $3x + 2y - 4 = 0$ and $2x + 4y - 12 = 0$.

   (A) Intersecting

   (B) Coincident

   (C) Parallel

   (D) None of the above

4) The value of k for quadratic equation $kx(x-2) + 6 = 0$ is _____ if it has two equal roots.

   (A) 6

   (B) 5

   (C) 2

   (D) −6

5) The missing term in following A.P. is _____.

   2, ☐, 26.

   (A) 26

   (B) 14

   (C) 24

   (D) 12

6) For two triangles, $\triangle ABC$ and $\triangle PQR$, if $\dfrac{AB}{QR} = \dfrac{BC}{PQ} = \dfrac{AC}{PR}$ then $\triangle ABC \sim$ _____.

   (A) $\triangle RQP$

   (B) $\triangle PQR$

   (C) $\triangle QPR$

   (D) None of the above

■ **Fill in the blanks with correct option : (Questions : 7 to 12)**

7) If AB is a diameter of a circle whose centre is $(2, -3)$ and B is $(1, 4)$ then coordinates of point A are _____. $\left[(3, -10), (-10, 3), \left(\dfrac{3}{2}, \dfrac{1}{2} \right) \right]$

8) $(1 + \tan\theta + \sec\theta)(1 + \cot\theta - \cosec\theta) =$ _____. $(1, 2, -1)$

9) (A) **This question is for normal students.**

A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q so that PQ = 12 cm, length OQ = _____ cm. $\left(\sqrt{119}, 13, 8.5\right)$

9) (B) **This question is only for visually impaired students.**

A tangent to a circle intersects it in _____ point(s). (0, 2 ,1)

10) If the radius of a sector is doubled and angle of the sector is kept unchanged. Then area of new sector will be _____ times the area of original sector. (8, 2, 4)

11) If a lemon is cut into four equal parts then the total surface area of one part will be _____. $(3\pi r^2, 2\pi r^2, 8\pi r^2)$

12) For a frequency distribution, if $n = 51$, $l = 145$, $cf = 11$, $f = 18$ and $h = 5$ then median = _____ . (148, 149.03, 150.73)

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

13) The probability of an event can be $1\dfrac{3}{4}$.

14) A linear equation in two variable has infinite solutions.

15) If quadratic equation $6x^2 + bx - 6 = 0$ has opposite roots then $b = 6$.

16) The distance of a point having coordinates $(\cos \theta, \sin \theta)$ from origin is 1, where $0° < \theta < 90°$.

■ **Answer the following in one sentence or word or figure : (Questions : 17 to 20)**

17) If the radius of a cylinder is increased by 10% and its height is increased by 20%, then what will be the increase in its volume in terms of percentage.

18) What is the combined mean of prime and composite numbers amongst first n natural numbers.

19) Find the LCM of 12, 15 and 21.

20) Find the discriminant of the quadratic equation $3x^2 - 2x + \dfrac{1}{3} = 0$.

■ **Match the following : (Questions : 21 to 24)**

Table - 1 :

	A		B
21)	$\alpha^2 + \beta^2$	(a)	$\left(-b^2 \big/ c^2\right)$
22)	$\left(\dfrac{1}{\alpha} + \dfrac{1}{\beta}\right)^2$	(b)	$\dfrac{b^2 - 2ac}{a^2}$
		(c)	$b^2 \big/ c^2$

Table - 2 :

	A		B
23)	tan A	(a)	$\dfrac{1}{\sqrt{1 - \sin^2 A}}$
24)	sec A	(b)	$\sqrt{1 - \sin^2 A}$
		(c)	$\dfrac{\sin A}{\sqrt{1 - \sin^2 A}}$

SECTION - B

■ Answer any 9 (Nine) out of 13 (Thirteen) questions given below with calculation :
(Questions : 25 to 37)

(Each correct answer carries 2 marks.)

[18]

25) There is a circular path around a sports field. Tashi takes 18 minutes to cover one round of the field, while Heer takes 12 minutes for the same. Suppose they both start at the same point and at the same time, and go in the same direction. After how many minutes will they meet again at the starting point?

