KENDRIYA VIDYALAYA SANGATHAN, TINSUKIA REGION
PRE BOARD 2025-26
MATHEMATICS STANDARD (041)

Time: 3:00 hrs **Max Marks: 80**

Instructions for the candidates:
Read the following instructions carefully and follow them:
1. This question paper contains 38 questions. All Questions are compulsory.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Question numbers 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, Question numbers 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Question numbers 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Question numbers 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Question numbers 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. There is no overall choice. However, an internal choice has been provided.
9. Draw neat and clean figures wherever required. Take π =22/7 wherever required if not stated.
10. Use of calculators is not allowed.

SECTION A

Q1 From the letters of the word "MOBILE", a letter is selected at random, the probability that the selected letter is a vowel is [1]

(a) $\frac{3}{7}$ b) $\frac{1}{6}$ (c) $\frac{1}{2}$ (d) $\frac{1}{3}$

Q2 For the equation $x^2 + 5x - 1$, which of the following statements is correct? [1]

(a) The roots of the equation are equal
(b) The discriminant of the equation is negative
(c) The roots of the equation are real, distinct.
(d) The discriminant is equal to zero

Q3 The following distribution gives the daily income of 50 workers of the factory. The lower limit of the modal class is [1]

Income (in ₹)	400-424	425-449	450-474	475-499	500-524
Number of workers	12	14	8	6	10

(a)425 (b) 449 (c) 424.5 (d) 425.5

Q4 If a $=x^3 y^2z^2$, b$= x^2y^2z^3$, and c$=x^3y^2z^n$ and the LCM (a, b, c) $= x^3y^2z^5$ then the value of n is: [1]

(a) 3 (b) 2 (c) 5 (d) 1

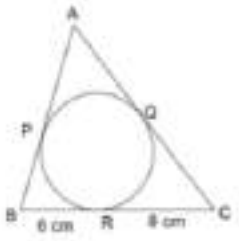
Q5 If A + B = 90°, cot B = $\frac{3}{4}$ then tan A is equal to: [1]

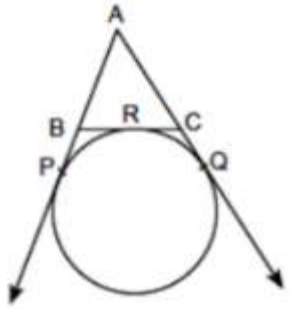
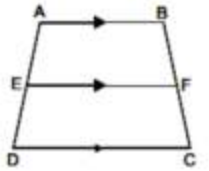
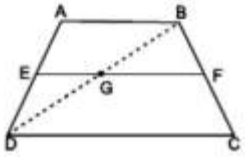
(a) $\frac{5}{3}$ (b) $\frac{1}{3}$ (c) $\frac{3}{4}$ (d) 1

Q6 Which of the following pair of equations are dependent? [1]

