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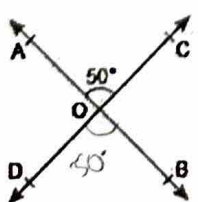IB|CAMBRIDGE|CBSE
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FINAL EXAMINATION– 2024-2025
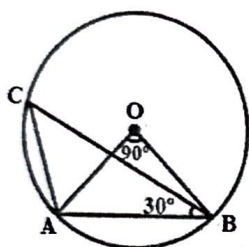
DATE: 01.02.2025

CLASS: IX

SUBJECT: MATHEMATICS

MAX. MARKS: 80

DURATION: 3 HOURS

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 based integrated units of assessment (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 two questions of 5 marks, two questions of 3 marks and two questions of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E

	SECTION – A (20x1=20M)	
	Section A consists of 20 questions of 1 mark each.	
1.	For rationalising the denominator of the expression $\frac{1}{\sqrt{12}}$ we multiply and divide by A) $\frac{1}{12}$ B) 12 C) $\sqrt{2}$ D) $\sqrt{3}$	1
2.	The value of $\frac{361^3+139^3}{361^2-361\times139+139^2}$ is A) 300 B) 500 C) 400 D) 600	1
3.	The coordinates of the point which lies on the x-axis and is 5 units away from the origin in the negative direction of x-axis are: A) (-5, 0) B) (5, 0) C) (0, 5) D) (0, -5)	1
4.	Given a rational number $-\frac{5}{9}$. This rational number can also be known as A) a natural number B) a whole number C) a fraction D) a real number	1
5.	If $x + y = 3$, $x^2 + y^2 = 5$ then xy is A) 1 B) 3 C) 2 D) 4	1
6.	The graph of the linear equation $2x + 3y = 6$ cuts the y-axis at the point: A) (0, 2) B) (0, 3) C) (3, 0) D) (2, 0)	1
7.	Which of the following needs a proof? A) Axiom B) Theorem C) Definition D) Postulate	1
8.	Which of the following is the general form of a linear equation in two variables? A) $ax + by = c$ B) $ax^2 + by^2 = c$ C) $ax + by + c = 0$ D) Both A and C	1
9.	In the given figure, if $\angle AOC = 50^0$, then $(\angle AOD + \angle COB)$ is equal to A) 100^0 B) 260^0 C) 140^0 D) 130^0	1

10.	The total number of chapters in Euclid's famous treatise "The Elements" is A) 13 B) 55 C) 460 D) 465	1
11.	The linear equation $3y - 5 = 0$ represented as $ax + by + c = 0$ has A) unique solution B) infinitely many solutions C) two solutions D) no solution	1
12.	If the difference between two complementary angles is 10^0, then the angles are A) $50^0 , 60^0$ B) $80^0 , 10^0$ C) $50^0 , 40^0$ D) $35^0 , 45^0$	1
13.	Choose the correct statement. A) A triangle has two right angles B) All the angles of a triangle are more than 60^0 C) All the angles of a triangle are less than 60^0 D) An exterior angle of a triangle is always greater than the opposite interior angles.	1
14.	In a parallelogram ABCD, E and F are the mid-points of sides AB and CD respectively. AF and CE meet the diagonal BD of length 12 cm at P and Q. Then length of PQ is A) 6 cm B) 4 cm C) 3 cm D) 5 cm	1
15.	In the given figure, $\angle AOB = 90^0$ and $\angle ABC = 30^0$, then $\angle CAO$ is equal to A) 30^0 B) 45^0 C) 90^0 D) 60^0	1
16.	A student gets a rhombus from a rectangle by A) joining the mid-points of adjacent sides B) joining the mid points of opposite sides C) reducing the longer side D) any one method from the above.	1
17.	If a right circular cone has radius 4 cm and slant height 5 cm then what is its volume? A) $\frac{332}{7}$ cm^3 B) $\frac{334}{7}$ cm^3 C) $\frac{342}{7}$ cm^3 D) $\frac{352}{7}$ cm^3	1
18.	In a frequency distribution, the mid-value of a class is 10 and the width of the class is 6. The lower limit of the class is A) 6 B) 7 C) 8 D) 12	1
19.	**Assertion(A)**: The value of 'k' for which the polynomial $(x - 3)$ is a factor of the polynomial $x^3 - x^2 - kx - 3$ is 5. **Reason (R)**: If $(x - a)$ is a factor of the polynomial $f(x)$, then $f(-a) = 0$. A) Both assertion and reason are correct and reason is the correct explanation for assertion B) Both assertion and reason are correct and reason is not the correct explanation for assertion. C) Assertion is true but the reason is false. D) Assertion is false and reason is true.	1
20.	**Assertion(A)**: The abscissa of point (3, 5) is 5. **Reason (R)**: The perpendicular distance from y-axis is called its abscissa. A) Both assertion and reason are correct and reason is the correct explanation for assertion B) Both assertion and reason are correct and reason is not the correct explanation for	2

assertion.

