Pre Board Examination I - 2026-27

Class X

MATHEMATICS (STANDARD)

Time Allowed : 3 Hours **Maximum Marks : 80**

General Instructions :

Read the following instructions very carefully and strictly follow them :

(i) *This question paper contains **38** questions. **All** questions are **compulsory**.*

(ii) *This question paper is divided into **five** Sections – **A**, **B, C, D** and **E**.*

(iii) *In **Section A,** Questions no. **1** to **18** are multiple choice questions (MCQs) and questions number **19** and **20** are Assertion-Reason based questions of **1** mark each.*

(iv) *In **Section B,** Questions no. **21** to **25** are very short answer (VSA) type questions, carrying **2** marks each.*

(v) *In **Section C,** Questions no. **26** to **31** are short answer (SA) type questions, carrying **3** marks each.*

(vi) *In **Section D,** Questions no. **32** to **35** are long answer (LA) type questions carrying **5** marks each.*

(vii) *In **Section E,** Questions no. **36** to **38** are case study based questions carrying **4** marks each. Internal choice is provided in **2** marks questions in each case study.*

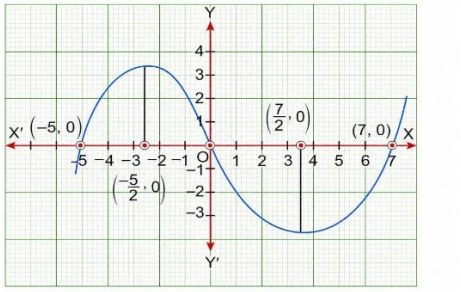
(viii) *There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 2 questions in Section C, 2 questions in Section D and 3 questions in Section E.*

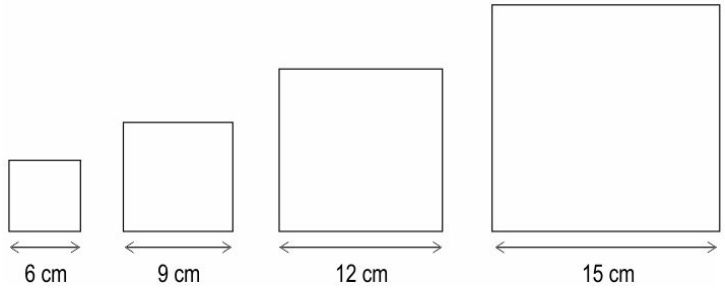
(ix) *Draw neat diagrams wherever required. Take* $\pi = \frac{22}{7}$ *wherever required, if not stated.*

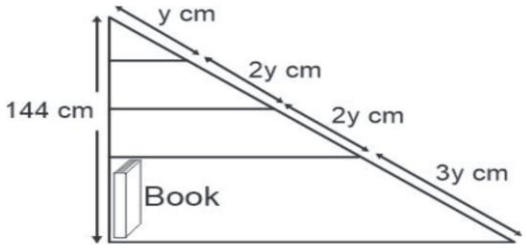
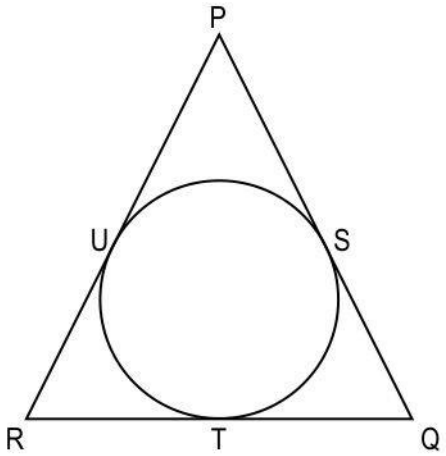
(x) *Use of calculator is **not** allowed.*

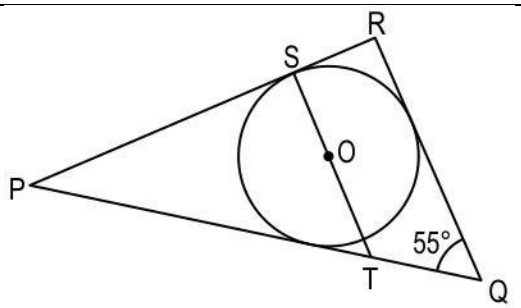
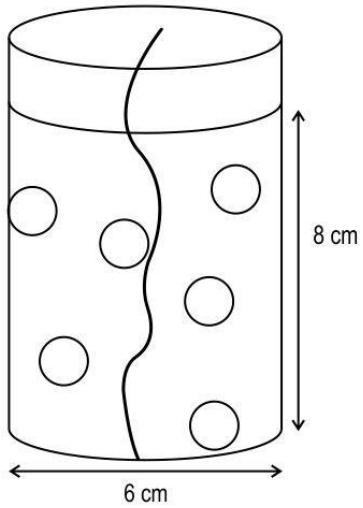
SECTION A

