KENDRIYA VIDYALAYA SANGTHAN JABALPUR REGION
PRE BOARD (2025-26)
MATHEMATICS STANDARD – Code No.041
CLASS – X

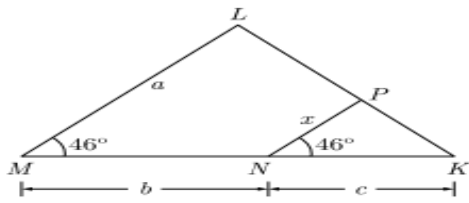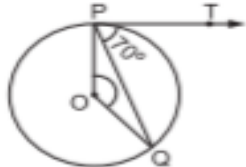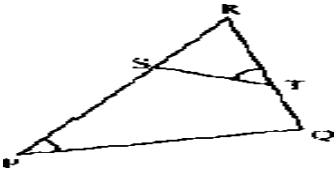**Maximum Marks: 80**　　　　　　　　　　　　　　　　　　　　　**Time: 3 hours**
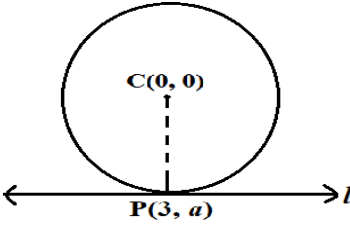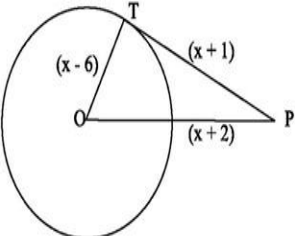
General Instructions:

<u>Read the following instructions carefully and follow them:</u>

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 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 $\pi = \frac{22}{7}$ wherever 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 a $=x^3\,y^2\,z^2$, b$= x^2 y^2 z^3$, and c$=x^3 y^2 z^n$ and the LCM (a,b,c) $= x^3 y^2 z^5$ then the value of n is: (a) 3　　　　　　　(b) 2　　　　　　　(c) 5　　　　　　　(d) 1	1
2.	The greatest possible speed at which a man can walk 135 km and 225 km in exact number of hours is: (a) 5 km/hr　　　　(b) 15 km/hr　　　　(c) 65 km/hr　　　　(d) 45 km/hr	1
3.	For the equation $x^2 + 5x - 1$, which of the following statements is correct? (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 and irrational (d) The discriminant is equal to zero	1
4.	If α and β are zeroes of the polynomial ax^2-5x+c and α+β=αβ=10, then (a) a=5, c=$\frac{1}{2}$　　　(b) a=1,c=$\frac{5}{2}$　　　(c) a=$\frac{5}{2}$,c=1　　　(d) a=$\frac{1}{2}$,c=5	1

5.	The point of intersection of the lines represent by 3x –y =3 and y axis is given by (a) (0, -3) (b) (0, 3) (c) (2, 0) (d) (-2,0)	1
6.	The maximum value of $1/\csc\alpha$ is (a) 0 (b) 1 (c) $\sqrt{2}/3$ (d) $\sqrt{1}/2$	1
7.	In the given figure , value of x is: (a) $\frac{ab}{a+b}$ (b) $\frac{ac}{b+c}$ (c) $\frac{bc}{b+c}$ (d) $\frac{ac}{a+c}$	1
8.	What is y-coordinate of the mid-point (3,7) and (5,9)? (a) 7 (b) 8 (c) 6 (d) 9	1
9.	The length of the diagonal of a rectangle with vertices A (1, 2) B (1,5) C(6,5) D (6,2): (a) $\sqrt{34}$ (b) 5 (c) $\sqrt{52}$ (d) 50	1
10.	Distance between points P(3,0) and Q (2, $\tan\theta$) is : (a) $\sec\theta$ (b) $\csc\theta$ (c) 2 (d) $\tan\theta$	1
11.	If $\sqrt{2} \sin (60° - \alpha) = 1$ then α is: (a) 45° (b) 15° (c) 60° (d) 30°	1
12.	In a sector of a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. The length of the corresponding chord is: (a) 20cm (b) 21cm (c) 22cm (d)25cm	1
13.	If two tangents inclined at an angle 60° are drawn to a circle of radius 3 cm, then length of each tangent is equal to: (a) $\frac{3}{2}\sqrt{3}$ cm (b) 6 cm (c) 3 cm (d) $3\sqrt{3}$ cm	1
14.	If PT is a tangent to a circle with centre O and PQ is a chord of the circle such that ∠QPT = 70^0, then the measure of ∠POQ: (a) 100^0 (b) 50^0 (c) 90^0 (d) 140^0	1
15.	Difference of mode and median of a data is 24 . the difference of median and mean is (a) 12 (b) 24 (c) 8 (d) 36	1
16.	The probability that a non-leap year has 53 Sundays , is : (a) 2/7 (b) 1/7 (c) 3/7 (d) 1	1

