PM SHRI KENDRIYA VIDYALAYA SITAPUR I SHIFT

UT-2 (2023-24)

Class: XI | Max. Marks: 40

Subject: -Mathematics | Time: 90 minutes

General Instructions:

1. This question paper contains five sections – A, B, C, D and E. Each part is compulsory.
2. Section A has 4 multiple choice type questions of 1 mark each and 2 assertion reasoning question of 1 mark each and 6 very short questions of 1 mark each.
3. Section B has 4 questions of 2 marks each.
4. Section C has 2 questions of 3 marks each,
5. Section D has 2 questions of 5 marks each
6. Section E has 1 case based question of 4 marks.
7. There is an internal choice in some of the questions.

Q.NO	Section A	Marks
	Q (1-4) are multiple choice type questions. Select the correct option	
1	Slope of a line which cuts off intercepts of equal length on the axes is (A) -1 (B) 0 (C) 2 (D) $\sqrt{2}$	1
2	If the focus of parabola is (0, -3) and its directrix is y = 3, then its equation is (a) $x^2 = -12y$ (b) $x^2 = 12y$ (c) $y^2 = -12x$ (d) $y^2 = 12x$	1
3	The length of the foot of perpendicular drawn from the point P (3, 4, 5) on Y - axis is (A) 10 (B) $\sqrt{34}$ (C) $\sqrt{113}$ (D) $5\sqrt{2}$	1
4	$\lim_{x\to 0} \frac{\lvert x\rvert}{x}$ is equal to A) 0 B) 0.5 C) 1 D) does not exists	1
	In the given questions (Q No.5 and Q No. 6), 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.**	
5	Assertion (A): Equation of the horizontal line having distance 'a' from the x-axis is either y = a or y = –a. Reason (R): Equation of the vertical line having distance b from the y-axis is either x = b or x = –b.	1
6	Assertion (A): The point (– 4, 5, – 6) lies in the VI octant. Reason (R): The three coordinate planes divide the space into eight equal parts known as octants.	1
	Very Short Answer Type Questions	
7	Find the equation of the line passing through (1, 2) and perpendicular to x + y + 7 = 0	1
8	Find the distance between the lines 3x + 4y = 9 and 6x + 8y = 15.	1
9	Find the area of the circle centred at (1, 2) and passing through (4, 6).	1
10	Find the length of latus rectum of the ellipse $3x^2 + y^2 = 12$.	1
11	If the origin is the centroid of a triangle ABC having vertices A (a, 1, 3), B (– 2, b, – 5) and C (4, 7, c), find the value of a.	1
12	Evaluate $\lim_{x\to 2} \frac{x^3-8}{x-2}$	1

	Section B	
13	Find angles between the lines $\sqrt{3}\,x + y = 1$ and $x + \sqrt{3}\,y = 1$	2
14	For the ellipse $9x^2 + 16y^2 = 144$, find the vertices and eccentricity.	2
15	Find the equation of the set of points which are equidistant from the points (1, 2, 3) and (3, 2, –1).	2
16	Evaluate the limit : $\lim_{x\to 0} \frac{\sin(2+x)-\sin(2-x)}{x}$	2
	Section C	
17	Three vertices of a parallelogram ABCD are $(3, -1, 2)$, B $(1, 2, -4)$ and C $(-1, 1, 2)$. Find the coordinates of the fourth vertex.	3
18	Suppose $f(x) = \begin{cases} a + bx, & x < 1 \\ 4, & x = 1 \\ b - ax, & x > 1 \end{cases}$ And if $\lim_{x\to 1} f(x) = f(1)$ what are possible values of a and b ?	3
	Section D	
19	Find the equation of the circle which passes through the points (2, 3) and (4, 5) and the centre lies on the straight line $y - 4x + 3 = 0$. Or A rod of length 12 cm moves with its ends always touching the coordinate axes. Determine the equation of the locus of a point P on the rod, which is 3 cm from the end in contact with the x-axis.	5
20	In the triangle ABC with vertices A (2, 3), B (4, –1) and C (1, 2), find the equation and length of altitude from the vertex A. Or Find the image of the point (3, 8) with respect to the line $x + 3y = 7$ assuming the line to be a plane mirror.	5
	Section E	
21	**Case study based :**  Consider the lampshade in above figure and answer the questions given below: (i). Name the curve formed by the image of lampshade. (ii). Find the equation of the image of lampshade with vertex $(0, \pm 3)$ and foci $(0, \pm 5)$ (iii). Find he length of transverse axes of image of lampshade. (iv). Find the length of latus rectum of image of lampshade.	1+1+ +1+1