26) Solve the following pair of linear equation.

$$\sqrt{2}x + \sqrt{3}y = 0$$
$$\sqrt{3}x - \sqrt{8}y = 0$$

27) Find the roots of the quadratic equation $3x^2 - 2\sqrt{6}x + 2 = 0$.

28) Represent the following situation in the form of quadratic equation :

'A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/hr less, then it would have taken 3 hours more to cover the same distance. We need to find the speed of the train.

29) How many three digit numbers are divisible by 7?

30) If $\cot\theta = \dfrac{7}{8}$, evaluate $\dfrac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)}$.

31) Prove the following identity, where the angles involved are acute angles for which the expressions are defined $\dfrac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta} = \tan\theta$.

32) **(A)** **This question is for normal students.**

If tangents PA and PB from a point P to a circle with centre O are inclined to each other at angle of 80°, then find ∠POA.

32) **(B)** **This question is only for visually impaired students.**

Define the following :

i) Tangent to a circle

ii) Secant of a circle

33) A solid is in the shape of a cone standing on a hemisphere with both their radii being equal to 1 cm and the height of the cone is equal to its radius. Find the volume of the solid in terms of π.

34) The table below shows the daily expenditure on food of 25 householdes in a locality.

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.

35) The following table shows the age of the patients admitted in a hospital during a year.

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.

36) A piggy bank contains hundred 50p 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

i) Will be a 50p coin?

ii) Will not be a ₹5 coin?

37) Suppose we throw a die once.

i) What is the probability of getting a number greater than 4?

ii) What is the probability of getting a number less than or equal to 4?

SECTION - C

- **Answer any 6 (Six) of the following as asked out of 9 (Nine) with calculation:**
  (Questions : 38 to 46)
  (Each correct answer carries 3 marks.)   [18]

38) Find the zeros of the quadratic polynomial $x^2 - 4x - 437$ and verify the relationship between the zeros and the coefficients.

39) Find a quadratic polynomial if sum and product of its zeros are $-\dfrac{1}{4}$ and $\dfrac{1}{4}$ respectively.

40) In an A.P., given $a_n = 4$, $d = 2$, $S_n = -14$, find n and a.

41) For what value of n, are the nth terms of two A.P.s :
63, 65, 67, ... and 3, 10, 17, ... equal?

42) Find a relation between x and y such that the points (x, y) is equidistant from the point $(3, 6)$ and $(-3, 4)$.

43) **(A)** **This question is for normal students.**
PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q intersect at a point T (see fig.). Find the length TP.
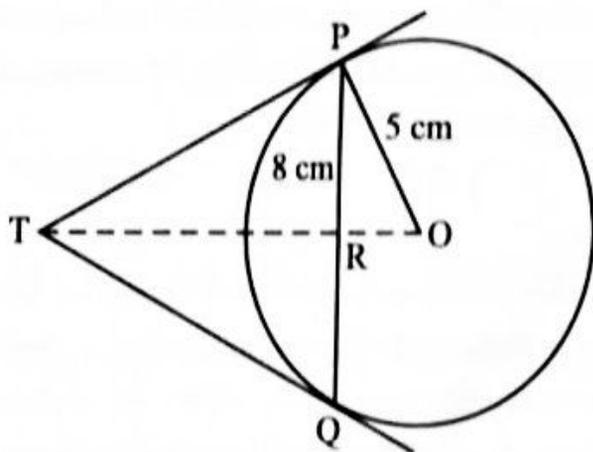
43) (B) **This question is for visually impaired students.**

How many tangents to a given circle can be drawn from a point lying.

i) Outside the circle

ii) In the circle

iii) On the circle

44) (A) **This question is for normal students.**

Prove that - The tangent at any point of a circle is perpendicular to the radius through the point of contact.

44) (B) **This question is for visually impaired students.**

Answer the following questions :

i) How many tangents can a circle have?

ii) How many parallel tangents at the most can a circle have?

iii) What is common point of a tangent to a circle and the circle called?

45) To warn ships for underwater rocks, a lighthouse spreads a red coloured light over a sector of angle $80°$ to a distance of 16.5 km. Find the area of the sea over which the ships are warned. (Use $\pi = 3.14$)

46) A game consists of tossing a one rupee coin 3 times and noting its outcome each time. Jay wins if all the tosses give the same result i.e., three heads or three tails. and loses otherwise write all possible outcomes. Calculate the probability that Jay will win the game. Also find the probability of getting atleast 2 heads.

