Class- IX No of Printed Pages - 8

Annual Examination 2024-25

Subject- Mathematics

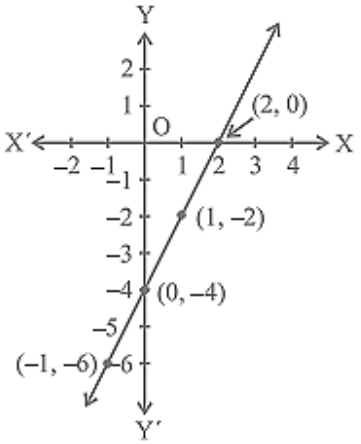
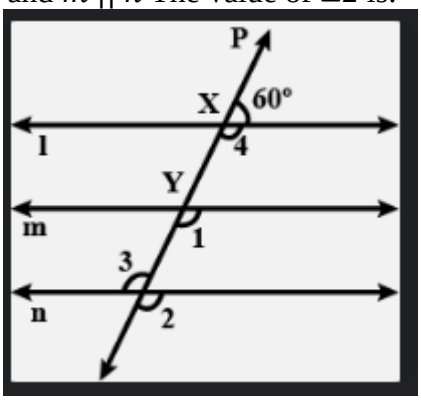
Set – A1

Time Allowed: 3 Hrs. Maximum Marks: 80

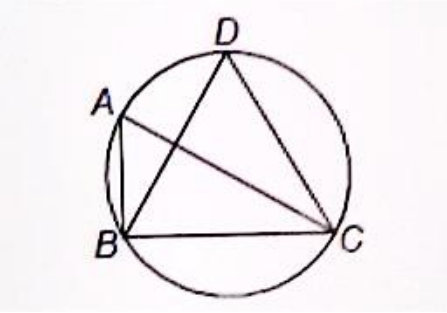
General Instructions:

1. This Question Paper has 5 Sections A-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 subparts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2marks 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.	
		MARKS
1.	Which of the following is an irrational number? (a) $\sqrt{\frac{4}{9}}$ (b) $\frac{\sqrt{12}}{\sqrt{3}}$ (c) $\sqrt{7}$ (d) $\sqrt{81}$	**1**
2.	The rationalising factor of $\sqrt{3}+\sqrt{5}$ is (a) $\sqrt{3}-5$ (b) $3-\sqrt{5}$ (c) $\sqrt{5}+\sqrt{3}$ (d) $\sqrt{3}-\sqrt{5}$	**1**
3.	The value of $'a'$ for which (-1) is the zero of the polynomial $5x^3-9x^2-ax+18$ is (a) (-3) (b) 2 (c) 4 (d) (-2)	**1**
4.	The value of $(249)^2-(248)^2$ is (a) 1 (b) 477 (c) 487 (d) 497	**1**
5.	Two tanks have equal volume of water. After $10l$ of water is taken out from each tank, the tanks still have the same volume. Which of these axioms is demonstrated by this situation? (a) If equals are added to equals, the wholes are equals. (b) If equals are subtracted from equals, then remainders are equals. (c) Things which are equal to the same thing are equal to one another. (d) A whole is greater than the part.	**1**
6.	The mirror image of the point $(-7,8)$ with respect to $x-axis$ lies in the (a) IV quadrant (b) III quadrant (c) II quadrant (d) I quadrant	**1**
7.	The point which does not lie on the line $y=3x+4$ is (a) (1, 7) (b) $(-1,1)$ (c) (2,10) (d) (4,12)	**1**

8.	Identify the equation of the line represented by the graph given below:  (a) $x + y = 0$ (b) $y = 2x$ (c) $y = 2x + 1$ d) $y = 2x - 4$	**1**
9.	Axioms are assumed (a) universal truths specific to geometry (b) universal truths in all branches of mathematics (c) theorems (d) definitions	**1**
10.	In the figure, $l \parallel m$ and $m \parallel n$ The value of $\angle 2$ is:  (a) 120^0 (b) 60^0 (c) 50^0 (d)30^0	**1**
11.	The value of $\frac{\sqrt{32}+\sqrt{48}}{\sqrt{8}+\sqrt{12}}$ is equal to (a)$\sqrt{2}$ (b) 2 (c) 4 (d) 8	**1**
12.	In triangles ABC and DEF, AB = FD and $\angle A = \angle D$. The two triangles will be congruent by SAS axiom if (a) BC = DE (b) AC = DE (c) AC = EF (d) BC = FE	**1**
13.	The quadrilateral in which the diagonals intersect at right angles is: (a) square (b) parallelogram (c) trapezium (d) rectangle	**1**

