VSI INTERNATIONAL SCHOOL

SP-6(A/1), Sitapura Industrial Area, Pratap Nagar-Jaipur (Raj.)

Affiliated to CBSE Delhi, Affiliation No: -1731160

SAMPLE PAPER (2025-26)

SUBJECT – MATHEMATICS STANDARD (041)

CLASS – X

TIME ALLOWED: 3 HOURS **MAXIMUM MARKS: 80**

General Instructions:

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 $\pi = \frac{22}{7}$ wherever required if not stated.
11. Use of calculators is not allowed.

Section – A

Section A consists of 20 questions of 1 mark each

1. If $6370 = 2^m \times 5^n \times 7^k \times 13^p$, then the value of m + n + k + p is

(A) 2 (B) 3

(C) 4 (D) 5

2. If C(1, –1) is the mid-point of the line segment AB joining points A(4, x) and B(– 2, 4), then value of x is :

(A) 5 (B) – 5

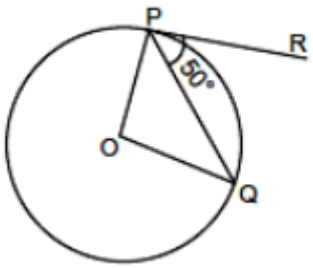
(C) 6 (D) – 6

3. If the system of equations 3x + y = 1 and (2k – 1)x +(k – 1)y = 2k + 1 is inconsistent, then k =

(A) –1 (B) 0

(C) 1 (D) 2

4. In figure if O is centre of a circle, PQ is a chord and the tangent PR at P makes an angle of 50° with PQ, then POQ is equal to



(A) 100° (B) 80°

(C) 90° (D) 75°

5. If $\tan\theta = \frac{a}{b}$ then the value of $\frac{a\sin\theta + b\cos\theta}{a\sin\theta - b\cos\theta}$ is

(A) $\frac{a^2 - b^2}{a^2 + b^2}$ (B) $\frac{a^2 + b^2}{a^2 - b^2}$

(C) $\frac{a}{a^2 + b^2}$ (D) $\frac{b}{a^2 + b^2}$

6. The value(s) of k for which the quadratic equation $2x^2 + kx + 2 = 0$ has equal roots, is

(A) 4 (B) ± 4

(C) – 4 (D) 0

7. The area of the square that can be inscribed in a circle of radius 8 cm is

(A) 256 cm² (B) 128 cm²

(C) $64\sqrt{2}$ cm² (D) 64 cm²

8. Two dice are rolled together. The probability of getting sum of numbers on the two dice as 2, 3 or 5, is:

(A) 7/36 (B) 11/36

(C) 5/36 (D) 4/9

9. If $\sqrt{3}\sin\theta - \cos\theta = 0$ and $0° < \theta < 90°$, find the value of θ.

(A) 30° (B) 45°

(C) 60° (D) 0°

10. If $a = 2^3 \times 3$, $b = 2 \times 3 \times 5$, $c = 3^n \times 5$ and LCM (a, b, c) $= 2^3 \times 3^2 \times 5$, then n is equal to

(A) 1 (B) 2

(C) 3 (D) 4

11. If the sum of the zeroes of the polynomial $p(x) = (p^2 - 23)x^2 - 2x - 12$ is 1, then p takes the value (s)

(A) $\sqrt{23}$ (B) –23

(C) 2 (D) ±5

12. A sphere of diameter 18 cm is dropped into a cylindrical vessel of diameter 36 cm, partly filled with water. If the sphere is completely submerged then the water level rises by

(A) 4cm (B) 5 cm

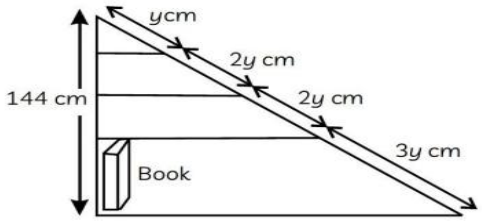
(C) 3 cm (D) 6 cm

13. An arc of a circle is of length 5π cm and the sector it bounds has an area of 20π cm². Then the radius of the circle is:

(A) 4 cm (B) 8 cm

(C) 12 cm (D) 16 cm

14. Akash has a triangular cabinet that fits under his staircase. There are four parallel shelves as shown below. The total height of the cabinet is 144 cm. What is the maximum height of a book that can stand upright on the bottom-most shelf?