This section has 20 Multiple Choice Questions (MCQs) carrying 1 mark each. 20 × 1 = 20

Q1	**If p and q are two distinct prime numbers, then their HCF is** **(a) 2** **(b) 0** **(c) either 1 or 2** **(d) 1**
Q2	The graph of y=p(x) is given. Zeros of the polynomial p(x) are  (a) -5,7 (b) −5/2 , -7/2 (c) -5,0,7 (d) -5,−5/2 , 7/2 , 7
Q3	If the sum of zeroes of the polynomial p(x) = $2x^2 - kv2x + 1$ is v2 , then value of k is: (a) v2 (b) 2 (c) 2v2 (d) $\frac{1}{2}$
Q4	The pair of equations ax+2y = 9 and 3x+by = 18 represent parallel lines ,where a,b are integers,if (a) a = b (b) 3a = 2b (c) 2a = 3b (d) ab = 6
Q5	The father's age is six times his son's age. Four years hence, the age of the father will be four times his son's age. The present ages (in years) of the son and the father are, respectively (a) 4 and 24 (b) 5 and 30 (c) 6 and 36 (d) 3 and 24
Q6	Which of the following is not a quadratic equation? a. $(x + 2)^2 = 2(x + 3)$ b. $x^2 + 3x = (-1)(1 - 3x^2)$ c. $(x + 2)(x - 1) = x^2 - 2x - 3$ d. $x^3 - x^2 + 2x + 1 = (x + 1)^3$

Q7	The quadratic equation $x^2 + 8x + h = 0$ has equal roots. Which of these is the value of h ? (a) 8 (b) 0 (c) 4 (d) 16
Q8	Vanshika decided to plant a certain number of seeds every month as a part of a gardening project. In the first month, she planted 5 flower seeds, and in the final month, she planted 50 flower seeds. Every month, she planted 3 more seeds than the previous month. How many flower seeds did Vanshika plant in total? (a) 50 (b) 103 (c) 390 (d) 440
Q9	Shown below are some squares whose sides form an arithmetic progression (AP).  *(Note: The figures are not to scale.)* Which of these are also in AP? i) The areas of these squares. ii) The perimeters of these squares. iii) The length of the diagonals of these squares. (a) only ii) (b) only i) and ii) (c) only ii) and iii) (d) all - i), ii) and iii)
Q10	Which of the following are in Arithmetic progression? i) 2, 12, 22, 32, 42, ... ii) 1, 2, 4, 7, 11, 16, ... iii) 7, 6.5, 6, 5.5, 5, ... (a) only i) (b) only i) and ii) (c) only i) and iii) (d) all - i), ii) and iii)
Q11	A circle of radius 5 units has its centre at (-2, 2). The point (-6, y) lies on the circle. Which of these could be the value of y ? (a) -3 (b) 1 (c) 5 (d) 6
Q12	P(1, 7), Q(-3, 2) and R(6, 1) are the coordinates of the vertices of a triangle. Which of the following types of triangle is ΔPQR? (a) Scalene triangle (b) Equilateral triangle (c) Isosceles right-angled triangle (d) Isosceles acute-angled triangle

Q13	Which one of these is the relation between *x* and *y* if (*x, y*) is equidistant from (-1, 4) and (2, 5)? (a) $3x - y = 6$ (b) $6x + 2y = -9$ (c) $3x + y = 6$ (d) $3x - y = 3$
Q14	Leela has a triangular cabinet that fits under her staircase. There are four parallel shelves as shown below.  The total height of the cabinet is 144 cm. What is the maximum height of a book that can stand upright on the bottom-most shelf? a) 18 cm b) 36 cm c) 54 cm d) 86.4 cm
Q15	In the figure below, ΔPQR is an isosceles triangle with PQ = PR, and the lengths of PU and UR are 5 units and 3 units respectively.  *(Note: The figure is not to scale.)* Which of the following is TRUE? (a) PS = 3 units (b) SQ = 5 units (c) QT = 3 units (d) QR = 8 units
Q16	In the following figure, O is the center of the circle. PQ, QR and RP are tangents of the circle. TS is parallel to QR.