14. In the given figure, if $\angle ABC = 95^0$, $\angle ACB = 40^0$, then $\angle BDC$ is **1**



(a)45^0 (b) 35^0 (c) 25^0 (d)15^0

15. The radius of a sphere (in cm) whose surface area is $12\pi\ cm^2$, is: **1**

(a) 3 (b) $\sqrt{3}$ (c) $3\frac{2}{3}$ (d) $3\frac{1}{3}$

16. For drawing a frequency polygon of a continuous frequency distribution, we plot the points whose ordinates are the frequency of the respective classes and the abscissa are respectively **1**

(a) Class marks of the classes (b) Upper limit of the classes

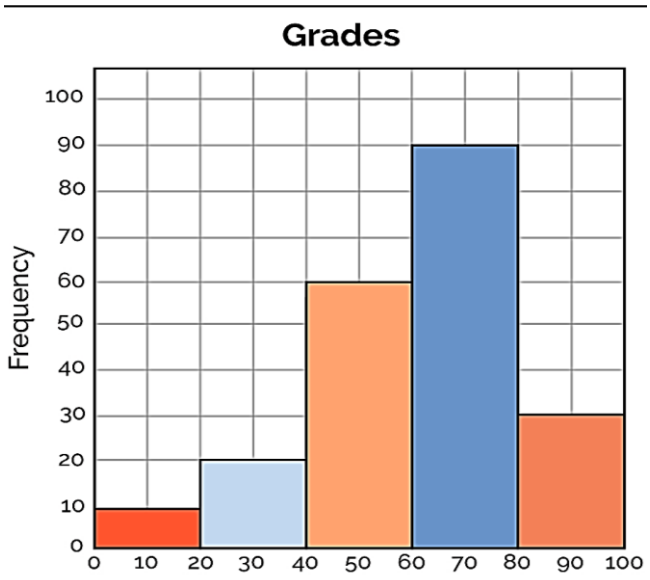
(c) Lower limit of the classes (d) Upper limit of the preceding classes

17. The class size of the grouped frequency table given below is **1**

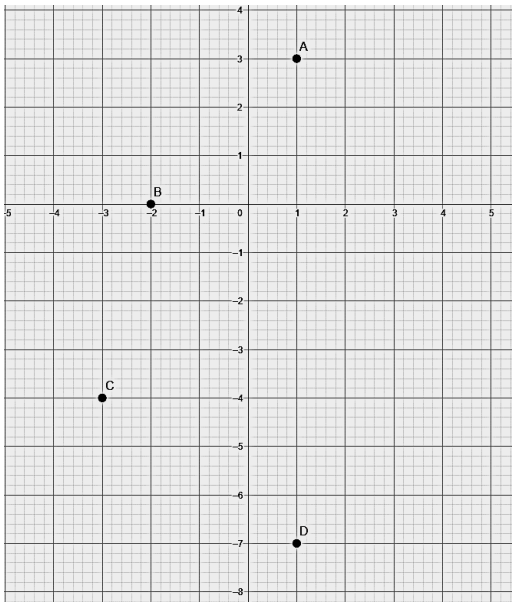
Class Interval	5 – 5.2	5.2 – 5.4	5.4 – 5.6	5.6 – 5.8	5.8 – 6.0
Frequency	3	4	4	4	6

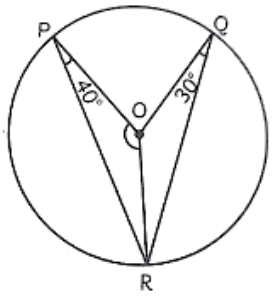
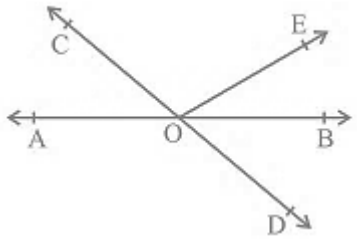
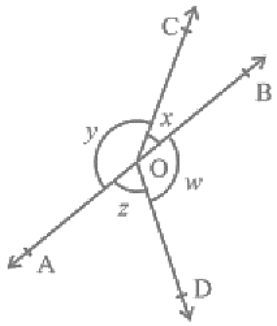
(a) 0.2 (b) 1.5 (c) 0.9 (d) 1.2

