HANSRAJ PUBLIC SCHOOL
SECTOR-6, PANCHKULA
CLASS-X, PRE-BOARD (2025-26)
SUBJECT- MATHEMATICS

Date- 29-12-2025 **Roll No.** 31
Time: 3 hours **Maximum Marks: 80**

General Instructions:
1. This question Paper has 5 Sections A, B, C, D and E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case study-based questions (04 marks each) with sub- parts of the values of 1, 1 and 2 marks each respectively.
7. All questions are compulsory. However, an internal choice in 2 questions of 5 marks, 2 questions of 3 marks and 2 questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take π =22/7 wherever required if not stated.

SECTION A

Section A consists of 20 questions of 1 mark each.

Q.1. The HCF of two numbers 65 and 104 is 13. If LCM of 65 and 104 is 40x, then the value of 'x' is (1)
(A) 5 (B) 13 (C) 40 (D) 8

Q.2. For what value of 'k' will k+9, 2k - 1 and 2k + 7 are the consecutive terms of an AP? (1)
(A) 18 (B) 13 (C) 8 (D) 10

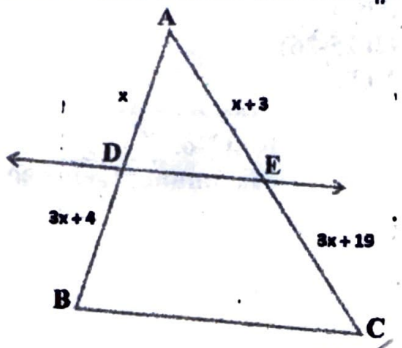
Q.3 The two zeroes of the polynomial $2x^2 - 6x - 3$ are of the form $\frac{3 \pm \sqrt{k}}{2}$, the value of 'k' is (1)
(A) 5 (B) 15 (C) -15 (D) 8

Q.4. The roots of the quadratic equation $y^2 + y - 1 = 0$ are (1)
(A) Irrational and distinct (B) not real
(C) rational and distinct (D) real and equal

Q.5. A ticket is drawn at random from a bag containing tickets numbered from 1 to 40. The probability that the selected ticket has a number which is a multiple of 5 is (1)
(A) 1/5 (B) 3/5 (C) 4/5 (D) 1

Q.6. A quadratic polynomial whose zeroes are $3 + \sqrt{2}$ and $3 - \sqrt{2}$ is (1)
(A) $x^2 - 6x + 7$ (B) $x^2 + 6x + 7$ (C) $x^2 - 6x - 7$ (D) $x^2 + 6x - 7$

Q.7 Find the value of x for which DE ∥ BC in the given figure. (1)

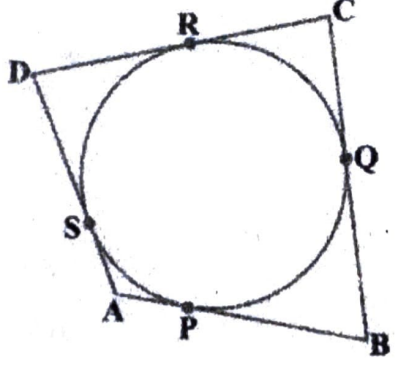


(A) 1 (B) 2 (C) 3 (D) 4

Q.8. If $\sin(A-B)=\frac{1}{2}$ and $\cos(A+B)=\frac{1}{2}$, $0°<A+B<90°$, A > B, then A and B are respectively. (1)

(A) $30^0, 45^0$ (B) $45^0, 30^0$ (C) $45^0, 15^0$ (D) $60^0, 15^0$

Q.9. In the given figure if AB = 6 cm, BC = 7cm and CD = 4 cm, then length of AD is: (1)



(A) 3 cm (B) 4 cm (C) 5 cm (D) 6 cm

Q.10 If $P(\frac{a}{3}, 4)$ is the mid-point of the line segment joining the points Q(-6,5) and R(-2,3), then the value of '**a**' is (1)

(A) -4 (B) -12 (C) 12 (D) -6

Q.11. If the system of equations 3x + y = 1 and (2k – 1)x + (k-1)y = 2k + 1 is inconsistent , then k = (1)

(A) -1 (B) 0 (C) 1 (D) 2

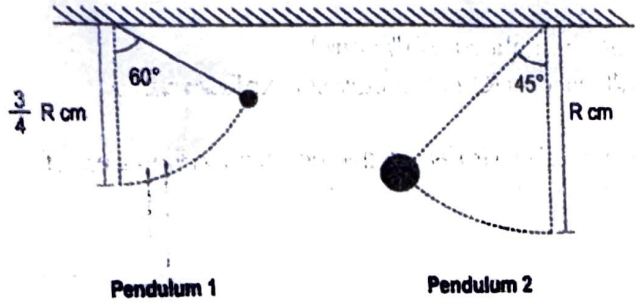
Q.12. The value of $2\sin^2 30^0 - 3\cos^2 45^0 + \tan^2 60^0 + 3\sin^2 90^0$ is (1)