	 *(Note: The figure is not to scale.)* Which of these is the measure of ∠RPQ? (a) 35° (b) 55° (c) 62.5° (d) 70°
Q17	A circular pond needs to be fenced along its circumference. One-fourth of the fencing is already done, which cost Rs 750 at the rate of Rs 50 per metre. How many metres of the pond still need to be fenced? (a)15 (b)20 (c)45 (d)60
Q18	6 spherical glitter balls with diameter 1 cm are present in a cylindrical candle made with transparent wax as shown in the figure below.  *(Note: The figure is not to scale.)* Find the volume of wax used to make the candle. (a) 70π cm^3 (b) 71π cm^3 (c) 72π cm^3 (d) 73π cm^3

ASSERTION-REASON BASED QUESTIONS

In the following questions, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

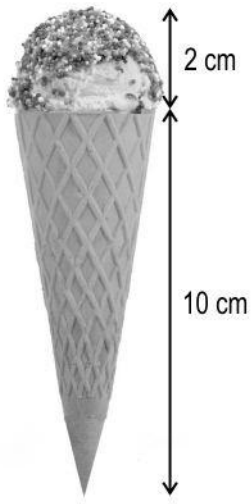
(a) Both A and R are true and R is the correct explanation of A. (b) Both A and R are true but R is not the correct explanation of A. (c) A is true but R is false. (d) A is false but R is true.

Q19	**Assertion (A):** A quadratic polynomial having $2 + \sqrt{3}$ and $2 - \sqrt{3}$ as its zeroes is given by $f(x) = x^2 - 4x + 1$.

	Reason (R): Quadratic polynomials whose two zeroes are α and β are given by $f(x) = k\{x^2 - x(\alpha + \beta) + \alpha\beta\}$, where k is any non-zero real number.
Q20	**Assertion (A):** $(2x - 1)^2 - 4x^2 + 5 = 0$ is not a quadratic equation. **Reason(R):** An equation of the form $ax^2 + bx + c = 0$, $a \neq 0$, where a, b, c ∈ R is called a quadratic equation.

SECTION B

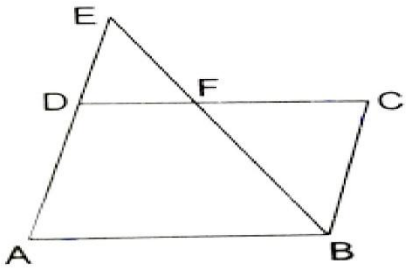
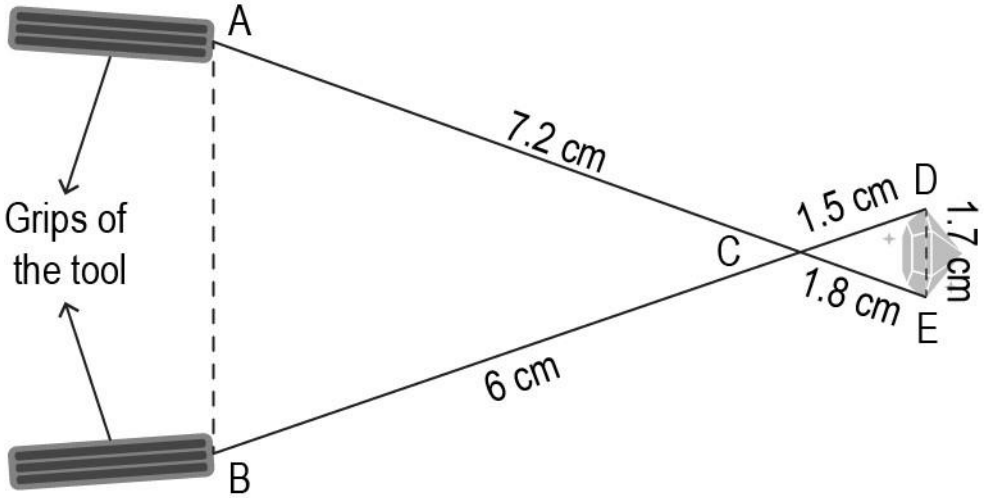
This section comprises of very short answer type-questions (VSA) of 2 marks each