18. The number of students getting grades less than 60 are **1**

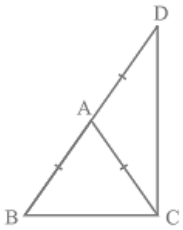
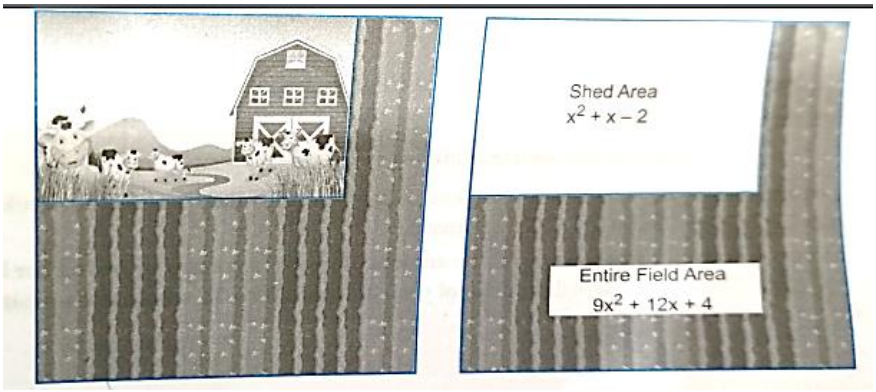


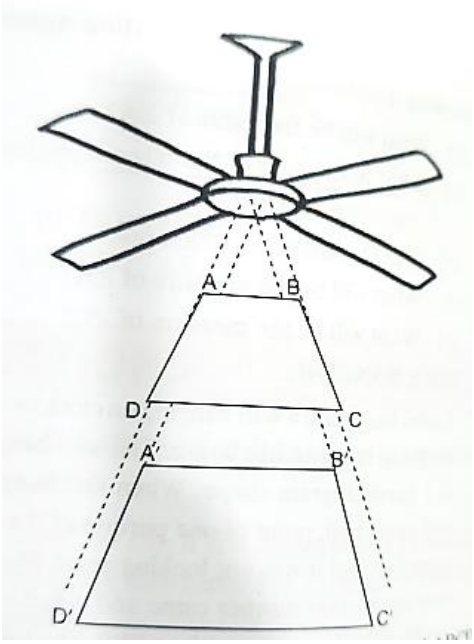
(a) 100 (b) 90 (c) 80 (d) 70

19.	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 ***Statement A* (Assertion):** The factorization of $2x^2 - y^2 + z^2 - 2\sqrt{2}xy - 2yz + 2\sqrt{2}zx$ is $(\sqrt{2}x - y + z)\,(\sqrt{2}x - y + z)$ ***Statement R* (Reason):** $a^2 + b^2 = (a + b)^2 - 2ab$ (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**
20.	***Statement A* (Assertion):** Coordinates of a point (3, 2) lie in the I quadrant. ***Statement R* (Reason):** In the point (3, 2), 3 and 2 are the perpendicular distances of the point from $x - axis$ and $y - axis$ respectively. (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.	
21.	Express $x = 0.3\overline{8}$ in the form $\frac{p}{q}$.	**2**
22.	From the graph below determine the coordinates of the points A, B, C and D  	**2**

	OR In which quadrant or on which axis each of the following points lie? P(– 3, 5), Q(4, – 1), R(2, 0), S(– 3, – 6)	
23.	Point P and Q are on the circle with center O. Point R is on the major arc PQ. If $\angle OPR = 40^0$ and $\angle OQR = 30^0$, then find the measure of the angle subtended by the minor arc PQ at the center.  	**2**
24.	If the volume of a right circular cone of height 9 cm is $48\pi\ cm^3$, find the diameter of its base.	**2**
25.	Lines AB and CD intersect at O. If ∠ AOC + ∠ BOE = 70° and ∠ BOD = 40°, find reflex ∠ COE.  **OR** If $x + y = w + z$, then prove that AOB is a line.  	**2**
	SECTION C	
	Section C consists of 6 questions of 3 marks each.	
26.	Factorise the following : $8p^3 + \frac{12}{5}p^2 + \frac{6}{25}p + \frac{1}{125}$	**3**
27.	Draw the graph of the linear equation $3x + 4y = 12$	**3**

