SAMPLE PAPER-1
FINAL EXAMINATION-2024
MATHEMATICS

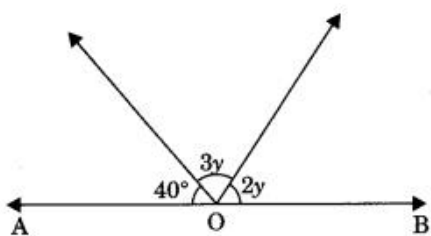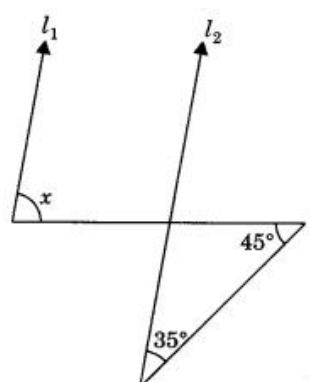**Time Allowed: 3 Hrs.**   **Maximum Marks : 80 General**

Instructions:

1. This Question Paper has 5 Sections A-E.
2. Section **A** has 20 MCQs carrying 01 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 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 2 marks questions of Section E
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

S.NO	SECTION A Section A consists of 20 questions of 1 mark each.
1	The width of each of five continuous classes in a frequency distribution is 5 and the lower class limit of the lowest class is 10. The upper class limit of the highest class is a)15　　　b) 25　　　c) 35　　　d) 40
2	Factorise $a(a-1) - b(b-1)$. a) $(a+b)(a+b-1)$　　b) $(a-b)(a-b)$　　c)$(a+b-1)(a-b)$　　d) $(b-a)(a+b)$
3	If $8^{x+1} = 64$,What is the value of 3^{2x+1} ? a)1　　　b) 3　　　c) 9　　　d) 27
4	Degree of polynomial $(x^5 + 2) + (x^5 - 2)$ is a) 10　　　b) 5　　　c)2　　　d) 4
5	If the angles $(2x - 10)^o$ and $(x - 5)^o$ are complementary then $x =$____ a)65　　　b)75　　　c)30　　　d)35　　　(all in degrees)
6	In an isosceles triangle, if the vertex angle is thrice the sum of the base angles ,then the measure of the vertex angle of the triangle will be - a)135　　　b)120　　　c)140　　　d)22.5　　　(all in degrees)
7	In quadrilateral ABCD , ∠A +∠C is 2 times ∠B +∠D. If ∠A=140° and ∠D=60°, then ∠B will be - a)60　　　b)90　　　c)120　　　d)110　　　(all in degrees)
8	ABCD is a trapezium in which AB is parallel to CD. M and N are midpoints of AD and BC resp. If AB =12 cm, MN=14 cm then CD = _____ a)10　　　b)12　　　c)14　　　d)16　　　(all in cm)
9	If AB,BC and CD are equal chords of a circle with O as the center of the circle. AD is the diameter, then ∠AOB =_____

	a)60　　　　b)90　　　　c)120　　　　d)140　　　　(all in degrees)
10	The three steps from solids to points are: (a) Solids – surfaces – lines – points (b) Solids – lines – surfaces – points (c) Lines – points – surfaces – solids (d) Lines – surfaces – points – solids
11	Twice the range of the given data : 4.5, 6.3, 7.5 , 13.5, 2.5, 8.3 is a) 11　　　　b) 22　　　　c) 23　　　　d) 11.5
12	The area of an equilateral triangle having side length equal to $\dfrac{\sqrt{3}}{4}$ cm is: a) $\dfrac{2}{27}$ sq.cm　　b) $\dfrac{2}{15}$ sq.cm　　c) $\dfrac{3\sqrt{3}}{64}$ sq.cm　　d) $\dfrac{3}{14}$ sq.cm
13	Which of the following is an irrational number a) 16.411411411411　　　　b) 16.0141414141 c) 16.0141411411411144114…　　d) 16.14$\overline{412}$
14	The graph of linear equation $x + 2y = 2$, cuts the y-axis at: a) (2,0)　　b) (0,2)　　c) (0,1)　　d) (1,1)
15	The radius of a hemispherical balloon increases from 6 cm to 12 cm as air is being pumped into it. The ratio of the surface areas of the balloon in the two cases is a) 1:4　　b) 1:3　　c) 2:3　　d) 2:1
16	In figure, find the value of y. a) 28°　　　　b) 40° c) 140°　　　d) 56°
17	Equal sides of an isosceles right triangle is 20 cm .its area would be - a) $225cm^2$　　b) $200cm^2$　　　c) $100cm^2$　　　d) $450cm^2$
18	In figure $l_1 \| l_2$, the value of x is a) 80°　　　b) 100°　　　c) 110°　　　d) 70°