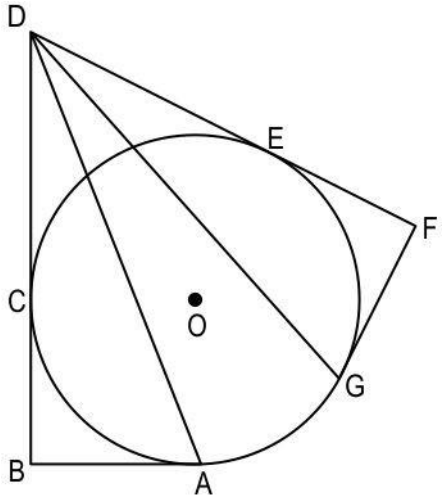
Q21	Show that any number of the form 4^n can never end with the digit 0.
Q22	If the sum of the zeroes of the quadratic polynomial $f(t) = kt^2 + 2t + 3k$ is equal to their product, find the value of k?
Q23	**(a)** Solve 2x+3y = 11 and 2x-4y = -24 and hence find the value of m for which y= mx+3 OR **(b)** The sum of a 2 digit number and number obtained by reversing the digits is 66. If the digits of the number differ by 2,find the number .
Q24	**(a)** How many three-digit numbers are divisible by 7 ? OR **(b)** Check whether 301 is a term of the list of numbers 5,11,17,23,…
Q25	Yash and his younger brother, Swapnil buy a cone of ice cream to share equally. The ice cream is filled till the top of the cone and an hemispherical scoop is added on the top as shown below.  (Note: The figure is not to scale.)

	Yash eats his share of the ice cream and gives the remaining to Swapnil. When Yash gives the cone to Swapnil, the volume of the ice cream in the cone is $\frac{28\pi}{3}$ cm^3. Did Swapnil get an equal share?

SECTION C

(This section comprises of short answer type questions (SA) of 3 marks each)

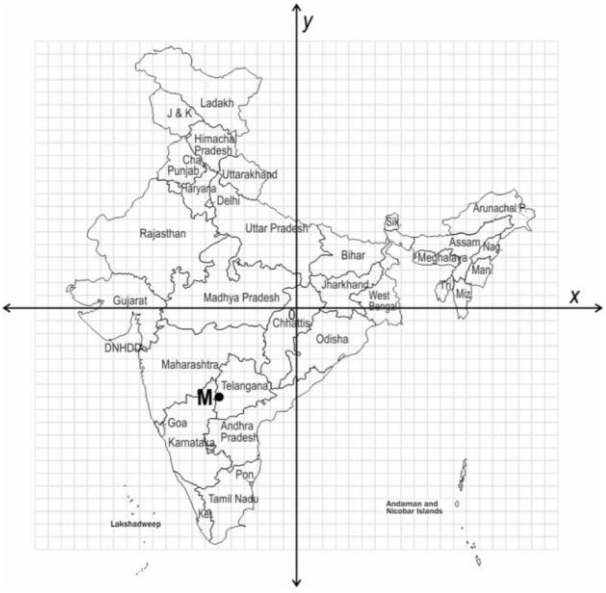
Q26	**A rectangular arrangement of pens has rows and columns. Rohan takes away 3 rows of pens and then Sarah takes away 2 columns of pens from the remaining pens. The remaining pens are rearranged in p rows and q columns where p is a prime number. If Rohan takes 24 pens and Sarah takes 18 pens, find all possible value(s) of p . Show your work.**
Q27	**The sum of ages (in years) of a son and his father is 35 years and product of their ages is 150years, find their ages.**
Q28	**E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that Δ ABE ~ Δ CFB.**  **OR** **Ritika's grandfather is a jeweller who needs to pick up a newly cut sapphire and place it in a necklace. To do so he uses a tool that is pictured in the figure below. The tool must be held in a specific manner as to not damage the sapphire.** 