(A) 18 cm (B) 36 cm

(C) 54 cm (D) 86.4 cm

15. In an MCQ test, a student guesses the correct answer x out of y times. If the probability that the student guesses the answer to be wrong is 2/3 then what is the relation between x and y

(A) $y = 3x$ (B) $x = 3y$

(C) $3x = 2y$ (D) $2x = 3y$

16. If (a, b) is the mid-point of the line segment joining the points A (10, –6) and B (k, 4) and $a - 2b = 18$, the values of k is

(A) 30 (B) 22

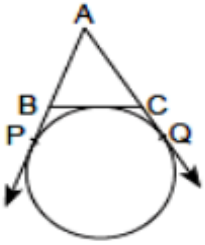
(C) 4 (D) 40

17. The mean and median of a distribution are 14 and 15, respectively. The value of the mode is:

(A) 16 (B) 17

(C) 18 (D) 13

18. 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



(A) 7.5 (B) 15

(C) 10 (D) 9

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 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):** 6^n ends with the digit zero, where n is natural number.

Reason (R): Any number ends with digit zero, if its prime factor is of the form $2^m \times 5^n$ where m, n are natural numbers.

20. **Assertion (A):** In a right ΔABC, right angled at B, if $\tan A = 1$, then $2 \sin A . \cos A = 1$.

Reason (R): $\tan 45° = 1$ and $\sin 45° = \cos 45° = 1/\sqrt{2}$

Section – B

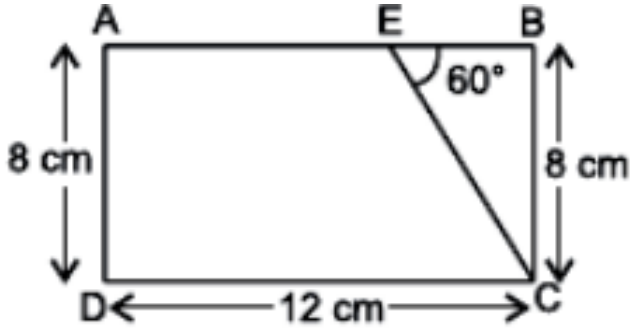
Section B consists of 5 questions of 2 marks each

21. **(A).** Which term of the progression 19, $18\frac{1}{5}$, $17\frac{2}{5}$,..... is the first negative term.

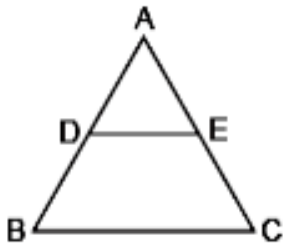
OR

(B). If seven times the 7th term of an A.P. is equal to eleven times the 11th term, then what will be its 18th term?

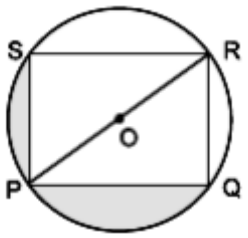
22. In the given figure, ABCD is a rectangle with AD = 8 cm and CD = 12 cm. Line segment CE is drawn, making an angle of 60° with AB, intersecting AB at E. Find the length of CE and BE.



23. In figure, D and E are points on AB and AC respectively, such that DE || BC. If AD = $\frac{1}{3}$ BD, AE = 4.5 cm, find AC.

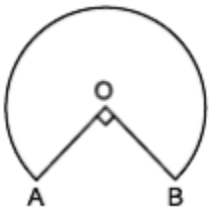


24. **(A)** In the figure, PQRS is a square and O is centre of the circle. If Radius = $10\sqrt{2}$, then calculate the area of shaded region.