(A) 1 (B) 5 (C) 0 (D) none of these

Q.13. The volume of the largest sphere that can be carved out of a cube of side 7cm is: (1)

(A) 179.66 cm^3 (B) 279.66 cm^3 (C) 169.66 cm^3 (D) 205 cm^3

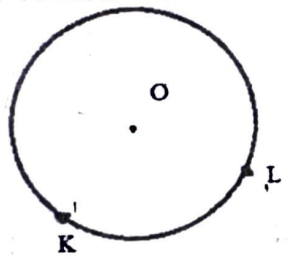
Q.14. Shown below are two pendulums of different length attached to a bar (1)



Based on the figure shown above, the arc length of pendulum 1 is _____ the arc length of pendulum 2.

(A) greater than (B) lesser than
(C) equal to (D) can not be answered without knowing the value of R

Q.15. A circle is shown below: - (1)



(i) There is only one line passing through point K which makes an angle of 90^0 with OK.
(ii) The shortest distance of a tangent passing through point L from the centre O is equal to the radius of the circle, OL.
(iii) One tangent can pass through two points K and L of a circle.
Which statement(s) is /are correct.

(A) (i) and (ii) (B) (iii) (C) (ii) and (iii) (D) (i), (ii), (iii)

Q.16. 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

Q.17. The mean of five numbers is 15. If we include one more number, the mean of six numbers becomes 17. The included number is (1)

(A) 27 (B) 37 (C) 17 (D) 25

Q.18. A bag contains 100 cards numbered 1 to 100. A card is drawn at random from the bag. What is the probability that the number on the card is a perfect cube? (1)

(A) $\frac{1}{20}$ (B) $\frac{3}{50}$ (C) $\frac{1}{25}$ (D) $\frac{7}{100}$

DIRECTION: In the question number 19 and 20, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct option

Q.19 Assertion (A): If the points A(4,3) and B(x,5) lie on a circle with centre O(2,3), then the value of 'x' is 2

Reason (R): Centre of a circle is the mid- point of each chord of the circle.

(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 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. (1)

Q.20. Assertion (A): If the volumes of two spheres are in the ratio 27:8. Then their surface areas are in the ratio 3:2.

Reason (R): Volume of the sphere $= \frac{4}{3}\pi r^3$ and its surface area $= 4\pi r^2$

(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 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. (1)

SECTION B

Section B consists of 5 questions of 2 marks each.

Q.21. Find the HCF of 612 and 1314 using prime factorisation method. (2)

OR

Explain whether $3 \times 12 \times 101 + 4$ is a prime number or composite number. (2)

Q.22 Show that the points A (5,1), B(1,4) and C(8,5) are the vertices of a right- angled triangle. (2)

Q.23. Find the ratio in which the segment joining the points (1,-3) and (4,5) is divided by x-axis? Also find the coordinates of this point on x – axis. (2)

Q.24. Find the value of x if ,2 $cosec^2 30° + x\ sin^2 60° - \frac{3}{4} tan^2 30° = 10$ (2)

Q.25. Tree Plantation Drive

A Group Housing society has 600 members, who have their houses in the campus and decided to hold a tree plantation drive on the occasion of new year. Each household was given the choice of planting a sampling of its choice. The number of different types of samplings planted were:

(i) Neem = 125 (ii) Peepal = 165 (iii) Creepers = 50 (iv) Fruit plants = 150

(v) Flowering plants = 110

On the opening ceremony, one of the plants is selected randomly for a prize.

What is the probability that the selected plant is

(A) a fruit plant or a flowering plant? (B) either a Neem plant or a Peepal plant? (2)

OR

Three unbiased coins are tossed together. Find the probability of getting:

(A) at least two heads (B) at most two tails (2)

SECTION C

Section C consists of 6 questions of 3 marks each.

1

12
28

96 | 2 | 4 12
7 | 2 6
3 | 1 3

$\frac{12+5}{5} = \frac{17}{5}$

Q.26. An arc of a circle of radius 10 cm subtends an angle of 60^0 at the centre. Find
(i) the length of the arc
(ii) the area of the minor segment of the circle made by the corresponding chord. (3)

OR

Rahul bought a pair of glasses with wiper blades. He was curious to know the area being cleaned by each of wiper blades. With the help of ruler and a protractor, he found the length of each blade as 3 cm and the angle swept as 60^0.