SECTION - D

■ Answer any 5 (Five) of the following questions out of 8 (Eight): (Questions : 47 to 54) (Each question carries 4 marks.) [20]

47) A lending library has a fixed charge for the first three days and an additional charge for each day thereafter. Saritha paid ₹27 for a book kept for seven days, while Susy paid ₹21 for the book she kept for five days. Find the fixed charge and the charge for each extra day.

48) Aftab tells his daughter, "Seven years ago, I was seven times as old as you were then. Also, three years from now, I shall be three times as old as you will be.". Find the present ages of Aftab and his daughter.

49) (A) This question is for normal students.

If AD and PM are medians of $\triangle ABC$ and $\triangle PQR$, respectively where $\triangle ABC \sim \triangle PQR$, prove that $\dfrac{AB}{PQ} = \dfrac{AD}{PM}$.

49) (B) This question is only for visually impaired students.

   i) State basic proportionality theorem.

   ii) All _____ triangles are similar (isosceles, equilateral)

   iii) State SAS condition for similarity of two triangles.

   iv) Define similar triangles.

50) (A) **This question is for normal students.**

State and prove Thales theorem (Basic proportionality theorem).

50) (B) **This question is for visually impaired students.**

i) Two polygons of the same number of sides are similar if their corresponding angles are _____ . (equal, proportional)

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

iii) State AAA condition for similarity of two triangles.

iv) State whether given statement is True or False.

"All congruent figures are similar but all similar figures need not be congruent."

51) (A) **This question is for normal students.**

The angles of depression of the top and the bottom of an 8 m tall building from the top of a multi-storeyed building are 30° and 45°, respectively. Find the height of the multi-storeyed building and the distance between the two buildings.

51) (B) **This question is only for visually impaired students.**

Explain the following terms :

i) Angle of elevation.

ii) Angle of depression.

iii) Line of sight.

iv) Horizontal level.

52) A solid consisting of a right circular cone of height 120 cm and radius 60 cm standing on a hemisphere of radius 60 cm is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the volume of water left in the cylinder, if the radius of the cylinder is 60 cm and its height is 180 cm. [Take $\pi = 3.14$]

53) (A) This question is for normal students.

The decorative block shown in given figure is made of two solids - a cube and a hemisphere. The base of the block is a cube with edge 5 cm, and the hemisphere fixed on the top has a diameter of 4.2 cm.

Find the total surface area of the block. $\left(\text{Take } \pi = \dfrac{22}{7}\right)$
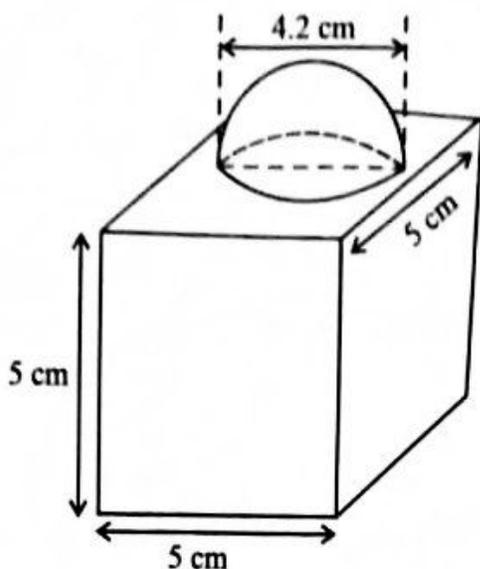
53) (B) This question is only for visually impaired students.

Write the formula for the following :

i)   Volume of cuboid.

ii) Curved surface area of hemisphere.

iii) Volume of cone.

iv) Total surface area of cylinder.

54) The lengths of 40 leaves of a plant are measured correct to the nearest millimeter, and the data obtained is represented in the following table :

Length (in mm)	Number of leaves
118-126	3
127-135	5
136-144	9
145-153	12
154-162	5
163-171	4
172-180	2

Find the median length of the leaves.

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