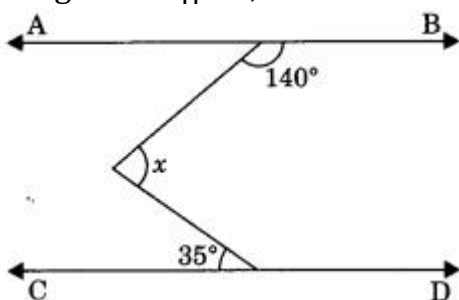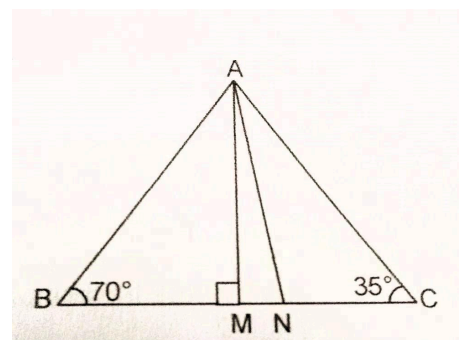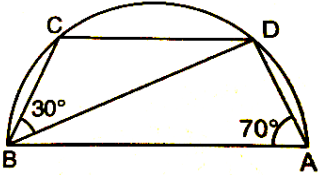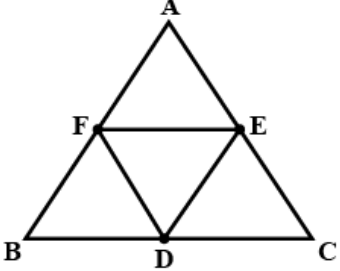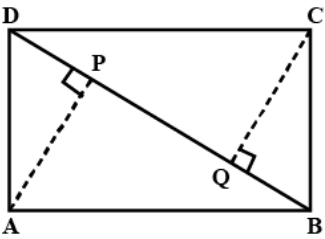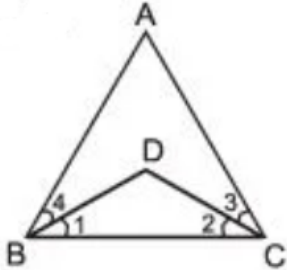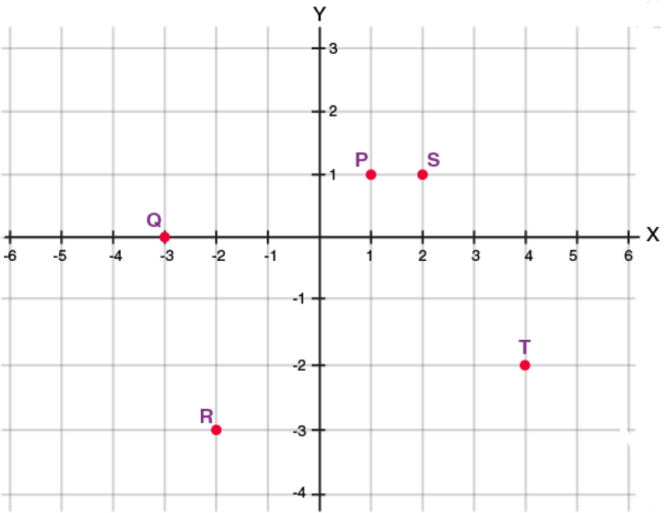|	

19	**DIRECTION:** In question number 19 and 20, a statement of **assertion (A)** is followed by a statement of **Reason (R)**. Choose the correct option
	
	Assertion (A): The perpendicular distance of the point A(3, 4) from the y-axis is 4
	
	Reason(R) : The perpendicular distance of a point from y-axis is called its x-coordinate.
	
