केन्द्रीय विद्यालय संगठन, कोलकाता संभाग
KENDRIYA VIDYALAYA SANGATHAN, KOLKATA REGION
द्वितीय प्री-बोर्ड परीक्षा/SECOND PRE- BOARD EXAMINATION 2025-26

कक्षा/**CLASS - X** अधिकतम अंक/ **MAX.MARKS-80**

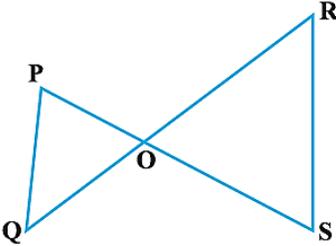विषय/ **SUBECT-MATHEMATICS** समय/**Time : 3 Hours**

General Instructions:

Read the following instructions carefully and follow them:

1. *This question paper contains 38 questions.*
2. *This Question Paper is divided into 5 Sections A, B, C, D and E.*
3. *In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion- Reason based questions of 1 mark each.*
4. *In Section B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.*
5. *In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.*
6. *In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.*
7. *In Section E, Questions no. 36-38 are case study based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.*
8. *All Questions are compulsory. However, an internal choice in 2 Questions of section B, 2 Questions of section C and 2 Questions of section D has been provided. And internal choice has been provided in all the 2 marks questions of Section E.*
9. *Draw neat and clean figures wherever required.*
10. *Take π =22/7 wherever required, if not stated*
11. *Use of calculators is not allowed.*

Q.No.	Section A	Marks
	Section A Consists of 20 questions of 1 mark each.	
1.	If a and b are written as a $=x^4y^2$ and b$= x^2y^2$; x, y are prime numbers, then HCF (a,b) is (a) x^4y^3 (b) xy (c) x^2y^2 (d) x^3y^2	1
2.	The pair of equations $3x – 5y = 7$ and $– 6x + 10y = 7$ have (a) a unique solution (b) infinitely many solutions (c) no solution (d) two solutions	1
3.	If α and β are the roots of $4x^2 + 3x + 7 = 0$, then the value of $1/α +1/β$ is (a) -3/7 (b) -3/4 (c)3/4 (d) 3/7	1
4.	*Polynomial whose sum and product of zeros are -3 and 2 respectively is* (a) $x^2 -3x +2$ (b) $x^2 +3x +2$ (c) $x^2 -3x -2$ (d) $x^2 +3x -2$	1

5.	If k, (2k – 1) and (2k + 1) are three successive terms of an A.P, then the value of k is (a) 1 (b)2 (c)3 (d) -1	1
6.	Two poles of height 6m and 11m stand vertically upright on a plane ground. If the distance between their foot is 12m, then distance between their tops is (a) 12m (b) 14m (c) 13m (d) 11m	1.
7.	The values of k for which the quadratic equation $9x^2 – 3kx + k = 0$ has equal roots are (a) 0,3 (b) 0,4 (c) 3,-3 (d) -4,4	1
8.	A tangent PQ at a point P of a circle of radius 6cm meets a line through the centre O at a point Q so that OQ = 10 cm. then the length of PQ is (a) 12 (b)8 (c) 3 (d) 5	1
9.	If ΔABC ~ΔDEF, AB=6cm, DE=9cm, EF=6cm and FD=12cm, then the perimeter of ΔABC is (A) 28cm (B) 28.5cm (C) 18cm (D) 23cm	1
10.	The co-ordinates of the point which is mirror image of the point (−3, 5) about x-axis are (a) (3, 5) (b) (3, −5) (c) (−3, −5) (d) (−3, 5)	1
11.	The distance between the point P(1, 4) and Q(4, 0) is a) 4 b) 5 c) 6 d) 3√3	1
12.	Value of $4\sin^2 60°+3\tan^2 30°-8\sin 45° \cos45°$ is (a) 4 (b) 2 (c)0 (d) 1	1

13.	In the given figure, PA is a tangent from an external point P to a circle with centre O and diameter AB. If ∠POB=115°, then measure of ∠APO is
	
	   (a) 25° (b) 30°
	   (c) 20° (d) 65°
	
		1
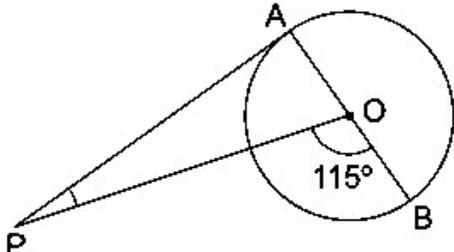
14.	The length of the minute hand of a clock is 21 cm , then the length of arc covered by the minute hand in 5 minutes is (a) 42 (b) 22 (c)21 (d) 11	1
15.	The sum of the probabilities of all the elementary events of an experiment is (a) 0.5 (b) 1 (c) 2 (d) 1.5	1
16.	In a leap year, the probability of getting 53 Sunday is (a) 1/7 (b) 2/7 (c)3/7 (d) 4/7	1
17.	If Mode and Mean of data are 12 and 15, then Median of data is _____ a) 12 b) 14 c) 15 d) 16	1

