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	1
	(A) -1 (B) 0 (C) 2 (D) $\sqrt{2}$	
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	1
	(A) 10 (B) $\sqrt{34}$ (C) $\sqrt{113}$ (D) $5\sqrt{2}$	
4	$\frac{ x }{x}$ is equal to	1
	A) 0 B) 0.5 C) 1 D) does not exists	
	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.	
	uy	
5	Assertion (A): Equation of the horizontal line having distance 'a' from the x-axis is either	1
	y = a or $y = -a$.	
	Reason (R): Equation of the vertical line having distance b from the y-axis is either $x = b$ or $x = -b$.	
6	Assertion (A): The point (-4, 5, -6) lies in the VI octant.	1
	Reason (R): The three coordinate planes divide the space into eight equal parts known	
	as octants.	
	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)	1
	and C (4, 7, c), find the value of a.	
12	Evaluate $\frac{x^3-8}{x-2}$	1
	Evaluate $\frac{1}{x-2}$	
		I

	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)	2
	and (3, 2, -1).	
16	Evaluate the limit : $\frac{\sin \sin (2+x) - \sin(2-x)}{x}$	2
	Section C	
17	Three vertices of a parallelogram ABCD are	3
	(3, -1, 2), $B(1, 2, -4)$ and $C(-1, 1, 2)$. Find the coordinates of the	
	fourth vertex.	
18	Suppose $f(x) = \{a + bx, x < 14, x = 1 b - ax, x > 1\}$	3
	And if $f(x) = f(1)$ what are possible values of a and b?	
	Section D	
19	Find the equation of the circle which passes through the points (2, 3) and (4, 5)	5
2,	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 <i>x</i> -axis.	
20	In the triangle ABC with vertices A (2, 3), B (4, -1) and C (1, 2), find the equation and	5
	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.	
0.4	Section E	1.1.
21	Case study based :	1+1+
	A Section 1	
	Consider the lemmahade in above frame and ensured the secretions of the lemmahade in above frame and ensured the secretions of the lemmahade in above frame and ensured the secretions of the lemmahade in above frame and ensured the secretions of the lemmahade in above frame and ensured the secretions of the lemmahade in above frame and ensured the secretions of the lemmahade in above frame and ensured the secretions of the lemmahade in above frame and ensured the secretions of the lemmahade in above frame and ensured the secretions of the lemmahade in above frame and ensured the secretions of the lemmahade in above frame and ensured the secretions of the lemmahade in above frame and ensured the secretions of the lemmahade in the	
	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.	
	(11). I ma me tengui of facus rectum of image of fampshade.	