17.	A right triangle with sides 3 cm, 4 cm and 5 cm is rotated about the side of 3 cm to form a cone. The volume of the cone so formed is: (a) 12π cm³ (b) 14π cm³ (c) 16π cm³ (d) 118π cm³	1
18.	A card is drawn at random from a well-shuffled pack of 52 cards. The probability that the card drawn is not an ace is : (a) $\dfrac{1}{13}$ (b) $\dfrac{9}{13}$ (c) $\dfrac{4}{13}$ (d) $\dfrac{12}{13}$	1

	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): From a point P, 10 cm away from the center of the circle, a tangent PT of length 8 cm is drawn, then the radius of the circle is 5 cm. Reason (R): A line drawn through the end of the radius and perpendicular to the radius is the tangent to the circle.	1
20.	Assertion (A): 2 is an example of a rational number. Reason(R): The square roots of all positive integers are irrational numbers.	1
(Section – B) **Section B consists of 5 questions of 2 marks each.**	
21.(A) **(B)**	Find the sum of the first 25 terms of an A.P. whose n^{th} term is given by $a_n = 2 - 3n$. **OR** Find how many two-digit numbers are divisible by 6?	2
22.	S and T are point on sides PR and QR of ΔPQR such that ∠P = ∠RTS. Show that ΔRPQ ~ ΔRTS. 	2
23.	If Sin(A-B) =1/2 , Cos(A+B) = 1/2 where $0 < A + B \leq 90^0$, A$> B$. Find A and B	2

24. (A)	The length of the minute hand of a clock is 21 cm. Find the area swept by the minute hand in 10 minutes.	2
(B)	**OR** Find the area of a quadrant of a circle whose circumference is 44 cm.	

25.	Find the radius of the circle with centre at origin, if line l given by $x + y = 5$ is tangent to the circle at point P. 	2

(Section – C)
Section C consists of 6 questions of 3 marks each.

26.	To prove $\frac{5+2\sqrt{7}}{3}$ is irrational, which basic knowledge you must have, write it. And prove $\frac{5+2\sqrt{7}}{3}$ is irrational with the help of that basic knowledge.	3
27.	If α and β are zeroes of a polynomial $6x^2 - 5x + 1$, then form a quadratic polynomial whose zeroes are α^2 and β^2	3
28.	Find the value of k for which the system: x + 2y = 5, 3x + ky + 15 = 0 has a unique solution. OR Solve the pair: 49x + 51y = 499, 51x + 49y = 501	3
29.	Prove that: $\frac{sinA - cosA + 1}{sinA + cosA - 1} = \frac{1}{secA - tanA}$ OR $\quad \frac{sin^3\theta + cos^3\theta}{sin\theta + cos\theta} = 1 - sin\theta\ cos\theta$	3
30.	In the figure given below, find the actual length of sides of ΔOTP. OT is radius of the circle. 	3

31.	Two dice are thrown at the same time. What is the probability that the sum of the two numbers appearing on the top of the dice is:
	    (i) at least 9
	    (ii) 7
	    (iii) less than or equal to 6
		3

