KENDRIYA VIDYALAYA SANGATHAN : RANCHI REGION

SECOND PRE-BOARD EXAMINATION (2025-26)

CLASS- X MATHEMATICS STANDARD – Code No.041

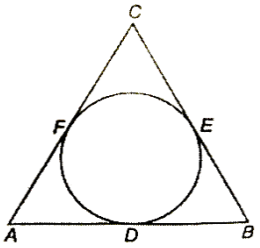
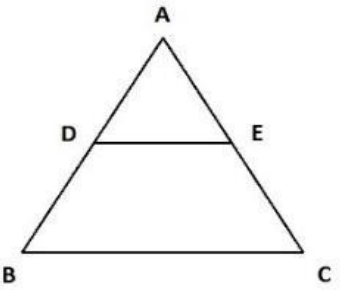
Maximum Marks : 80 **Time: 3 hours**

General Instructions:

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 SectionB, Questionnumbers 21-25are veryshort answer (VSA) type questions, carrying02 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 in 2 questions of Section B, 2 questions of Section C and 2 questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required. Take $\boldsymbol{\pi = \frac{22}{7}}$ where ever required if not stated.
10. Use of calculators is not allowed.

(Section A) **Section A consists of 20 questions of 1 mark each.**		
Q. No.	**Questions**	**Marks**
1.	If the HCF (2520, 6600) = 40 and LCM (2520, 6600) = 252 × k, then the value of k is: (A)1650 (B) 1600 (C)165 (D)1625	**1**
2.	The point P on x-axis is equidistant from the points A(-1, 0) and B(5, 0) is: (A) (2, 0) (B) (0, 2) (C) (3, 0) (D) (2, 2)	**1**
3.	The pair of equations given by y + 2x = 8 and 2x + 4y – 16 = 0 represents two lines which are: (A) parallel (B) coincident. (C) intersecting at exactly one point (D) intersecting at exactly two points	**1**

4.	In fig. if AB=12cm,BC=8cm and AC = 10cm, then What will be the value of AD,where AB , BC and CA are Tangents to the circle  (A) 3cm (B) 4cm (C) 6cm (D) 7cm	**1**
5.	Given that $\sin\alpha = \frac{1}{2}$ and $\cos\beta = \frac{1}{2}$, then the value of $(\alpha + \beta)$ is (A) 0° (B) 30° (C) 60° (D) 90°	**1**
6.	If -2 is a root of quadratic equation $x^2 - px - 10 = 0$ then (A) p = 3 (B) p = 5 (C) p = 7 (D) p = 1	**1**
7.	An arc of a circle is of length 5π cm and the sector it bounds has an area of 20π cm square . The radius of the circle is (A) 4 cm (B) 10 cm (C) 8 cm (D) 15 cm	**1**
8.	One card is drawn at random from a well shuffled deck of 52 playing cards. The probability that it is a red king is: (A) 2 /26 (B) 2 /13 (C) 1/ 26 (D) 1/ 52	**1**
9.	If $2\sin 3x = \sqrt{3}$, then x =? (A) 45° (B) 20° (C) 30° (D) 15°	**1**
10.	The LCM of smallest two-digit composite number and smallest composite number is (A) 12 (B) 44 (C)4 (D)20	**1**
11.	2 cubes each of volume 64 cm^3 are joined end to end. What is the surface area of the resulting cuboid ? (A) 160 cm^2 (B) 150cm^2 (C) 260cm^2 (D) 200cm^2	**1**
12.	If the zeroes of the quadratic polynomial $x^2 + (a + 1)x + b$ are 2 and -3, then (A) a = -7, b = -1 (B) a = 5, b = -1 (C) a = 2 , b = - 6 (D) a = 0, b = -6	**1**
13.	The area of a circle that can be inscribed in a square of side 6 cm is: (A)36π cm^2 (B) 18π cm^2 (C)12π cm^2 (D)9π cm^2	**1**
14.	In ΔABC, DE $\parallel$ BC as shown in the figure. If AD = 4cm, AB = 9 cm and AC= 13.5 cm, then the length of EC is:  (A)6 cm (B)7.5 cm (C) 4.5 cm (D) 3.5 cm	**1**

15. A bag has 5 white marbles, 8 red marbles and 4 purple marbles. If we take a marble randomly, then what is the probability of not getting purple marble ?

