



INDIAN SCHOOL SOHAR
PRE-BOARD I EXAMINATION (2024-25)
MATHEMATICS BASIC (241)

No. of printed pages: 5

CLASS: X

MAX. MARKS: 80

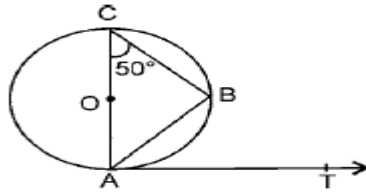
DATE: 02/01/2025

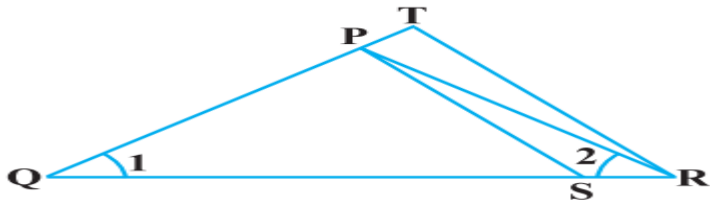
TIME: 3 HOURS

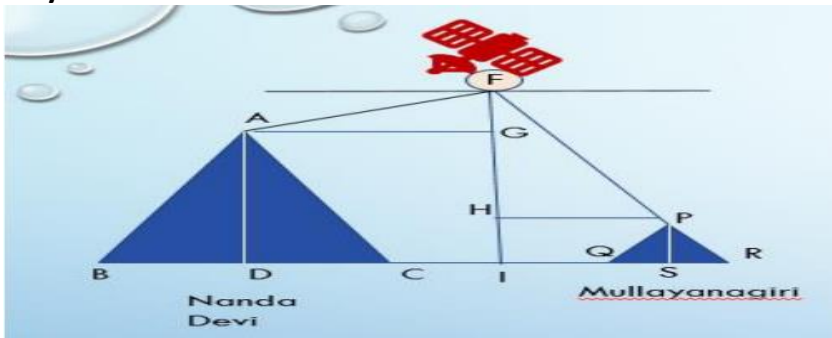
General Instructions:

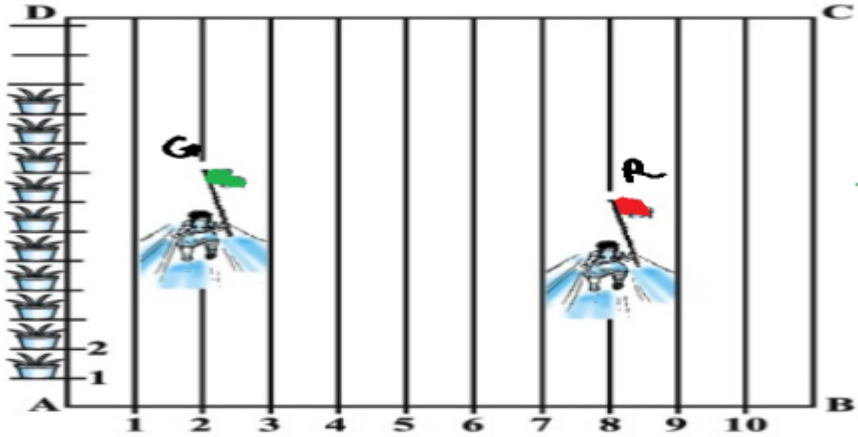
1. This question paper contains 38 questions.
2. This Question Paper has 5 Sections A, B, C, D, and E.
3. Section A has 20 MCQs carrying 1 mark each.
4. Section B has 5 questions carrying 02 marks each.
5. Section C has 6 questions carrying 03 marks each.
6. Section D has 4 questions carrying 05 marks each.
7. Section E has 3 Case Based integrated units of assessment (04 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 2 marks, 2 Questions of 3 marks and 2 Questions of 5 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
9. Draw neat diagrams wherever required.

SECTION A		
Section A consists of 20 questions of 1 mark each.		
Q. No		Marks
1	For some integer q , every odd integer is of the form (a) $2q$ (b) $2q + 1$ (c) q (d) $q + 1$	1
2	Given that $HCF(306, 657) = 9$, find $LCM(306, 657)$ (a) 306 (b) 657 (c) 34 (d) 22338	1
3	The zeroes of the quadratic polynomial $x^2 + 89x + 720$ are (a) both are negative (b) both are positive (c) one is positive and one is negative (d) both are equal	1
4	For what value of k , do the equations $6x - ky = -16$ and $3x - y + 8 = 0$ represent coincident lines? (a) 2 (b) - 2 (c) $\frac{1}{2}$ (d) $-\frac{1}{2}$	1
5	If $x = 1$ is a common root of the equations $ax^2 + ax + 3 = 0$ and $x^2 + x + b = 0$, then ab is equal to: (a) 3 (b) - 3 (c) 6 (d) 3.5	1
6	The distance of the point $P(-6, 8)$ from the origin is: (a) 8 (b) $2\sqrt{7}$ (c) 10 (d) 6	1
7	In ΔABC , $DE \parallel BC$, If $AD = x + 2$, $DB = 3x + 16$, $AE = x$ and $EC = 3x + 5$ then the value of x is (a) 6 (b) 3 (c) 7 (d) 2	1