(Section – D)
Section D consists of 4 questions of 5 marks each

32.	Aviation analysts are reviewing the impact of weather on flight timings. For one particular flight of 600 km, they discovered that the reduction of 200 km/h in cruising speed resulted in a half-hour increase in travel time. "From these observations, infer the intended duration of the journey before the reduction in speed occurred".	5
33.	(i)Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio. (ii)Using the above theorem, prove that if ABCD is a trapezium in which AB ∥ DC and its diagonals intersect each other at the point E then $\dfrac{AE}{BE} = \dfrac{CE}{DE}$	5
34	A solid iron pole consists of a cylinder of height 220 cm and base diameter 24 cm, which is surmounted by another cylinder of height 60 cm and radius 8 cm. Find the mass of the pole, given that 1 cm^3 of iron has approximately 8 gm mass. (Use π= 3.14) OR A vessel full of water is in the form of an inverted cone of height 8 cm and the radius of its top, which is open, is 5 cm. 100 spherical lead balls are dropped into vessel. One-fourth of the water flows out of the vessel. Find the radius of a spherical ball.	5
35.	The distribution below gives the marks of 100 students of a class, if the median marks are 24, find the frequencies f_1 and f_2.	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 mean of the following data is 42. Find the missing frequencies x and y if the sum of frequencies is 100.

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	7	10	x	13	y	10	14	9

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

36.	In the month of April to June 2022, the exports of passenger cars from India increased by 26% in the corresponding quarter of 2021–22, as per a report. A car manufacturing company planned to produce 1800 cars in 4th year and 2600 cars in 8th year. Assuming that the production increases uniformly by a fixed number every year.	4

Based on the above information answer the following questions.

(i) Find the production in the 1st year. **1**

(ii) Find the production in the 12th year. **1**

(iii) Find the total production in first 10 years. **2**
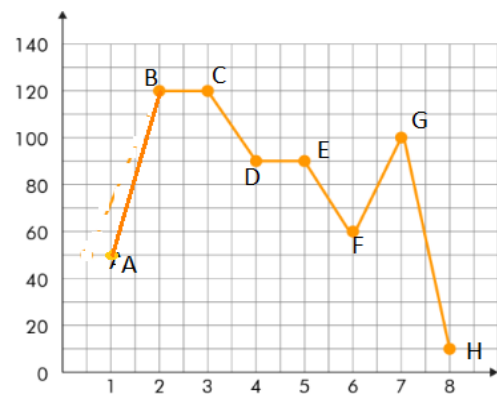
OR

In how many years will the total production reach 31200 cars?

37

The city municipal corporation plans to set up **multi-level parking stations** at various coordinates.

The height (y-axis) represents **parking capacity (in units)**, and the x-axis shows the **location number** along a main road.

The proposed locations are:
- A – Small Community Parking
- B – Commercial Complex Parking
- C – Railway Station Parking
- D – Stadium Parking
- E – Bus Stand Parking
- F – Housing Colony Parking
- G – Mall Parking
- H– Open Ground Parking

(i) The length of line segment CD is **1**

(ii) The coordinates of the booth if the contractor wants to build it halfway between F and G **1**

(iii) A solar-powered charging point will be placed on the line joining G and H such that the division ratio is **2:3**.

Find its coordinates. **2**

OR

(iii) A digital signboard must be placed on the **x-axis** such that it is equidistant from Stadium Parking (D) and Bus Stand Parking (E).

Find its coordinates.

| 38 | A group of students of class X visited India Gate on an educational trip. The teacher and students had interest in history as well. The teacher narrated that India Gate, officially named 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?

1

(ii) Find the length of the shadow cast by the India Gate if the elevation of the Sun is at 60º?

1

(iii) If the shadow and the monument stand equal in measure at that instant, what must be the Sun's angle of elevation?

2

OR

(iii)To take a wide-angle photograph from a higher viewpoint, a media person sets up a long ladder on the pavement. What should be the minimum length of such a ladder so that it exactly connects the ground point to the tip of the monument if he places it exactly equal to the height of the monument from the base.?