(i) Find the area that each wiper cleans in one swipe, in terms of π.
(ii) If the diameter of each circular glass is 5 cm, what percent (%) of the area of the glass will be cleaned by the blade in one swipe? (3)

Q.27. Prove that $\sqrt{5}$ is an irrational number. (3)

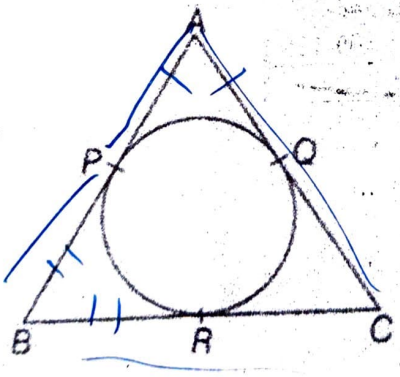
Q.28. Solve for x: $2x^2$-x-1/8 = 0 (3)

OR

A train travels a distance of 480 Km at uniform speed. If the speed had been 8 Km/ h less, then it would have taken 3 hours more to cover same distance. Find the speed of train.

Q.29. Prove that: $\frac{sinA+cosA}{sinA-cosA}+\frac{sinA-cosA}{sinA+cosA}=\frac{2}{2sin^2A-1}$ (3)

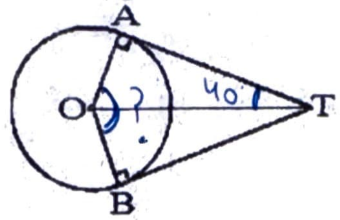
Q.30. (a) **In** the figure if AP = PB, then show that AC = BC



(3)

OR

(b) In figure, If ∠ATO = 40°, find ∠AOB



(3)

Q.31. Quadratic polynomial $2x^2 - 3x + 1$ has zeros as α and β. Now form a quadratic polynomial whose zeros are 3α and 3β. (3)

SECTION D

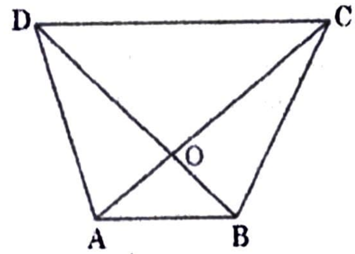
Section D consists of 4 questions of 5 marks each.

Q.32. (a) Solve the following pair of equations, graphically:
$2x + y = 6$; $2x - y + 2 = 0$ (5)

Q.33. State and prove basic proportionality theorem. (5)

OR

The diagonals of a quadrilateral ABCD intersect each other at the point O such that $\frac{AO}{BO} = \frac{CO}{OD}$. Show that quadrilateral ABCD is a trapezium.



(5)

Q.34. (A) The mean of the following frequency distribution is 62.8 and the sum of all the frequencies is 50. Compute the missing frequencies f_1 and f_2.

Classes	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	5	f_1	10	f_2	7	8

(5)

OR

(B) Find the median height.

Height (in cm)	Number of girls
Less than 140	4
Less than 145	11
Less than 150	29
Less than 155	40
Less than 160	46
Less than 165	51

(5)

Q.35. The angles of depression of the top and the bottom of an 8 m tall building from the top of a multi-storeyed building are 30° and 45°, respectively. Find the height of the multi-storeyed building and the distance between the two buildings. (5)

SECTION E

Case study-based questions are compulsory.

Q.36. India is a competitive manufacturing location due to the low cost of manpower and strong technical and engineering capabilities contributing to higher quality production runs. The production of TV sets in a factory increases uniformly by a fixed number every year. It produced 16000 sets in the 6^{th} year and 22600 in 9^{th} year. Based on the above information answer the following:

(i) What is the production during first year? (1)

(ii) Find the total production in(during) first 3 years. (1)

(iii) (A) In which year, the production was 29200? (2)

OR

(B) What was the difference in the production during 7^{th} year and the 4^{th} year? (2)

Q.37. Kumbh Mela is a major pilgrimage and festival in Hinduism. It is celebrated in a cycle of approximately 12 years at four river-bank pilgrimage sites: the Prayagraj (Ganges-Yamuna Sarasvati rivers confluence), Haridwar (Ganges), Nashik (Godavari), and Ujjain (Shipra). The festival is marked by a ritual dip in the waters. The seekers believe that bathing in these rivers is a means to prayaschitta for past mistakes, and that it cleanses them of their sins. Government of Uttarakhand is planning to procure tent for the pilgrims during Kumbh Mela. **The specification of tent is-** it is in the shape of cylinder surmounted by a conical top. The height and diameter of cylindrical part are 9m and 30m respectively and height of the conical part is 8m with same diameter as that of cylindrical part.

Based on the above information answer the following:

(i) What is the slant height of conical part? (1)

(ii) Find the area of the canvas used in making the tent. (1)

(iii) (A) Find the cost of canvas bought for the tent at the rate Rs 200 per sq m, if 30 sq m canvas was wasted during stitching. (2)

Or

(B) Find the volume of air in the tent. (2)

Q.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.

Based on the above information answer the following questions using the coordinate geometry.

(i) Find the distance between Lucknow (L) to Bhuj(B). (1)

(ii) Name the type of triangle formed by the places Lucknow (L), Nashik (N) and Puri(P) (1)

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