(A) 0.5 (B) 0.66 (C) 0.08 (D) 0.77

16. The line segment joining the points A (5, 3) and B (-3, 11) is divided by the point C (3,5) in the ratio **1**

(A) 1:3 (B) 3:1 (C) 2:3 (D) 3:2

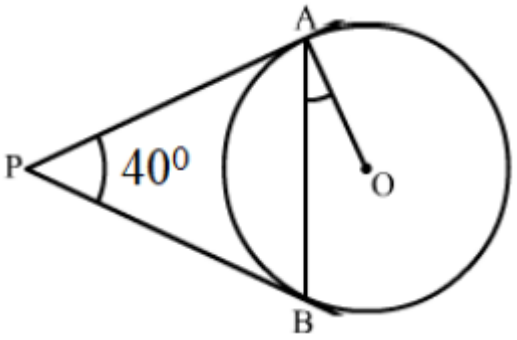
17. For the following distribution: **1**

Class	0-5	5-10	10-15	15-20	20-25
Frequency	10	15	12	20	9

The sum of lower limits of the median class and modal class is

(A) 15 (B) 25 (C) 30 (D) 35

18. If PA and PB are tangents to the circle with centre O such that ∠APB = 40°, then ∠OAB is equal to **1**



(A) 40° (B) 30° (C) 20° (D) 25°

DIRECTIONS: 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 explanation of assertion (A)

(C) Assertion (A) is true but reason (R) is false.

(D) Assertion (A) is false but reason (R) is true.

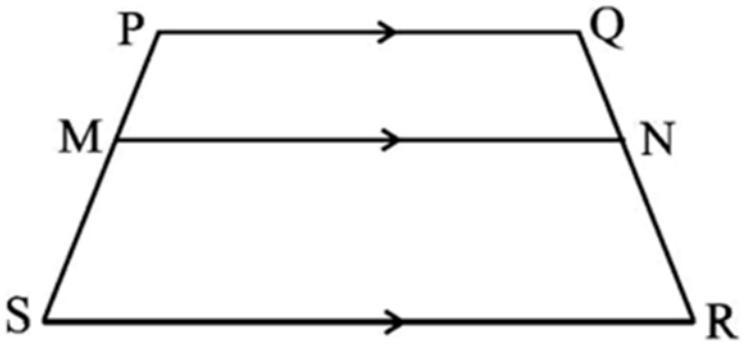
19. Assertion (A): The HCF of two numbers is 18 and their product is 3072. Then theirLCM = 169.
Reason (R): If a, b are two positive integers, then HCF x LCM = a x b. **1**

20. **Assertion(A):** The value of $\sin\theta$ always increases as θ increases from 0° to 90° **1**

Reason(R): The value of $\cos\theta$ always decreases as θ increases from 0°to 90°

(Section– B)

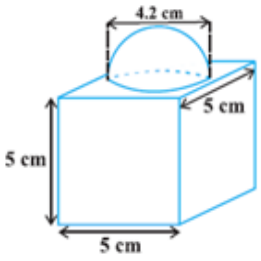
Section B consists of 5 questions of 2 marks each.

21.	Determine k so that $4k + 8$, $2k^2 + 3k + 6$ and $3k^2 + 4k + 4$ are three consecutive terms of an AP. **OR** Determine the A.P. whose third term is 16 and 7th term exceeds the 5th term by 12.	**2**
22.	In a Δ ABC, right angled at B, if $\tan A = \frac{1}{\sqrt{3}}$ Find the value of : SinACosC + CosASinC	**2**
23.	PQRS is a trapezium with PQ || SR. If M and N are two points on the non-parallel sides PS and QR respectively, such that MN is parallel to PQ, then show that $\frac{PM}{MS} = \frac{QN}{NR}$  	
24.	A chord of a circle of radius 21 cm subtends an angle 60^0 at the centre. Find the area of the corresponding minor segment of the circle. [Use $\pi = 3.14$ and $\sqrt{3} = 1.73$]. **OR** A brooch is made with silver wire in the form of a circle with diameter 35 mm. The wire is also used in making 5 diameters which divide the circle into 10 equal sectors as shown in figure. Find. the area of each sector of the brooch. 	**2**
25.	Prove that the lengths of tangents drawn from an external point to a circle are equal.	**2**

(Section–C)

Section C consists of 6 questions of 3 marks each.

26.	Prove that the parallelogram circumscribing a circle is a rhombus.	**3**
27.	Prove that $\sqrt{2}+\sqrt{3}$ is an irrational number.	**3**
28.	If zeroes of the polynomial $x^2 + (a + 1)x + b$ are 2 and – 3, then find the value of (a + b).	**3**

29.	Prove the following Identities : $\frac{\sin A - 2\sin^3 A}{2\cos^3 A - \cos A} = \tan A$ (OR) Sec A (1-sin A) (sec A + tan A) =1	**3**
30.	A box contain 90 paper discs which are numbered from 1 to 90. There is only one number on a disc. If one disc is drawn at random from the box find the probability that it bears (i). a two-digit number. (ii). a perfect square number. (ii). a number divisible by 5.	**3**
31.	Seven times a two-digit number is equal to four times the number obtained by reversing the order of the digits. If the difference of the digits is 3, determine the number.. **OR** Draw the graph of the equation x – y + 1 = 0 and 3x + 2y – 12 = 0. Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis and shade the triangular region.	**3**
	(Section–D) **Section D consists of 4 questions of 5 marks each**	
32.	Ram and Shyam together have 55 marbles. Both of them lost 5 marbles each and the product of the number of marbles they have each 164. Find out how many marbles they had to start with ?	**5**
33.	Prove that If a line is drawn parallel to one side of a triangle to intersect other two sides in distinct points, the other two sides are divided in the same ratio.	**5**
34.	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 – OR The decorative block shown in the 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. (Take $\pi = \frac{22}{7}$)  	**5**

35. Find the mean and median of the following data: **5**

Class	40-45	45-50	50-55	55-60	60-65	65-70
Frequency	8	9	10	9	5	4

OR

If the median of the distribution table given below is 28.5, find the values of x and y.