18.	The distance between two parallel tangents of a circle of radius 3cm is (a) 3/2 (b) 2 (c) 3 (d) 6	1

	DIRECTION(19-20): In the question number 19 and 20, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct option
	      a. Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)
	      b. Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A)
	      c. Assertion (A) is true but reason (R) is false.
	      d. Assertion (A) is false but reason (R) is true.	

19.	Assertion : Sum of first 15 terms of 2+5+8——- is 345. Reason: Sum of fist n terms in an A.P. is given by the formula: Sn = 2n×[2a+(n−1)d]	1
20.	Assertion (A): If $\cos A + \cos^2 A = 1$, then $\sin^2 A + \sin^4 A = 1$ Reason (R): $\sin^2 A + \cos^2 A = 1$	1

Section-B

Section B Consists of 5 questions of 2 marks each.

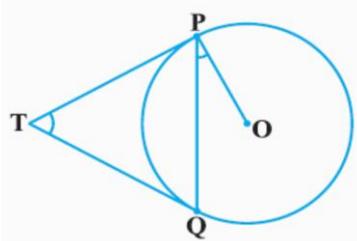| 21.	(A) Show that the number $2 \times 5 \times 7 \times 11 + 11 \times 13$ is a composite number. OR (B) .Check whether 4^n can end with the digit 0 for any natural number n.	2
22.	What will be the nature of roots of quadratic equation $2x^2 + 4x - 7 = 0$?	2
23.	In the adjoining figure, if PQ || RS, prove that Δ POQ ~ ΔSOR. 	2
24.	Find the mode of the following data:- <table><tr><td>Class Interval</td><td>0 –10</td><td>10 –20</td><td>20 -30</td><td>30 –40</td><td>40 – 50</td><td>50 – 60</td><td>60 – 70</td></tr><tr><td>Frequency</td><td>5</td><td>10</td><td>18</td><td>30</td><td>20</td><td>12</td><td>5</td></tr></table>	2
25.	If cos (A+B) = 0 and sin (A − B) = $\frac{1}{2}$, then find the value of A and B where A and B are acute angles. OR Prove the following identity: $\frac{\sin^3\theta + \cos^3\theta}{\sin\theta + \cos\theta} = 1 - \sin\theta.\cos\theta$	2

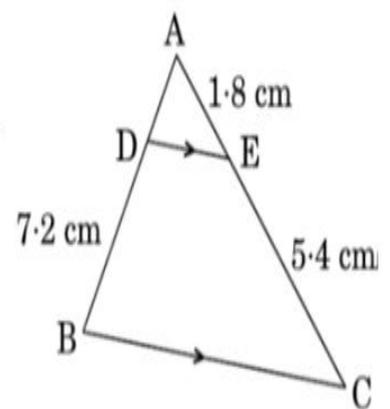|		**Section-C**	
		Section C Consists of 6 questions of 3 marks each.	
26.		Prove that the lengths of tangents drawn from an external point to a circle are equal. **OR** Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that ∠PTQ = 2 ∠OPQ.	3
27		Given$\sqrt{2}$ is an irrational number, then prove that $3 + 5\sqrt{2}$ is also an irrational number.	3
28.		Prove that : $\dfrac{cosA}{1+sinA} + \dfrac{1+sinA}{cosA}$ = 2secA	3

29.		Three unbiased coins are tossed together. Find the probability of getting:
		   i. at least two heads
		   ii. at most two heads
		   iii. exactly two heads
			3

30.		(A) The sum of first n terms of an AP is $5n^2 - n$. Find the nth term of the AP.
		
		           OR
		
		   (B) Find 20th term from the last term of A.P: 3, 8, 13,……..,253.
			3

31.		If the median of the following distribution is 28.5, find the missing frequencies (x and y) .	3

Class Interval	0 –10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	Total
Frequency	5	X	20	15	y	5	60