C) Assertion is true but the reason is false.

D) Assertion is false and reason is true.

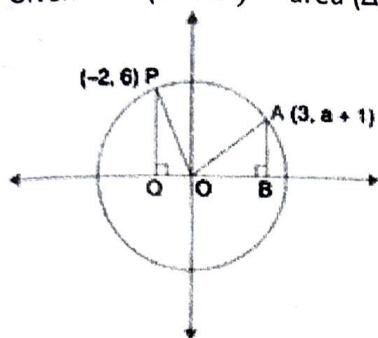## SECTION – B (5x2=10M)

Section B consists of 5 questions of 2 marks each.

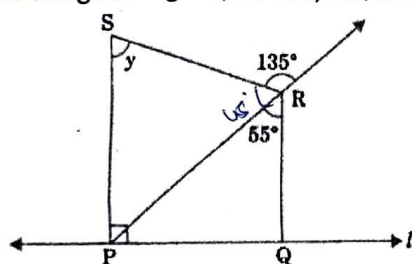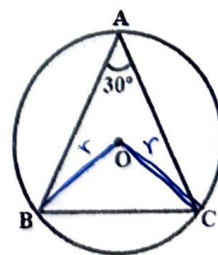| 21.	If $p(x) = x^2 - 2\sqrt{2}x + 1$, then find the value of $p(2\sqrt{2})$. **OR** If $49x^2 - b = \left(7x + \frac{1}{2}\right)\left(7x - \frac{1}{2}\right)$, then find the value of b.	2
22.	Given area (ΔOAB) = area (ΔOPQ). Find the ordinate of point A. (−2, 6) P A (3, a + 1) Q O B	2
23.	In the given figure, PS $\perp$ l, RQ $\perp$ l. Find the measure of y . S y 135° R 55° P Q l **OR** In the given figure, $\angle A = 50^0$ and the external bisectors of $\angle B$ and $\angle C$ join at O. Find the measure of $\angle BOC$. A 50° B C O	2
24.	In the given figure, ABC is a triangle in which $\angle BAC = 30^0$. Show that BC is equal to the radius of the circumcircle of ΔABC, whose centre is O. A 30° r O r B C	2
25.	For Diwali celebrations, a packet of 'conical diyas' is bought. In that, there are 15 conical diyas, with red glittering polish surface (including the base). Jaya took a scale and noted the following information: Radius of the base is 4 cm and the slant height is 10 cm. Then calculate the polished surface area of all diyas.	2
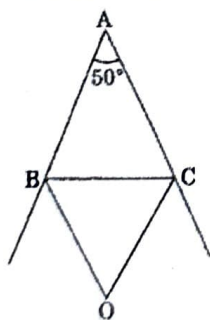
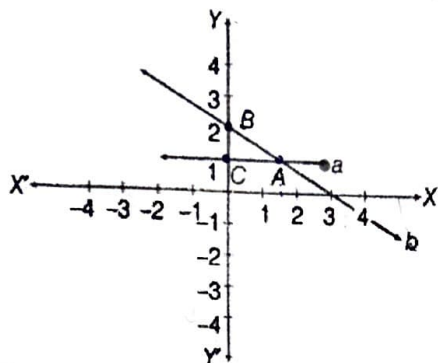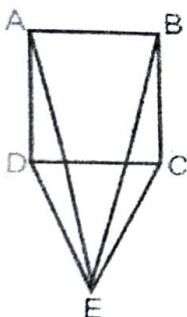|			
		SECTION – C (+x3=18M)	
		Section C consists of 6 questions of 3 marks each	
26.		Express $0.00\overline{32}$ in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.	3
		OR	
		Locate $\sqrt{4.7}$ on the number line.	
27.		A student wrote the equations of the lines a and b drawn in the following graph as $y = 1$, $2x + 3y = 6$ respectively. Is he right? If yes, then write the coordinates of point of intersection of lines a and b. Also, find the area enclosed between these lines and Y-axis. 	3
28.		In the given figure, $\triangle CDE$ is an equilateral triangle formed on the side CD of a square ABCD. Show that $\triangle ADE \cong \triangle BCE$. 	3
29.		The diagonals AC and BD of a parallelogram ABCD intersect each other at the point O. If $\angle CAD = 32^0$ and $\angle AOB = 90^0$, find $\angle DBC$.	3
30.		Find the area of triangle whose sides are 18 cm, 24 cm, and 30 cm.	3
31.		A hemispherical bowl of internal diameter 36 cm contains liquid to its brim. This liquid is to be filled in conical bottles of radius 3 cm and height 6 cm. How many bottles are required to empty the bowl? **OR** The volumes of two spheres are in the ratio 64 : 27. Find their radii, if the sum of their radii is 21 cm.	3
		SECTION – D (4x5=20M)	
		Section D consists of 4 questions of 5 marks each:	
32.		If $\dfrac{9^n \times 3^2 \times \left[3^{\frac{-n}{2}}\right]^{-2} - (27)^n}{3^{3m} \times 2^3} = \dfrac{1}{27}$, then prove that $m - n = 1$	5
33.		Find the value of $x^3 + y^3 + z^3 - 3xyz$ if $x^2 + y^2 + z^2 = 83$ and $x + y + z = 15$.	5
34.		State and prove Central Angle Theorem. **OR**	5

