CODE:2801- AG-FC-1-23-24 पंजियन क्रमांक

REG.NO:-TMC -D/79/89/36

General Instructions:

1. This Question paper contains - five sections A, B, C, D and E. Each section is compulsory. However, there are internal choices in some questions.

2. Section A has 18 MCQ's and 02 Assertion-Reason based questions of 1 mark each.

3. Section B has 5 Very Short Answer (VSA)-type questions of 2 marks each.

4. Section C has 6 Short Answer (SA)-type questions of 3 marks each.

5. Section D has 4 Long Answer (LA)-type questions of 5 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 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.

EXAMINATION 2023 -24

Time : 3 Hours	Maximum Marks : 80
CLASS – IX	**MATHEMATICS**

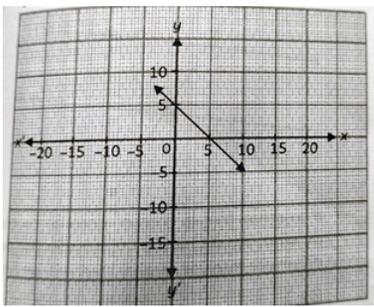| Sr. No.	SECTION – A This section comprises of very short answer type-questions (VSA) of 1 marks each	Marks
Q.1	Which of the following is not equal to $\left[\left(\dfrac{5}{6} \right)^{\frac{1}{5}} \right]^{-\frac{1}{6}}$? (a) $\left(\dfrac{5}{6} \right)^{\frac{1}{5}-\frac{1}{6}}$ (b) $\dfrac{1}{\left\{ \left(\dfrac{5}{6} \right)^{\frac{1}{5}} \right\}^{1/6}}$ (c) $\left(\dfrac{6}{5} \right)^{\left(\frac{1}{30} \right)}$ (d) $\left(\dfrac{5}{6} \right)^{\left(-\frac{1}{30} \right)}$	1
Q.2	Reema has a circular table cloth. She wants to decorate some of its parts with two different design paper. If she decorates it in such a way that $\angle ABC = 20^{0}, then \angle AOC$ will be:	1
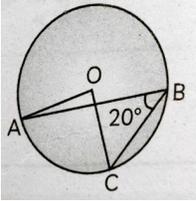
(a) 20^0 (b) 40^0 (c) 60^0 (d)10^0

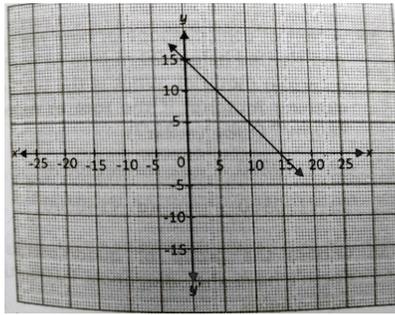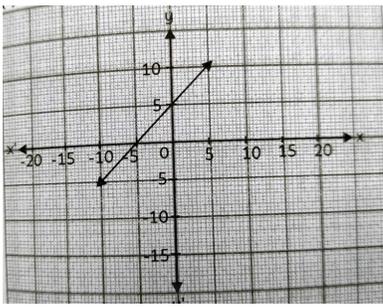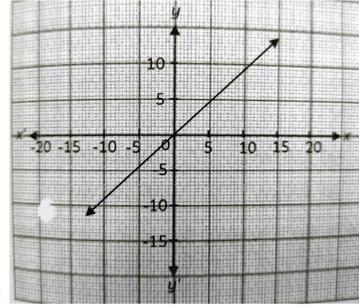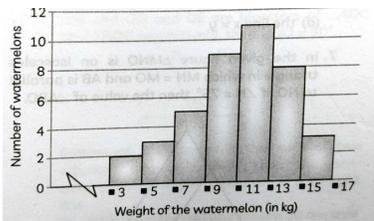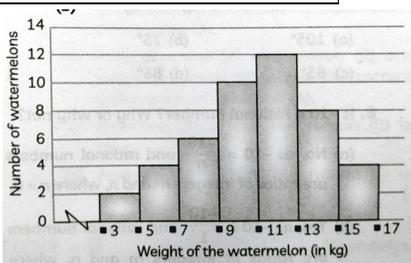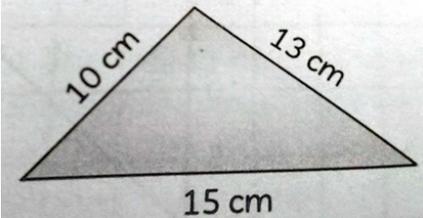| Q.3	If a straight line falling on two straight lines makes the interior angles on the same side of it, whose sum is 120^0, then the two straight lines, if produced indefinitely, meet on the side on which the sum of angles is: (a) less than 120^0 (b) greater than 120^0 (c) is equal to 120^0 (d) greater than 180^0	1
Q.4	The correct graph for the linear equation x+y=15 is: (a) (b) (c) (d)	1
Q.5	The table below shows the weights of number of watermelons at a store. Which of the following histogram represents the give data correctly? | C.I.	3-5	5-7	7-9	9-11	11-13	13-15	15-17
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Freq.	2	3	5	9	11	8	3 | (a) (b)	1