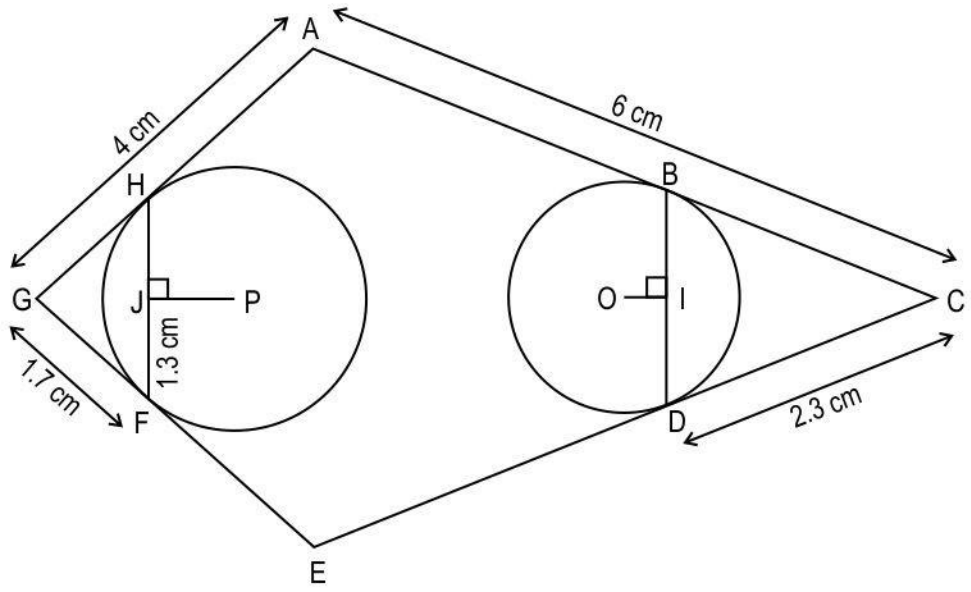
	(Note: The figure is not to scale.) **Ritika tells her grandfather tells her grandfather the width at which he needs to hold the tool.** **i) How does Ritika know how wide apart the grips of the tool are to be held?** **ii) Find the width at which Ritika's grandfather must hold the tool to safely place the sapphire in the necklace. Show your work.**				
Q29	**Shown below is a circle with centre O. AB = GF = 5 cm, DC = 7 cm. A, C, E, and G are the points of tangency with ∠ABC = ∠EFG = 90°.**  ***(Note: The figure is not to scale)*** **Find the length of (AD + DG). Show your work with valid reasons.**				
Q30	**Prove:** $\frac{\tan\theta}{1-\cot\theta} + \frac{\cot\theta}{1-\tan\theta} = 1 + \sec\theta\,\mathrm{cosec}\,\theta$				
Q31	**(a)**A bird was flying parallel to the ground, in an east-west direction with constant speed [3] at a height of 100 m from the ground. Sunita standing in the middle of the park, first observed the bird in the east at an angle of elevation of 30°. After 2 minutes, she observed the bird in the west from the same position making an angle of elevation of 45°. Find the speed of the bird. Draw a rough diagram to represent the given situation. Show your work. *(Note: Take √3 as 1.73.)* **OR**				

	(b) The shadow of a tower when the angle of elevation of the sun is 30° is found to be 20 m longer than when the angle of elevation is 60°. **i)** Find the height of the tower. **ii)** Find the length of the shadow of the building when the angle of elevation of the sunwas 30°. Draw a rough figure and show your work**.**

SECTION D

(This section comprises of long answer-type questions (LA) of 5 marks each)

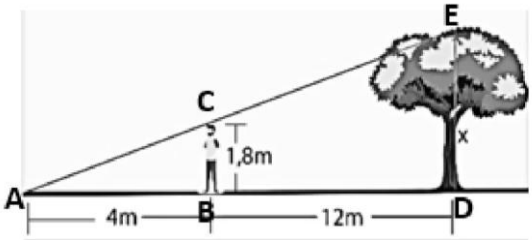
Q32	**Shown below is the map of India put on a coordinate plane where each small square represents 1 sq unit.**  **Alok has to travel from his home at point (0, 5) in Uttar Pradesh to point M(-6,-7) in Telangana. Assume that his travels happen in the shortest straight path. i) Find the approximate distance he travels from his home to reach point M in Telangana. ii) He plans to take 2 stops in his journey such that their journey is divided into 3 equal parts. Find the coordinates of his stops and the corresponding state.**
Q33	**Sahid is learning thread embroidery and draws following pattern with two circles inscribed inside a kite on a piece of cloth. A kite is a quadrilateral with two distinct pairs of adjacent sides that are of equal length. Here, AG = EG and AC = EC.** **Chord BD and HF are of equal length.**