Class interval	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	5	x	20	15	y	5

Section–E

Section E consists of 3 case study-based questions of 4 marks each.

36. Amit wants to buy a car and plans to take loan from a bank for his car. He repays his total loan of ₹ 1,18,000 by paying every month starting with the first installment of ₹ 1000. If he increases the installment by ₹ 100 every month , answer the following:

Based on the above information answer the following questions:

(i) Find the amount paid by Amit in the 30^{th} installment. **1**

(ii) What amount does Amit still have to pay after the 30^{th}installment ? **2**

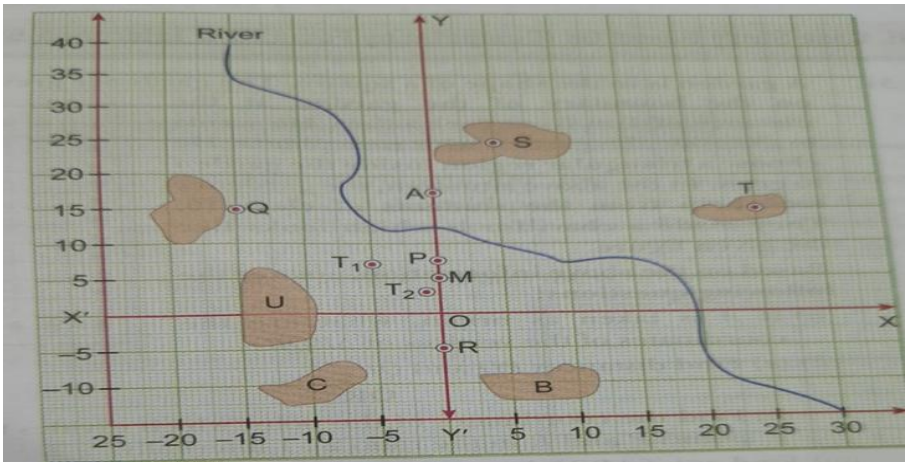
OR

If the total number of installments is 40, What is the amount paid in the last installment ? **2**

(iii) Find the ratio of the 1st installment to the last installment. **1**

37. National Park: A national park is an area set aside by the government to preserve and protect the natural environment.

The graph below shows a map of National Park. The shaded areas indicate words. The plain area indicates meadows and fields without trees. Point O on the graph represents the location of the park's supervisor's office, And Point P and Q are the ranger's towers.



Based on the above information answer the following questions:

(i) Find the distance between the Towers P (0,7.5) and Q (-15,15).

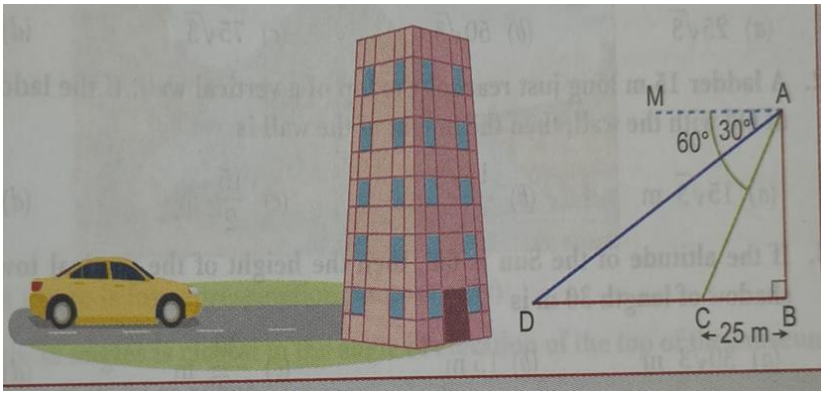
(ii) Find the point on x- axis (other than 0) equidistant from the points R(0,-5) and M(0,5).

OR

There are two trees T1 (-5,7) and T2 (-1,3) in the park. Find the coordinates of the mid-point of the line segment joining both the trees.

(iii) Find the distance of the point S (5,25) from x- axis.

38 Rohit is standing at the top of a building and observes a car at the angle of depression of 30° as it approaches the base of the building at a uniform speed. 6 seconds later, the angle of depression increases to 60° , and at that moment, the car is 25 m away from the building.



Based on the above information, answer the following questions.

(i) What is the height of the building?

	(ii) What is the distance between two positions of the car ? (iii) What would be the total time taken by the car to reach the foot of the building from starting point? OR What is the distance of the observer from the car when it makes an angle of 60° ?	

---------- END OF QUESTIONS----------