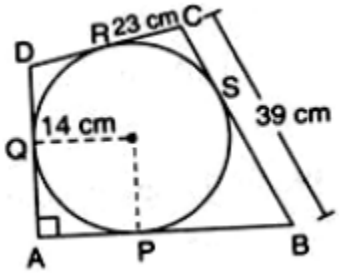


OR

(B) In the given figure, the shape of the top of a table is that a sector of a circle with centre O and ∠AOB = 90°. If AO = OB = 42 cm, then find the perimeter of the top of the table. [Use = $\frac{22}{7}$)



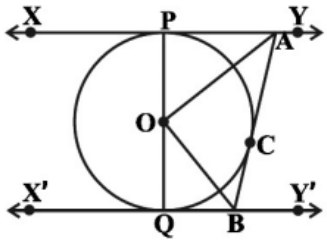
25. In the given figure, quadrilateral ABCD is circumscribed, touching the circle at P, Q, R and S such that ∠DAB = 90°, If CR = 23 cm and CB = 39 cm and the radius of the circle is 14 cm, then find the measure of AB.



Section – C

Section C consists of 6 questions of 3 marks each

26. In the below figure, XY and X′Y′ are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting XY at A and X′Y′ at B. Prove that ∠AOB = 90°.



27. Given that √3 is irrational, prove that 5 + 2√3 is irrational.

28. Find the value of k such that the polynomial $x^2 - (k + 6)x + 2(2k - 1)$ has sum of its zeroes equal to half of their product.

29. (A) Prove that: $\frac{\sin\theta+\cos\theta}{\sin\theta-\cos\theta}+\frac{\sin\theta-\cos\theta}{\sin\theta+\cos\theta}=\frac{2\sec^2\theta}{\tan^2\theta-1}$

OR

(B) If cosec θ – sin θ = m and sec θ – cos θ = n, prove that $(m^2n)^{2/3} + (mn^2)^{2/3} = 1$.

30. Two dice are thrown simultaneously. What is the probability that

(i) 6 will not come up on either of them?

(ii) 6 will come up on at least one?

(iii) 6 will come up at both dice?

31. (A) Using graphical method, solve the following system of equations:

3x + y + 4 = 0 and 3x – y + 2 = 0

OR

(B) Places X and Y are 100 km apart on a highway. One car starts from X and another from Y at the same time. If the cars travel in the same direction at different speeds, they meet in 5 hours. If they travel towards each other, they meet in 1 hour. What are the speeds of two cars?

Section – D

Section D consists of 4 questions of 5 marks each

32. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then prove that the other two sides are divided in the same ratio. Also in ΔABC, PQ || BC. If PB = 6 cm, AP = 4 cm, AQ = 8 cm, find the length of AC.

33. A life insurance agent found the following data for distribution of ages of 100 policy holders. Calculate the median age, if policies are given only to persons having age 18 years onwards but less than 60 years.

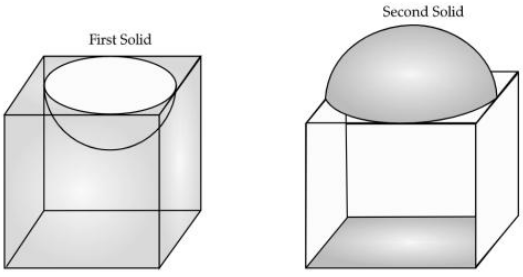
Age (in years)	Number of policy holders
Below 20	2
Below 25	6
Below 30	24
Below 35	45
Below 40	78
Below 45	89
Below 50	92
Below 55	98
Below 60	100

34. **(A)** Find the value of 'P' for which the quadratic equation $P(x - 4)(x - 2) + (x - 1)^2 = 0$ has real and equal roots

OR

(B) A fast train takes 3 hours less than a slow train for a journey of 600 km. If the speed of the slow train is 10 km/h less than that of the fast train. Find the speed of both the train and how much time is taken by slower train to cover 600 km.