(a) 2x + 3y = 9 and 4x + 6y = 18 (b) x + y = 2 and 2x – y = 4

(c) 5x + y = 10 and 2x + y = 6 (d) x – y = 0 and x + y = 4

Q7	What is y-coordinate of the mid-point (3,7) and (5,9)? (a) 7 (b) 8 (c) 6 (d) 9	1
Q8	17 cards are numbered as 1,2,3, ----------,17, then probability of divisible by 3 and 2 both (a)$\frac{7}{17}$ (b) $\frac{5}{17}$ (c) $\frac{3}{17}$ (d) $\frac{2}{17}$	1
Q9	The difference of the areas of a minor sector of angle 120^o and its corresponding major sector of a circle of radius 21 cm, is (A) 496 cm^2 (B)462 cm^2 (C) 346.5 cm^2 (D) 693 cm^2	1
Q10	If perimeter of given triangle is 38 cm, then length AP is equal to  (a)19 cm (b) 5 cm (c) 10 cm (d) 8 cm	1
Q11	If the roots of the equation $x^2 + bx + c$ are (1,2) then b and c are = (A) (-2,3) (B) (-3,2) (C) (-6,1) (D) (-1,6)	1
Q12	Find the product of HCF and LCM of (32,28) using relationship between HCF and LCM of two numbers (a) 256 (b) 840 (c) 832 (d) 896	1
Q13	In a cylindrical container of base radius is 8 cm has some water in it. If the level of the water is 20cm the volume of the water in the container is (a) 5.67 (b) 4.02 (c) 3.89 (d) 4.97	1
Q14	The perimeters of two similar triangles are 25cm and 15 cm respectively. One side of the first triangle is 10 cm. The length of the corresponding side of the second triangle is (a) 4 cm (b) 5 cm (c) 6 cm (d) 10 cm	1
Q15	The length of the minute hand of a clock is 14 cm. The area swept by the minute hand in 5 minutes is (a) 153.9 cm^2 b) 102.6 cm^2 (c) 51.3 cm^2 (d) 205.2 cm^2	1
Q16	Distance between points (1,2) and (4, 6) is: (a) 8 (b)$\sqrt{13}$ (c) $\sqrt{25}$ (d) 7	1
Q17	If cosec θ – cot $\theta = \frac{1}{3}$, the value of (cosec θ + cot θ) is (a) 1 (b) 2 (c) 3 (d) 4	1
Q18	In figure, AP, AQ and BC are tangents to the circle. If AB = 5 cm, AC = 6 cm and BC = 4 cm, then the length of AP (in cm) is	1

	 (a) 15 (b) 7.5 (c) 20 d) 30	
	Directions: In the following questions, a statement of assertion is followed by a statement of reason. Mark the correct choice as: **(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**	
Q19	**Assertion(A)**: The HCF of two numbers is 2 and their LCM is 15 **Reason(R)**: HCF is a factor of LCM.	1
Q20	**Assertion (A)**: $\sin^2 A + \cos^2 A = 1$ **Reason (R)**: $(\sin A + \cos A)^2 = 1$ for any angle A.	1
	SECTION B	
Q21	In the given figure, if ABCD is a trapezium in which AB || DC || EF, then prove that $\frac{AE}{ED} = \frac{BF}{FC}$  	2
Q22	Two concentric circles are of radii 7 cm and r cm respectively, where r > 7 cm . A chord of the larger circle, of length 48 cm, touches the smaller circle. Find the value of r.	2
Q23	A man receives Rs. 60 for the first week and Rs. 3 more each week than the preceding week. How much does he earn by the 20th week? **OR** The A.P. 8, 10, 12 ….has 60 terms. Find the sum of the last 10 terms.	2
Q24	If $\tan\theta + \cot\theta = 5$, find the value of $\tan^2\theta + \cot^2\theta$. **OR** If $\theta = 45°$, then what is the value of $2\sec^2\theta + 3\operatorname{cosec}^2\theta$?	2
Q25	A sector of 56˚ cut out from a circle, contains area of 17.6 cm^2. Find the radius of the circle.	2
	SECTION C	
Q26	Three years hence, a father's age will be three times that of his son. Five years ago, the father was seven times the son's age. Find their present ages.	3

	OR The cost of 4 pens and 4 pencil boxes is Rs. 100. Three times the cost of a pen is Rs. 15 more than the cost of a pencil box. Form the pair of linear equations for the above situation. Find the cost of a pen and a pencil box.	
Q27	Prove the identity following: $\frac{sin\theta-cos\,\theta}{sin\theta+cos\,\theta}+\frac{sin\theta+cos\,\theta}{sin\theta-cos\,\theta}=\frac{2}{2sin2\theta-1}$ OR\ Prove that: $\left(\frac{1+\tan^2 A}{1+\cot^2 A}\right)=\left(\frac{1+tanA}{1+cotA}\right)^2=\tan^2 A$	3
Q28	Given that $\sqrt{5}$ is irrational, Prove that $3+2\sqrt{5}$ is irrational.	3
Q29	All the black face cards are removed from a pack of 52 playing cards. The reaming cards are well shuffled and then a card is drawn at random. Find the probability of getting (i) face card (ii) red card (iii)black card.	3
Q30	A corporation of Amaravathi city has allocated a parallelogram ABCD shaped land to construct a circular cricket stadium touching all the sides of ABCD to BCCI. Show that ABCD is a rhombus and find its area if AC = 2.5 km and BD = 3.2 km.	3
Q31	Find the quadratic polynomial whose zeroes are $(2+\sqrt{3})$ and $(2-\sqrt{3})$.	3
	SECTION D	
Q32	A rocket is in the form a right Circular Cylinder closed at the lower end and surmounted by a cone with same radius as that of cylinder. The diameter and height of the cylinder are 9 m and 15 m, respectively. If the slant height of the conical portion is the 7.5 m, find the total surface area and volume of the rocket. OR A tent is in the shape of a cylinder surmounted by a conical top. The cylindrical part is 3.5 m high and conical part has slant height 4.2 m. Both the parts have same radius 2 m. Find the area of the canvas used to make the tent and find the cost of canvas to be purchased at the rate of ₹50 per square meter considering zero wastage. (Use $\pi = 22/7$)	5
Q33	The distribution below gives the marks of 100 students of a class, if the median makes are 24, find the frequencies f1 and f2	5