28.	If two intersecting chords of a circle make equal angles with the diameter passing through their point of intersection, prove that the chords are equal.	**3**
29.	The perimeter of a triangular field is 420 m and its sides are in the ratio 6 : 7 : 8. Find the area of the triangular field. **OR** Find the area of a triangle two sides of which are 18cm and 10cm and the perimeter is 42cm.	**3**
30.	A hemispherical dome of a building is to be white washed. The total cost of white washing of dome building is Rs. 924 at the rate of Rs3 $per\ m^2$. Find (a) radius of the hemisphere (b) Volume of the hemisphere. **OR** Twenty seven solid iron spheres, each of radius 'r' and surface area S are melted to form a sphere with surface area S′. Find the (i) Radius ' R' of the new sphere, (ii) ratio of S and S′.	**3**
31.	In a city, the weekly observations made in a study on the cost of living index are given in the following table: **Cost Of Living Index** / **Number Of Weeks** **140 - 150** / **47** **150 - 160** / **82** **160 - 170** / **55** **170 - 180** / **78** **180 - 190** / **35** Draw a histogram to represent the above data.	**3**
	SECTION D	
	Section D consists of 4 questions of 5 marks each.	
32.	Find the value of $a\ and\ b$: $$\frac{6-4\sqrt{3}}{6+4\sqrt{3}} = a - b\sqrt{3}$$ **OR** Simplify the following: $$\left(\frac{64}{125}\right)^{-2/3} + \frac{1}{\left(\frac{256}{625}\right)^{1/4}} + \frac{\sqrt{25}}{\sqrt[3]{64}}$$	**5**

33.	Prove that Angles opposite to equal sides of an isosceles triangle are equal. Using the above result, prove the following ΔABC is an isosceles triangle in which AB = AC. Side BA is produced to D such that AD = AB. Show that ∠ BCD is a right angle.  	**5**
34.	Factorize: $x^3 + 13x^2 + 31x - 45$	**5**
35.	If two equal chords of a circle intersect within the circle, prove that the segments of one chord are equal to corresponding segments of the other chord. **OR** If the non-parallel sides of a trapezium are equal, prove that it is cyclic.	**5**
	SECTION E	
	Case study based questions are compulsory.	
36.	Raja owns a square grass field having area given by the polynomial $p(x) = 9x^2 + 12x + 4$. Inside the square field there is a rectangular region for grazing cows, having area given by the polynomial $f(x) = x^2 + x - 2$.  Based on the above information answer the following questions. (i) Find the area of the square field at x = 2. (ii) (A) Find the side of the square field. **OR** (ii) (B) Find the dimensions of the rectangular region. (iii) Write the degree of the polynomial $p(x)$.	**1+2+1**
37	LED ceiling fans with lights are a versatile option for both lightning and climate control in your home. Anjali placed a table just below the fan light. She took the cardboard in the shape of a quadrilateral ABCD whose angles are in the ratio 5: 6: 5: 8 and its perimeter is 28 cm. She found that the shadow of	**1+1+2**

	quadrilateral ABCD as $A'B'C'D'$ is projected onto a thick white paper that has already been placed on the table with the zoom factor of sides as well as of angles as 1: 2  Based on the above information, answer the following questions: (i) Find all the angles of quadrilateral ABCD. (ii) Find the perimeter of quadrilateral $A'B'C'D'$ (iii) (A) If AB // DC in quadrilateral ABCD and E is the midpoint of side AD. Show that F is the mid – point of side BC. **OR** (iii) (B) $A'B'C'D'$ a quadrilateral in which P,Q,R and S are mid points of the sides $A'B'$, $B'C'$, $C'D'$ and $D'A'$ respectively. Show that $A'B'C'D'$ is a parallelogram.	
38	The students of a school went for a picnic at hill station. They were carrying 750 m^2 of cloth with them .They made a conical tent using the cloth with height 24 m and diameter 14 m. On the basis of the above information (i) Find the slant height of the tent. (ii) (A) How much cloth is left after making the tent? Or (ii) (B) Find the volume of the tent. (iii) How many students can sit in the tent if a student on an average occupies 1.4m^2on the ground?	**1+2+1**