In the given figure, AB is a diameter of the circle, CD is a chord equal to the radius of the circle. AC and BD when extended intersect at a point E. Prove that $\angle AEB = 60^0$.
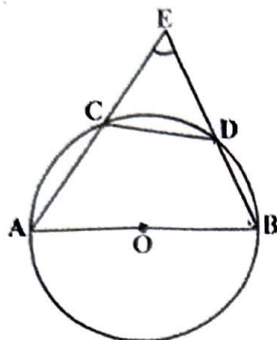
35. Draw a histogram to represent the following frequency distribution.

Class interval	10-15	15-20	20-30	30-50	50-80
Frequency	6	10	10	8	18

OR

Draw a frequency polygon representing the following frequency distribution.

Class Interval	30-34	35-39	40-44	45-49	50-54	55-59
Frequency	12	16	20	8	10	4

5

SECTION – E (3x4=12M)

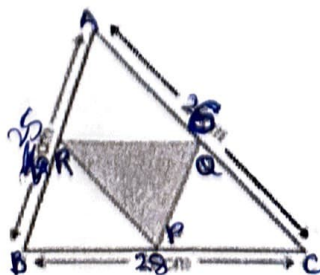Section-E consists of 3 questions of each 4 marks.

Case- based questions

36. Our excessive dependence on motorised road transport imposes significant economic costs on society. These include congestion, road causalities, physical inactivity and ill health caused by it e.g. Obesity. Cycling could substantially reduce these risks, while strengthening local economies in both urban and rural areas, supporting local businesses and property values; boosting the economic productivity. A bicycle is being lent at fixed charges for the first three days of week and an additional charge of each day thereafter. Mr. Sam paid ₹ 27 for a cycle kept for seven days. If fixed charges are ₹ x and per day charges are ₹ y then from the above information answer the following questions.

(i)   Write the linear equation formed.   **1**

(ii) What will be the equation formed if Mr. Sam paid ₹ 30 for 6 days?   **1**

(iii) If fixed charge is ₹ 15, find the additional charge paid by Mr. Sam for each extra day (for question (i)).   **2**

OR

(iii) If per day charge is ₹ 5, find the fixed charge for first three days. (for question (ii))

37. There is a Diwali celebration in the DPS school Janakpuri New Delhi. Girls were asked to prepare Rangoli in a triangular shape. They made a rangoli in the shape of triangle ABC with the dimensions of △ABC being 26 cm, 28 cm, 25 cm.

Based on the figure given above answer the following questions:

(i) In the figure, R is mid-point of AB and RQ || BC. Find the length of AQ.   1

(ii) In the figure R and Q are mid-points of AB and AC respectively. Find the length of RQ.   1

(iii) If a garland is to be placed along the side of △QPR which is formed by joining the midpoints, then find the length of the garland.   2

OR

(iii) In the following figure R, P and Q are the mid-points of AB, BC, and AC respectively. Find the area of △PQR?

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38. Winnowing method is used to remove the wheat grain from husk by wind or by blowing air. This method is based on the fact that husk particles are very light whereas wheat grains are comparatively heavy.

The mixture is allowed to fall from a height by shaking winnowing basket continuously. The husk particles are carried away by the wind to a greater distance. The wheat grains, being heavy, fall down vertically to the ground and form a heap of wheat grain which is generally conical in shape.

On the basis of the above information, answer the following:

After completing the winnowing process, a women farmer found that the diameter of the wheat cone so formed is 8m and height is 3 m.

(i) How much volume of wheat is collected by the women farmer? $\frac{1}{3}\pi r^2 h$ 1

(ii) Find the slant height of the conical heap of wheat. $l^2 = h^2 + r^2$ 1

(iii) Find the area of canvas required to protect the heap of wheat from rain if slant height is 7.5 m.   2

OR

(iii) It is observed that the diameters of two conical heaps of wheat are equal but their slant heights are in the ratio 9:5 find the ratio of their curved surface area.