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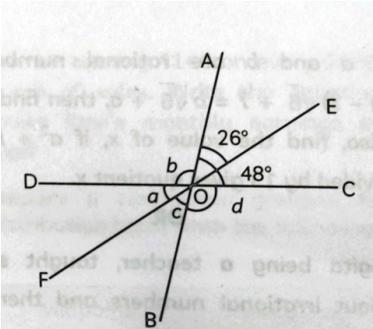(c) Weight of the watermelon (in kg)

(d) Weight of the watermelon (in kg)

Q.6	The line with the coordinates (4,1), (2,1) and (1,1) is parallel to : (a) x-axis (b) y-axis (c) the line x+y = 4 (d) the line x = y	1
Q.7	In the given figure ΔMNO is an isosceles triangle in which MN=MO and AB is parallel to NO. if $\angle N = 75^0$, then the value of $\angle ABO$. (a)105^0 (b) 75^0 (c) 65^0 (d) 85^0	1
Q.8	Is -10 a rational number? Why or why not? (a) no, as -10=$\dfrac{-10}{0}$ and rational numbers are ratios of integers m and n, where $n \neq 0$ (b) yes, as -10=$\dfrac{-10}{1}$ and rational numbers are ratios of integers m and n, where $n \neq 0$ (c) no, as -10= -$\dfrac{-10}{0}$ and rational numbers are ratios of integers m and n, where $n \neq 1$ (d) yes, as -10= -$\dfrac{-10}{1}$ and rational numbers are ratios of integers m and n.	1
Q.9	In the given figure, m and l are two parallel lines intersecting by a transversal line n. if another line is drawn parallel to the line m, what would be the increase in the pairs of alternate interior angles that will be formed? (a) 2 (b) 8 (c) 4 (d) 6	1

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Q.10	A tent of conical shape of base radius 28 m and slanted height 20m is to be made from a certain material. What is the total cost of clothing material if the rate of material is rs80/m²?(take π =22/7) (a) Rs 140800 (b) Rs150000 (c) Rs130500 (d) Rs140000	1
Q.11	Choose the group of quadrilaterals that doesn't have the diagonals intersecting at right angles. (a) parallelogram, kite, rhombus (b) square, rectangle, trapezium (c) parallelogram, rectangle,trapezium (d) rectangle, kite, trapezium	1
Q.12	One of the factors of $(25x^2-1)+(1+5x)^2$ is: (a) 5+x (b) 5-x (c) 5x-1 (d) 10x	1
Q.13	A triangular shaped container has sides 10cm, 13cm and 15cm. if swati wants to cover both lower and upper face of container with coloured paper. Calculate the required area of paper. (a) 128cm² (b) 112cm² (c) 110cm² (d) 105cm²	1
Q.14	In the adjoining figure, if $\angle AOC = 48^0$ and $\angle AOE = 26^0$, then the value of a is: (a) 26⁰ (b) 22⁰ (c) 42⁰ (d)24⁰	1
Q.15	The class marks of a frequency distribution are given as follows: 15,20,25…. The class corresponding to the class-mark 20 is: (a) 12.5-17.5 (b) 17.5-22.5 (c) 18.5-21.5 (d) 19.5-20.5	1
Q.16	The value of 399^2-398^2 is: (a) 779 (b) 979 (c) 879 (d) 797	1
Q.17	Akash has a rectangular cardboard sheet. He folded it and cut out triangular shapes ABC and DEF from it. Such that $\Delta ABC \cong \Delta DEF$ by RHS congruence rule (as shown in figure).	1
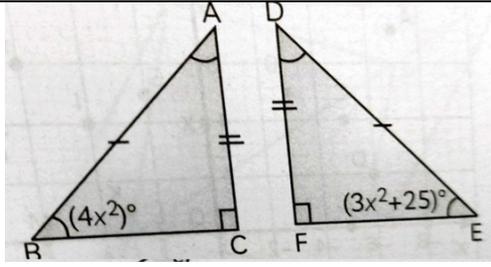
(a) 75^0 (b) 105^0 (c) 125^0 (d) 5^0