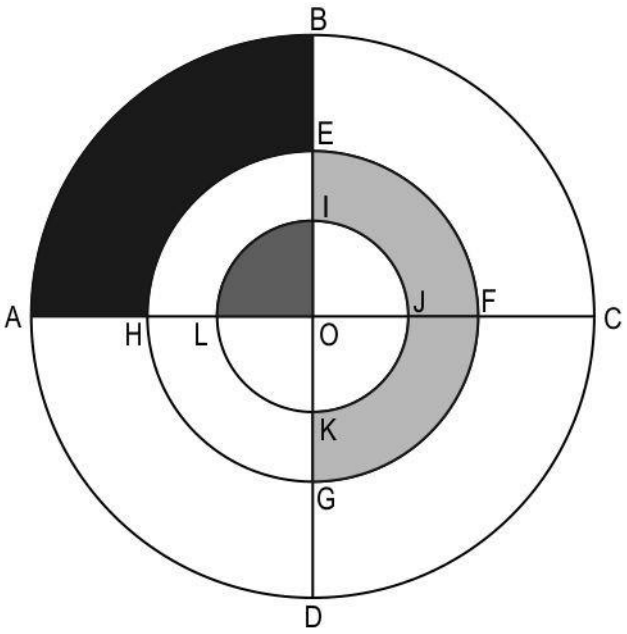
	 **(*Note: The figure is not to scale.*)** **If he wants to enclose hexagon ABDEFH with a red coloured thread, what length of red coloured thread will he need? Show your steps with valid reasons.**
Q34	**Solve the following:** i) **Given tan A = $\frac{5}{12}$, find sin A, cos A, cot A, sec A, cosec A.** ii) **Given $4\cos^2 A + 8\sin^2 A = 5$, show that cot A = √3.**
Q35	**A toy company designs a soft toy of a cube-shaped regular die. The numbers on the side of the die are represented by the number of hemispherical indents on each side, that is, a total of 21 hemispherical indents. The radius of each hemispherical indent is 4 cm and the edge of the toy is 30 cm long. The toy is to be covered with a cloth costing Rs 0.01 per cm^2 and is to be stuffed with cotton costing Rs 0.02 per cm^3.** 

	(Note: The figure is not to scale.) i) **How much cloth is required to make the soft toy?** ii) **What is the volume of cotton required to stuff the toy?iii) What is the cost of the cloth and cotton requires to make one toy?** **Show your work.** **(Note: Take π as $\frac{22}{7}$. The toy retains its shape after the cotton is stuffed.)**

SECTION E

(This section comprises of 3 case-study/passage-based questions of 4 marks each with two sub- parts . First two case study questions have three sub-parts (i), (ii), (iii) of marks 1, 1, 2 respectively. The third case study question has two sub-parts of 2 marks each)

Q36	**Case – Study 1 : Read the following passage and answer the questions given below.** **Sharon went to a park with her father. From a point A where Sharon was standing, her father and tip of a tree come in a straight line as shown in the figure. She remembers lesson on similar triangles.** **She asked her father to stay in that place and tried to estimate the height of the tree.**  **Based on this information, answer the following questions.** **(i) By what criterion are the triangles ΔABC and ΔADE similar?** **(ii) Write the ratios of corresponding sides of the triangles in the above question.** **(iii) Find the height of the tree.**
Q37	**Case – Study 2 : Read the following passage and answer the questions given below.** A group of students of class X visited India Gate on an education trip. The teacher and students had interest in history as well. The teacher narrated that India Gate, official name Delhi Memorial, originally called All-India War Memorial, monumental sandstone arch in New Delhi, dedicated to the troops of British India who died in wars fought between 1914 and 1919. The teacher also said that India Gate, which is located at the eastern end of the Rajpath (formerly called the Kingsway), is about 138 feet (42 metres) in height (i) What is the angle of elevation if they are standing at a distance of 42m away from the monument?

	(ii)Find the length of the shadow cast by the India Gate if the elevation of the Sun is at 60^o? (iii)The ratio of the length of the India Gate and its shadow is 1:1. What is the angle of elevation of the Sun ?
Q38	**Case – Study 3 : Read the following passage and answer the questions given below .** **An archery target board consists of three concentric circles with centre O as shown below. The innermost circle has a radius of 7 cm, the middle circle has a radius of 14 cm, and the outer circle has a radius of 28 cm. The target board is divided into four equal parts by AC and BD, which are the diameters of the outermost circles. The scoring system for the game is as follows: Area LIO: 10 points** **Area KJIEFG: 7 points** **Area ABEH: 4 points**  ***(Note: Take π as $\frac{22}{7}$ if required.)*** **a) Find the area of the sector in which 10 points can be scored. Show your work.** **b) If the target lands on the boundary of the 4 points scoring area, a deduction of 1 point occurs, resulting in a score of 3 points.** **Find the length of the boundary in which 3 points can be scored. Show your work.** **c) Find the area KJIEFG. Show your work.**