	(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.

20	**Assertion(A) :** The graph of the linear equation $2x - y = 1$ passes through the point (2, 3).
	Reason (R): Every point lying on the graph is not a solution of $2x - y = 1$.
	
	(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 for (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.

	SECTION B **Section B consists of 5 questions of 2 marks each.**
21	In Figure AB || CD, the value of x is **OR** In the figure AM ⊥ BC and AN is the bisector of ∠BAC. If ∠B = 70° and ∠C = 35°, find the measure of ∠MAN
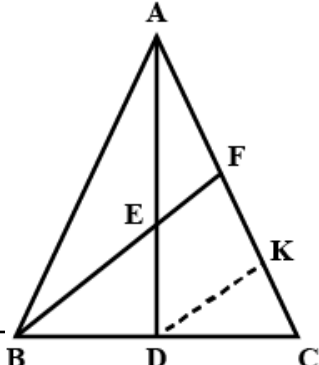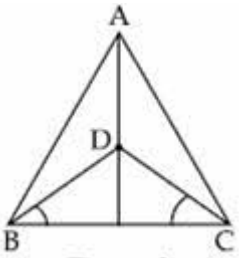
22	The surface area of sphere of radius $5cm$ is five times the area of curved surface of a cone of radius $4cm$. Find the height of the cone.
23	In the given figure C and D are points on the semi circle described on BA as diameter.Given ∠BAD= 70° and ∠DBC=30°.Calculate the measure of ∠ABD and ∠BDC.
24	In the figure, D, E and F are the mid points of the sides BC, CA and AB of an equilateral ΔABC. Prove that ΔDEF is also an equilateral triangle. **OR** ABCD is a parallelogram and AP and CQ are perpendiculars from vertices A and C on diagonal BD . Prove that AP = CQ
25	In the given figure ∠ABC = ∠ACB and ∠3 = ∠4. Prove that ∠1 = ∠?
	SECTION C **Section C consists of 6 questions of 3 marks each.**
26	In triangle ABC , AD is the median through A and E is the mid point of AD. BE produced meets AC in F . Prove that $AF = \frac{1}{3}AC$.

27	Triangle ABC is isosceles with AB =AC .Side BA is produced to point D such that AB=AD. Prove that ∠BCD is a right angle .
	OR
	In the given figure AB=AC ,D is the point in the interior of triangle ABC such that ∠DBC= ∠DCB . Prove that AD bisects ∠BAC of triangle ABC .
28	Simplify:
	$$\left(\frac{x^a}{x^{-b}}\right)^{a-b} \cdot \left(\frac{x^b}{x^{-c}}\right)^{b-c} \cdot \left(\frac{x^c}{x^{-a}}\right)^{c-a}$$
	OR
	If $x = 9 - 4\sqrt{5}$, find $x + \dfrac{14}{x}$
29	(i) Write the coordinates of a point whose perpendicular distance from x-axis is 5 units, the perpendicular distance from y-axis is 3 units and it lies in II Quadrant.
	(ii) From the figure , find the following:
	(a) $[3(\text{Ordinate of S}) - \text{Abscissa of Q}]$
	(b) Coordinates of Image of point R about y-axis
30	Find the value of a and b , if the line $6ax + by = 24$ passes through $(2, 0)$ and $(1, 2)$ Find the point passing through this line, lying on the Y-axis.
31	Find the value of k, if $(2x - 1)$ is a factor of $p(x) = 2x^3 - kx^2 + 2$
	SECTION D **Section D consists of 4 questions of 5 marks each**
32	When a polynomial $p(x) = x^4 - 2x^3 + 3x^2 - ax + b$ is divided by $x - 1$ and $x + 1$, the remainders are 5 and 19 respectively. Find the remainder when p(x) is divided by x – 2.