8	The mid-point of the line segment joining the points A (– 2, 8) and B (– 6, – 4) is: (a) (–6, – 4) (b) (2, 6) (c) (– 4, 2) (d) (4, 2)	1												
9	In the figure, AB is a chord of the circle and AOC is its diameter such that $\angle ACB = 50^\circ$. If AT is the tangent to the circle at the point A, then $\angle BAT$ is  (a) 60° (b) 65° (c) 50° (d) 40°	1												
10	If $\tan (A + B) = \sqrt{3}$ and $\tan (A - B) = \frac{1}{\sqrt{3}}$ ($A > B$) then the value of A is (a) 30° (b) 45° (c) 60° (d) 90°	1												
11	The value of $3\sin 30^\circ - 4\sin^3 30^\circ$ is: (a) 1 (b) 0 (c) 2 (d) - 2	1												
12	$\sqrt{(1 + \sin \theta)(1 - \sin \theta)}$ is equal to: (a) $\sin \theta$ (b) $\sin^2 \theta$ (c) $\cos^2 \theta$ (d) $\cos \theta$	1												
13	The area of the circle that can be inscribed in a square of 6cm is (a) $36\pi \text{ cm}^2$ (b) $18\pi \text{ cm}^2$ (c) $12 \pi \text{ cm}^2$ (d) $9\pi \text{ cm}^2$	1												
14	The Volume of the largest right circular cone that can be cut out from a cube of edge 4.2 cm is (a) 9.7 cm^3 (b) 58.2 cm^3 (c) 77.6 cm^3 (d) 19.4cm^3	1												
15	The total surface area of a solid hemisphere of radius 7 cm is (a) $447\pi \text{ cm}^2$ (b) $239\pi \text{ cm}^2$ (c) $174\pi \text{ cm}^2$ (d) $147\pi \text{ cm}^2$	1												
16	If mode of a data is 45, mean is 27, then median is (a) 30 (b) 27 (c) 23 (d) 33	1												
17	The lower limit of the modal class of the following data is <table border="1" style="margin: 10px auto;"><tr><td>Class Interval</td><td>5 -10</td><td>10-15</td><td>15 - 20</td><td>20 - 25</td><td>25 - 30</td></tr><tr><td>Frequency</td><td>2</td><td>12</td><td>8</td><td>7</td><td>10</td></tr></table> (a) 15 (b) 10 (c) 12.5 (d) 20	Class Interval	5 -10	10-15	15 - 20	20 - 25	25 - 30	Frequency	2	12	8	7	10	1
Class Interval	5 -10	10-15	15 - 20	20 - 25	25 - 30									
Frequency	2	12	8	7	10									
18	If $P(E) = 0.35$, then $P(\text{not } E)$ is given by (a) 1 (b) – 3.5 (c) – 0.65 (d) 0.65	1												
	Direction for questions 19 & 20: In question numbers 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 but 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 (A): $(2 + \sqrt{5}) \sqrt{5}$ is an irrational number. Reason (R): Product of two irrational numbers is always irrational.	1												

20	Assertion (A): The ratio in which the line segment joining (2, -3) and (5, 6) internally divided by X axis is 1:2. Reason (R): Formula for the internal division is $(\frac{mx_2+nx_1}{m+n}, \frac{my_2+ny_1}{m+n})$	1
SECTION B		
Section B consists of 5 questions of 2 marks each.		
21	For what value of "p" will the following system of equations have no solution. $(2p - 1)x + (p - 1)y = 2p + 1;$ $y + 3x - 1 = 0$	2
22	(A) In the following figure, $\frac{QR}{QS} = \frac{QT}{PR}$ and $\angle 1 = \angle 2$. Show that $\Delta PQS \sim \Delta TQR$.  OR (B) D is a point on the side BC of a triangle ABC such that $\angle ADC = \angle BAC$. Show that $CA^2 = CB \cdot CD$	2
23	Prove that the lengths of tangents drawn from an external point to a circle are equal.	2
24	Given that $15 \cot A = 8$, find $\sin A$ and $\sec A$	2
25	(A) The minute hand of a clock is 6 cm long. Find the area swept by it between 11:20 am and 11:55 am. OR (B) Find the area of a quadrant of a circle whose circumference is 22 cm.	2
SECTION C		
Section C consists of 6 questions of 3 marks each.		
26	Prove that $\sqrt{3}$ is irrational	3
27	(A) The ratio of incomes of two persons is 9: 7 and the ratio of their expenditures is 4:3. If each of them manages to save Rs 2000 per month, find their monthly incomes. OR (B) The sum of a two-digit number and the number obtained by reversing the digits is 66. If the digits of the number differ by 2, find the number.	3
28	If α and β are the zeros of the polynomial $P(x) = x^2 - x - k$ such that $\alpha - \beta = 9$, then find the value of "k"	3
29	Three coins are tossed simultaneously. What is the probability of getting (i) At least 2 heads? (ii) At most 2 heads?	3
30	(A) In ΔPQR, right-angled at Q, $PR + QR = 25$ cm and $PQ = 5$ cm. Determine the values of $\sin P$, $\cos P$ and $\tan P$ OR (B) Prove that $\frac{\cos A}{1 + \sin A} + \frac{1 + \sin A}{\cos A} = 2 \sec A$	3
31	If from an external point B of the circle with centre O, two tangents BC and BD are drawn such that $\angle DBC = 120^\circ$, prove that $BO = 2BC$.	3