Q.18	In a frequency distribution, the mid value of a class is 10 and the width of the class is 6. The upper limit of the class is: (a) 10 (b) 7 (c) 8 (d) 13	1

ASSERTION-REASON BASED QUESTIONS

In the following questions, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices. (a) Both A and R are true and R is the correct explanation of A. (b) Both A and R are true but R is not the correct explanation of A. (c) A is true but R is false. (d) A is false but R is true.

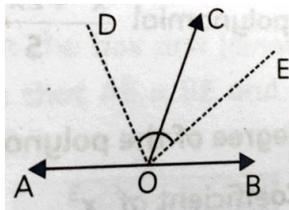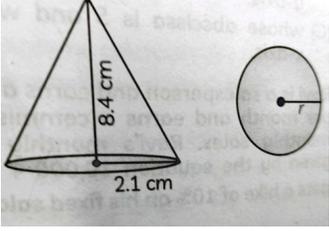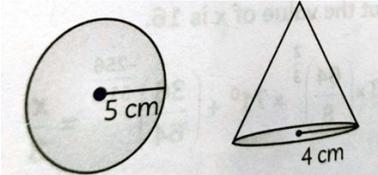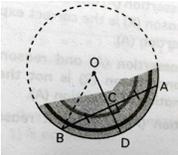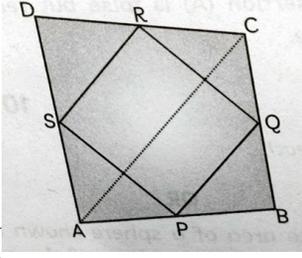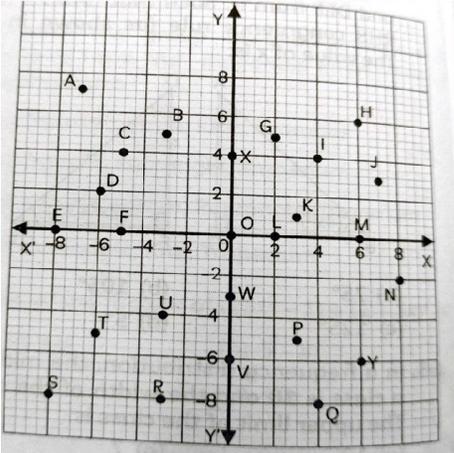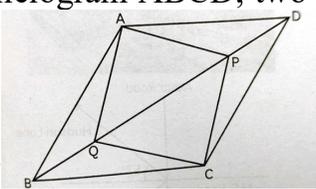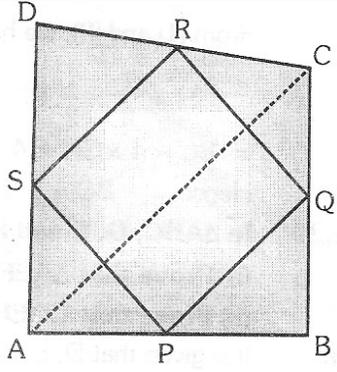| Q.19	Statement A (Assertion): if $x=1+\sqrt{2}+\sqrt{3}$ and $y=1+\sqrt{2}-\sqrt{3}$, then $xy=6+2\sqrt{2}$ Statement R (Reason): $(a+b)(a-b)=a^2-b^2$ (a) both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A) (b) both assertion (A) and reason (R) are 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
Q.20	Statement A (Assertion): If AOB is a straight line and OD and OE are bisectors of $\angle AOC \ and \ \angle BOC$ respectively, then $\angle DO = 90^0$ Statement R (Reason): if the sum of two adjacent angles is 180^0, then the non-common arms of the angles are in a straight line. (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