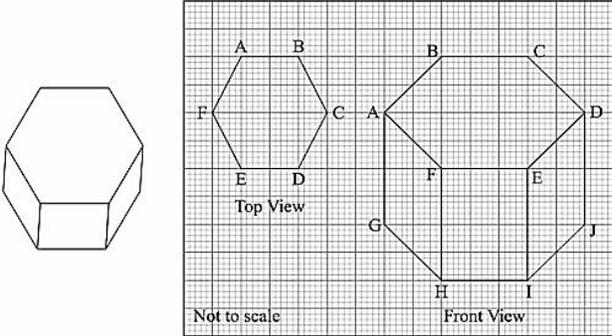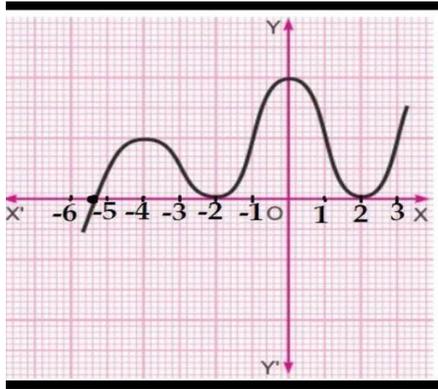|		**Section-D**	
		Section D consists of 4 questions of 5 marks each.	
32.		a) If a line is drawn parallel to any one side of the triangle that intersects the other two sides in two distinct points, then the line divides those two sides in the same ratio. b) In given Figure , DE llBC. Find the length of side AD given that AE = 1·8 cm, BD = 7·2 cm and CE = 5·4 cm.	5

33.	(A) Two poles of equal heights are standing opposite each other on either side of the road, which is 80 m wide From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30º, respectively. Find the height of poles and the distance of the point from the poles. OR (B) From the top of a hill 200 m high, the angles of depression of the top and the bottom of a pillar are 30° and 60° respectively. Find the height of the pillar and its distance from the hill .	5
34.	A cylindrical container is filled with ice-cream, whose diameter is 12 cm and height 15 cm. The whole ice-cream is distributed to 10 children in equal cones having hemispherical tops. If the height of conical portion is twice the diameter of its base, find the diameter of the ice-cream cone.	5
35.	(A) Draw the graphs of the equations $x - 2y + 2 = 0$ and $2x + y - 6 = 0$. Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis. Also find the area of the triangle . OR (B) A train covers a distance of 300 km at a uniform speed. If the speed of the train is increased by 5 km/hr, it takes 2 hours less in the journey. Find the original speed of the train.	5

	Section-E	
	Section E consists of 3 CASE BASED QUESTIONS of 4 marks each.	
36.	An aquarium is a transparent tank of water in which live fish and other water creatures and plants are kept. The diagrams below show the plans for an aquarium. It will be built in hexagonal shape. It will be made using • Six rectangular shaped clear glasses. • One regular hexagon clear glass for roof. (a) Refer to top view Find the value of x for which the distance between the points F(2,-3) and C(x, 5) is 10. (b) Refer to top view	1+1+2

	Find the mid-point of the line segment joining the points E(8,11) and B(11,15). (c) **Refer to front view** **Find the coordinates of the point which divides line segment joining the point A(-4, 5) and D(6, 3) in the ratios 3:2 internally.** **OR** **Refer to front view** **Find the perimeter of square EFHI where E(-2, 0), F(3, 0), H(3, 5) and I(-2, 5).**	

37.	A water sprinkler is set to shoot a stream of water a distance of 21 m and rotate through an angle which is equal to complementary angle of 10°.
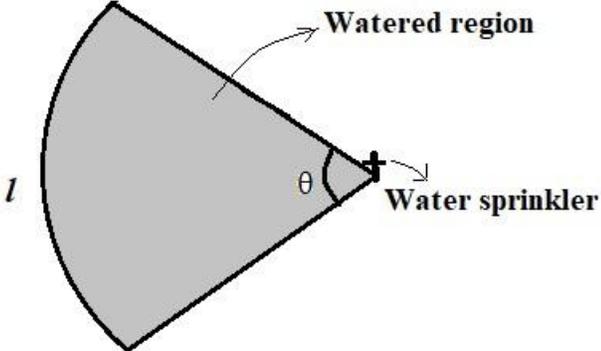	
	    i) Find the value of θ .
	    ii) What is the area of the watered region (in terms of π)?
	    iii) (A) If the radius (*r*) changes to 28m, find the angle θ so that the area of the watered region remains the same.
	
	OR
	
	If the radius(*r*) is increased from 21m to 28m and the angle remains the same, what is the increase in the area of the watered region?
		1+1+
		2

38.	One day, due to heavy storm an electric wire got bent as shown in the figure. It followed some mathematical shape of curve. Answer the following questions Below i). How many zeroes are there for the polynomial (shape of the wire)? ii) Find the zeroes of the polynomial from the figure. iii) Find the value of k if -1 is one of the zero of quadratic polynomial $x^2 - 3x + k = 0$. **OR** Write the expression for quadratic polynomial having zeroes 2 and -3 .	1+1+ 2

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