|	
	OR If $x - 3$ and $x - \dfrac{1}{3}$ are both factors of $ax^2 + 5x + b$, show that $a = b$.
33	If $a = \dfrac{\sqrt{7}-\sqrt{6}}{\sqrt{7}+\sqrt{6}}$ and $b = \dfrac{\sqrt{7}+\sqrt{6}}{\sqrt{7}-\sqrt{6}}$, find the value of $(a^2 + b^2 + ab)$
34	Prove that the quadrilateral formed by angle bisectors of a cyclic quadrilateral is also cyclic. **OR** Prove that the angle subtended by an arc at the centre is double the angle subtended by it at the remaining part of the circle.
35	Sarika distributed chocolates on the occasion of Children's Day. She gave 5 chocolates to each child and 20 chocolates to adults. If number of children is represented by 'x' and total distributed chocolates as 'y', form a linear equation in two variables to represent this statement and draw its graph.
	SECTION E **Case study based questions are compulsory.**
36	100 surnames were randomly picked up from a local telephone directory and a frequency distribution of the number of letters in the English alphabet in the surnames was found as follows: | Number of letters	Number of surnames
1-4	6
4-6	30
6-8	44
8-12	16
12-20	4 | (i) What is the difference between the maximum and minimum class size (ii) How many surnames have more than or equal to 4 letters but less than 8 letters? (iii) What is the adjusted frequency for the class interval having maximum class size? **OR** (iii) What is the difference in the class marks of the last two class intervals ?
37	Once upon a time in Ghaziabad was a corn cob seller. During the lockdown period in the year 2020, his business was almost lost. So, he started selling corn grains online through Amazon and Flipkart. Just to understand how many grains he will have from one corn cob, he assumed that one corn cob shaped somewhat like a cone, has the radius of its broadest end is 2.1 cm and length as 20 cm.
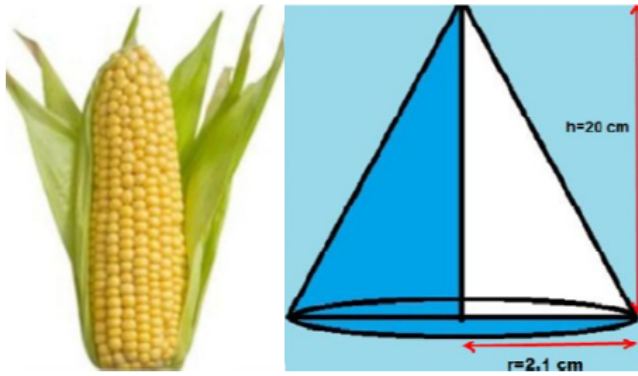
(i) What is the slant height of the corn cub?

(ii) What is the volume of the corn cub?

(iii) If each $1 cm^2$ of the surface of the cob carries an average of four grains, find how many grains (approximately) you would find on the entire cob.

OR

How many cobs can be stored in the carton having a capacity of $0.05544 m^3$

| 38 | A craft mela is organized by the Welfare Association to promote the art and culture for tribal people. Fairs and festivals are the custodians of our great cultural heritage. The pandal is to be decorated by using triangular flags around the field. Each flag has dimensions 25 cm, 25 cm and 22 cm |

(i) What is the semi-perimeter of the flag ?

(ii) What is the area of the flag?
(Use $\sqrt{14} \cong 3.74$)

(iii) If the rate of the cloth is ₹ 200 per m^2, find the total cost of 300 flags.

OR

(iii) Find the altitude of the triangular flag to the shortest side