This section comprises of very short answer type-questions (VSA) of 2 marks each

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Q.21	The cone shown in the figure is melted and recast into a sphere. Find the radius of the sphere.	2
	OR	
	The surface area of a sphere shown in the figure is five times the area of the curved surface of the cone. Find the height and volume of the cone.	
Q.22	Rationalize the denominator of $\dfrac{1}{\sqrt{3}-\sqrt{2}}$ and evaluate by taking $\sqrt{2}=1.414 \ and \ \sqrt{3}=1.732$.	2
Q.23	The diagram shows a fragment of a circular plate AB = 8cm and CD = 2cm, $OD \perp AB$ what is the diameter of the plate? 	2
Q.24	If a and b are rational number and $(a-3)\sqrt{6}+7=b\sqrt{6}+a$, then find a^2+b^2 Also , find the value of x, if a^2+b^2 when divided by 13 given quotient x. OR Yogita being a teacher taught student about irrational numbers and then asked them to find three irrational number between $\sqrt{2} \ and \ \sqrt{5}$.	2
Q.25	If shintu told rinu that x=-k and y=k+2, are the solution of a linear equation x+7y=a find the value of a, if y=8 .	2

SECTION – C

(This section comprises of short answer type questions (SA) of 3 marks each)

| Q.26 | For the polynomial $\dfrac{x^3+2x+1}{5}-\dfrac{7}{2}x^2-x^6$

 Write:

 (A) the degree of the polynomial . | 3 |

	(B) the coefficient of x^3	
	(C) the coefficient of x^6	
Q.27	ABCD is a quadrilateral in which P,Q,R And S are mid –points of the sides AB, BC, CD and DA ( ). AC is a diagonal, show that: (A) SR‖ AC AND SR=1/2 AC . (b) PQ=SR (c) PQRS is a parallelogram	3
Q.28	In the following mathematical equation, prove that the value of x is 16 $\left(\dfrac{1}{2}\right)^{-4} - 3 \times \left(\dfrac{64}{8}\right)^{\frac{2}{3}} \times 71^0 + \left(\dfrac{36}{64}\right)^{\frac{-256}{512}} = \dfrac{x}{3}$.	3
Q.29	Based on the given graph , answer the following question: (a) identify all the points with a negative abscissa and a negative ordinate. (b) identify any 4 coordinates that will make a square . (c) identify points with their abscissa as zero. OR Find the coordinates of the points: (A) Which lies on x-axis and y-axis both. (B) Whose ordinate is -4 and which lies on y-axis . (c) Whose abscissa is 5 and which lies on x-axis .	3
Q.30	Yamini and Fatima, two students of Class IX of a school, together contributed Rs 100 towards the Prime Minister's Relief Fund to help the earthquake victims. Write a linear equation which satisfies this data. (You may take their contributions as Rs x and Rs y.)	3

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	Draw the graph of the same.	
Q.31	The following table gives the life times of 400 neon lamps:	3

Life time (in hours)	Number of lamps
300 - 400	14
400 - 500	56
500 - 600	60
600 - 700	86
700 - 800	74
800 - 900	62
900 - 1000	48

(i)Represent the given information with the help of a histogram, (ii) How many lamps have a life time of more than 700 hours?

OR

The marks scored by 30 students of IX class, of a school in the first test of Mathematics our of 50 marks are as follows :

6	32	10	17	22	28	0	48	6	22
32	6	36	26	48	10	32	48	28	22
22	22	28	26	17	36	10	22	28	0

The number of times a mark is repeated is called its **frequency.** It is denoted by f.