	SECTION D																	
	Section D consists of 4 questions of 5 marks each																	
32	(A) A train travels at a certain average speed for a distance of 132 km and then travels a distance of 140 km at an average speed of 4 km/h more than the initial speed. If it takes 4 hours to complete the whole journey, what was the initial average speed? OR (B)A pole has to be erected at a point on the boundary of a circular park of diameter 13 meters in such a way that the differences of its distances from two diametrically opposite fixed gates A and B on the boundary is 7 meters. At what distances from the two gates should the pole be erected?	5																
33	If the median of the distribution given below is 28.5, find the values of x and y. <table border="1"><thead><tr><th>Class Interval</th><th>Frequency</th></tr></thead><tbody><tr><td>0 – 10</td><td>5</td></tr><tr><td>10 – 20</td><td>X</td></tr><tr><td>20 – 30</td><td>20</td></tr><tr><td>30 – 40</td><td>15</td></tr><tr><td>40 – 50</td><td>Y</td></tr><tr><td>50 – 60</td><td>5</td></tr><tr><td>TOTAL</td><td>60</td></tr></tbody></table>	Class Interval	Frequency	0 – 10	5	10 – 20	X	20 – 30	20	30 – 40	15	40 – 50	Y	50 – 60	5	TOTAL	60	5
Class Interval	Frequency																	
0 – 10	5																	
10 – 20	X																	
20 – 30	20																	
30 – 40	15																	
40 – 50	Y																	
50 – 60	5																	
TOTAL	60																	
34	(A) A wooden article was made by scooping out a hemisphere from each end of a solid cylinder. If the height of the cylinder is 10 cm, and its base is of radius 3.5 cm, find the total surface area of the article. OR (B)A vessel is in the form of an inverted cone. Its height is 8 cm and the radius of its top, which is open, is 5 cm. It is filled with water up to the brim. When lead shots, each of which is a sphere of radius 0.5 cm are dropped into the vessel, one-fourth of the water flows out. Find the number of lead shots dropped in the vessel.	5																
35	State and prove Basic proportionality theorem. In $\triangle ABC$, $DE \parallel BC$ such that $AD = 2.4$ cm, $AB = 3.2$ cm and $AC = 8$ cm then what is the length of AE?	5																
	SECTION E																	
	Section E has 3 Case Based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.																	
36	Case Study – 1  A Satellite flying at height h is watching the top of the two tallest mountains in Uttarakhand and Karnataka, them being Nanda Devi (height 7,816m) and Mullayanagiri (height 1,930 m). The angles of depression from the satellite, to the top of Nanda Devi and Mullayanagiri are 30° and 60° respectively. If the distance between the peaks of two mountains is 1937 km, and the satellite is																	

	vertically above the midpoint of the distance between the two mountains. (i) Find the distance of the satellite from the top of Nanda Devi (ii) Find the distance of the satellite from the top of Mullayanagiri (iii) (A) Find the distance of the satellite from the ground OR (iii) (B) What is the angle of elevation if a man is standing at a distance of 7816m from Nanda Devi?	1 1 2
37	Case Study – 2 Salary: In investigating different job opportunities, you find that firm A will start you at Rs 25,000 per year and guarantee you a raise of Rs 1,200 each year whereas firm B will start you at Rs 28,000 per year but will guarantee you a raise of only Rs 800 each year. (i) What would be your annual salary at firm A for the tenth year? (ii) What would be your annual salary at firm B for the tenth year? (iii) (A) Over a period of 15 years, how much would you receive from firm A? OR (iii) (B) Over a period of 15 years, how much would you receive from firm B?	1 1 2
38	Case Study – 3 In order to conduct Sports Day activities in your School, lines have been drawn with chalk powder at a distance of 1 m each, in a rectangular shaped ground ABCD, 100 flowerpots have been placed at a distance of 1 m from each other along AD, as shown in given figure below. Niharika runs $\frac{1}{4}$ th the distance AD on the 2nd line and posts a green flag. Preet runs $\frac{1}{5}$ th distance AD on the eighth line and posts a red flag.  (i) Find the positions of green and red flags. (ii) What is the distance between both the flags? (iii) (A) If Rashmi has to post a blue flag exactly halfway between the line segment joining the two flags, where should she post her flag? OR (iii) (B) If Karan has to post a flag at one-fourth distance from green flag, in the line segment joining the green and red flags, then where should he post his flag?	1 1 2

*****END*****