35. **(A)** There are two identical solid cubical boxes of side 7cm. From the top face of the first cube a hemisphere of diameter equal to the side of the cube is scooped out. This hemisphere is inverted and placed on the top of the second cube's surface to form a dome.



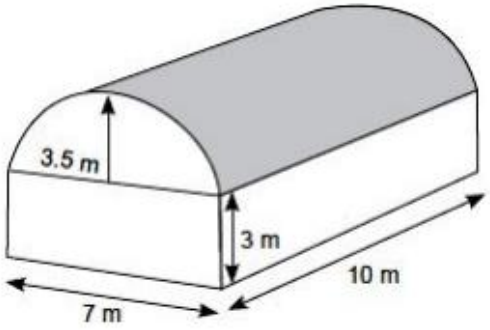
Find:

(i) the ratio of the total surface area of the two new solids formed

(ii) volume of each new solid formed.

OR

(B) A godown building is in the form as shown in the figure,



The vertical cross section parallel to the width side of the building is a rectangle of dimensions 7 m × 3 m, mounted by semicircle of radius 3.5 m. The inner measurements of the cuboidal portion of the building are 10 m × 7 m × 3 m. Find the interior surface excluding the floor.

Section – E

Section D consists of 3 questions of 4 marks each

36. A school auditorium has to be constructed with a capacity of 2000 people. The chairs in the auditorium are arranged in a concave shape facing towards the stage in such a way that each succeeding row has 5 seats more than the previous one. [1+1+2]

Based on the above information, answer the following questions:

(i) If the first row has 15 seats, then how many seats will be there in 12th row?

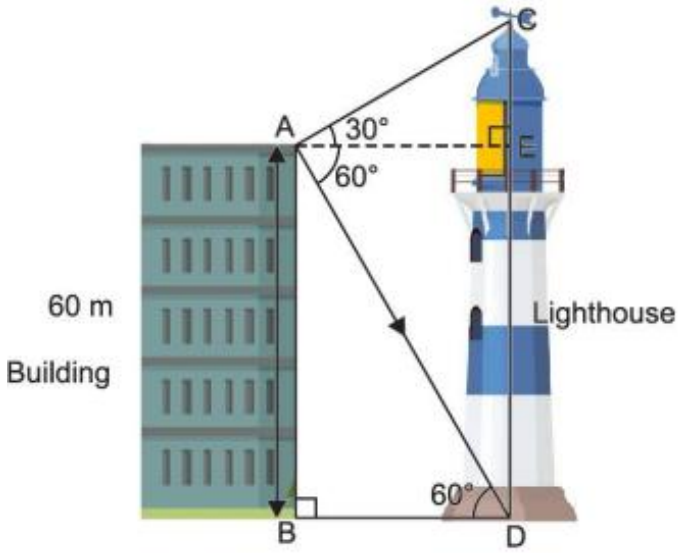
(ii) If there are 15 rows in the auditorium, then how many seats will be there in the middle row?

(iii) If total 1875 guests were there in the auditorium for a particular event, then how many rows will be needed to make all of them sit?

OR

(iii) If total 1250 guests were there in the auditorium for a particular event, then how many rows will be left blank out of total 30 rows?

37. Ram is watching the top and bottom of a lighthouse from the top of the building. The angles of elevation and depression of the top and bottom of a lighthouse from the top of a 60 m high building are 30° and 60° respectively. [2+2]



Based on the above information, answer the following questions:

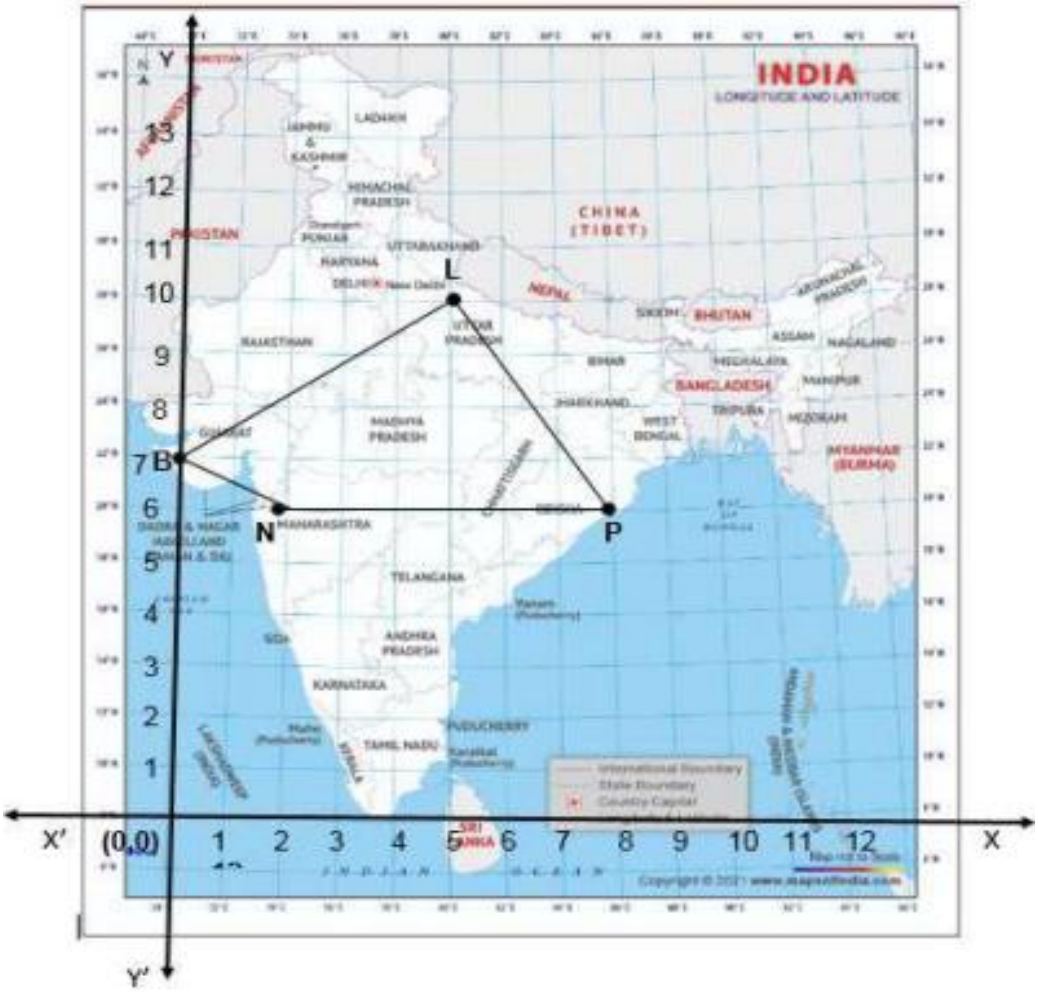
(i) The difference between the heights of the lighthouse and the building.

(ii) The distance between the lighthouse and the building.

OR

(ii) The ratio of the height of a light house and the length of its shadow on the ground is $\sqrt{3} : 1$, What is the angle of elevation?

38. In a GPS, The lines that run east-west are known as lines of latitude, and the lines running north-south are known as lines of longitude. The latitude and the longitude of a place are its coordinates and the distance formula is used to find the distance between two places. The distance between two parallel lines is approximately 150 km. A family from Uttar Pradesh planned a round trip from Lucknow (L) to Puri (P) via Bhuj (B) and Nashik (N) as shown in the given figure below. [1+1+2]



Based on the above information, answer the following questions:

(i) Find the distance between Lucknow (L) to Bhuj(B).

(ii) If Kota (K), internally divide the line segment joining Lucknow (L) to Bhuj (B) into 3 : 2 then find the coordinate of Kota (K).

(iii) Name the type of triangle formed by the places Lucknow (L), Nashik (N) and Puri (P)

OR

(iii) Find a place (point) on the longitude (y-axis) which is equidistant from the points Lucknow (L) and Puri (P).