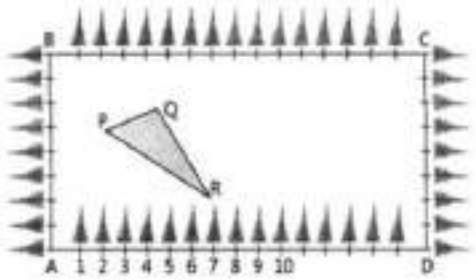
Marks	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
No. of students	4	6	10	f_1	25	f_2	18	5

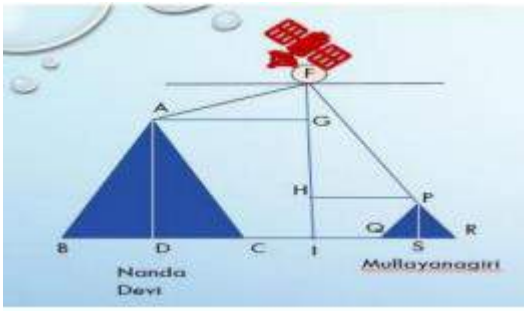
OR

The distribution below gives the marks of 40 students of a class, if the median marks are 32.5, find the frequencies f1 and f2.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	Total

	No. of students	f_1	5	9	12	f_2	3	2	40

Q34	A cottage industry produces a certain number of pottery articles in a day. It was observed on a particular day that the cost of production of each article (in rupees) was 3 more than twice the number of articles produced on that day. If the total cost of production on that day was Rs.90, find the number of articles produced and the cost of each article.	5
Q35	Sides AB and AC and median AD of a triangle ABC are respectively proportional to sides PQ and PR and median PM of another triangle PQR. Show that $\Delta ABC \sim \Delta PQR$.	5
	SECTION E	
Q36	The class X students of a school in Rajinder Nagar has been allotted a rectangular plot of land for their gardening activity. Saplings of mango are planted on the boundary at the distance of 1m from each other. There is a triangular grassy lawn in the plot as shown in figure.  Based on the above figure, answer the following questions (i). Taking A as origin, find the coordinates of vertices of the triangle. (ii). Find the length of side PQ of triangle PQR? (iii).Find the Coordinates of the point M on PR such that PM:MR = 2:1 **OR** What will be the coordinates of the vertices of triangle PQR if C is origin?	4
Q37	Your elder brother wants to buy a car and plans to take loan from a bank for his car. He repays his total loan of Rs 1,18,000 by paying every month starting with the first installment of Rs 1000. If he increases the installment by Rs 100 every month, Answer the following:  (i) Find the amount paid by him in 30th installment. (ii) Find the amount paid by him in the 30 installments. (iii)What amount does he still have to pay after 30th installment?	4

	OR (iii) If total installments are 40 then find amount paid in the last installment.	
Q38	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 the 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)What is the angle of elevation if a man is standing at a distance of 7816m from Nanda Devi? **OR** (iii) If a mile stone very far away from, makes 45 ̊to the top of Mullanyangiri mountain. So, find the distance of this mile stone from the mountain.	4