SECTION-D

Q.32	In a parallelogram ABCD, two points P and Q are taken on diagonal BD such that	5

DP=BQ (   ).
Show that:
(a) $\Delta APD \cong \Delta CQB$ (b) AP = CQ   (c) $\Delta AQB \cong \Delta CPD$
(d) AQ=CP   (e) APCQ is a parallelogram

Q.33	The pillars of a temple are cylindrical shaped. If each pillar has a circular base of radius 20 cm, and height 7m, then find the quantity of concrete mixture used to build 20 such pillars. Also find the cost of the concrete mixture at the rate of Rs. 200 per m³. $\left(Take\pi = \dfrac{22}{7} \right)$	5

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| Q.34 |
ABCD is a quadrilateral in which P, Q, R and S are mid-points of the sides AB, BC, CD and DA. AC is a diagonal. Show that : (i) SR ‖ AC and SR = $\frac{1}{2}$ AC (ii) PQ = SR (iii) PQRS is a parallelogram.

<center>OR</center>

If two sides of a triangle are unequal, then the greater side has greater angle opposite to it . | 5 |
|------|------|------|
| Q.35 | Check and state whether the polynomials given in right side are factors of the polynomial in left.

	Polynomial	Zeros
A	$2x^2 - 6x - 4$	$x - \sqrt{2}$
B	$x^3 - 23x^2 + 142x - 120$	x - 12
C	$x^3 - 5\sqrt{2}x^2 + 8\sqrt{2}$	x -12
D	$x^2 - 22x + 120$	x +1

<center>OR</center>

The linear equation that converts Fahrenheit (F) to celsius (C) is given by the relation $c = \dfrac{5F - 160}{9}$

(a) If the temperature is 86^0F, what is the temperature in celsius?

(b) If the temperature is 35^0c, what is the temperature in Fahrenheit?

(c) If the temperature is 0^0c, what is the temperature in Fahrenheit and if the temperature is 0^0F, what is the temperature is celsius?

(d) What is the numerical value of the temperature which is the same in both scales? | 5 |
| | <center>**SECTION – E**</center>

(This section comprises of 3 case study / passage – based questions of 4 marks each with two sub parts (i),(ii),(iii) of marks 1, 1, 2 respectively.The third case study question has two sub – parts of 2 marks each.) | |

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Q.36	Junk food is food that contains high levels of salt, sugar, fats and lack of nutrients such as vitamins, fibre and minerals, consuming them can lead to short and long-term health complication,including weight gain . if α be the number of children who take junk food and β be the number of children who take healthy food such that $\alpha > \beta$ where α and β are the zeros of the quadratic polynomial $p(y) = 2y^2 - 18y + 40$ 	
i.	Find the number of students who take healthy food .	1
ii.	How many students take junk food? OR Find the value of k. if p(0)+p(1)=k.p(2) .	1
iii.	Find the value of p (-1) .	2
Q.37	**CASE STUDY – 2** Raju and priya are cousins and both went to visit Mughal garden. Before going, they searched the location of their destination on a map. During searching, then found on map that akbar road and M.G road form a right angle at their intersection point and Hudson lane from 57^0 angle with M.G road . 	
i.	What is the measure of acute angle between akbar road and Hudson lane?	1
ii.	If a gudson lane makes 57^0 angle with M.G road and H.M road making 37^0 with M.G road, then which type of angle does form between hudson lane and H.M road?	1
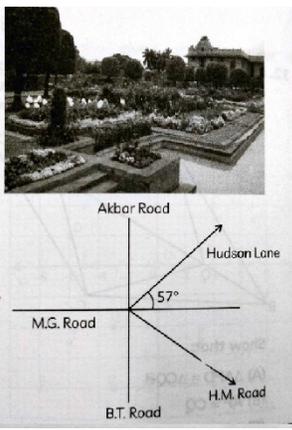
	OR If raju is standing on M.G road in the west direction and priya is on H.M road what is the shortest angle they can cover in order to meet?	
iii.	Find the measure of reflex angle formed between M.G road (in east direction) with Hudson lane.	2
Q.38	**CASE STUDY - 3** Interior decorator Natasha designed a floral carpet that was made up of 32 well-designed triangular pieces, the measurements of the triangular pieces are 18cm, 56cm ,70cm the rate of stitching the carpet is 70 paise per cm^2	
i.	Find the perimeter of one triangular piece.	1
ii.	Find the semi perimeter of one triangular piece.	1
iii.	Find the area of one of the triangular pieces. <center>OR</center> Find the total area of carpet made up pf 32 triangular pieces.	2
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