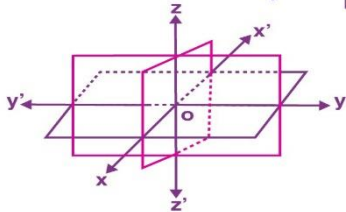# CBT CLASS XI MATHS JANUARY-2024

GENERAL INSTRUCTION :

CHAPTER: Three Dimension Geometry and Limits and Derivatives

Sr.No	Question	Marks
	Consider three planes intersecting at a point O such that these three planes are mutually perpendicular to each other (As Shown Following Figure). These three planes intersect along the lines X'OX, Y'OY and Z'OZ, called the x, y and z-axes, respectively. We may note that these lines are mutually perpendicular to each other. These lines constitute the rectangular coordinate system. The point O is called the origin of the coordinate system. The three coordinate planes divide the space into eight parts known as octants. These octants could be named as XOYZ, X'OYZ, X'OY'Z, XOY'Z, XOYZ', X'OYZ', X'OY'Z' and XOY'Z'. and denoted by I, II, III, ..., VIII , respectively. **Distance between Two Points** Let P(x_1, y_1, z_1) and Q (x_2, y_2, z_2) be two points and Distance between PQ represent by PQ = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$ **Case Study 1** Observe the following points and give the answer of following questions A (1,0, 3), B (4, –2, 3), C(4, –2, –5), D(4, 8, –5), E(– 4, 2, –5), F(– 4, 2, 5), G(0, –1, 6), H(2, – 4, 0),	
1	**Point B lies in .... Octant** (a) I (b) II (c) III (d) IV	1
2	**Which point lies in YOZ Plane** (a) A (b) G (c) H (d) B	1
3	**Distance between DE** (a) 5 (b) 10 (c) 15 (d) 20	1
4	**Distance of point C from XY- Plane** (a) 4 Unit (b) 2 Unit (c) -5 Unit (d) 5 Unit	1
	Case Study 2 **A function $f(x)$ is said to be rational function if $f(x) = g(x)/h(x)$, and $h(x) \neq 0$ than $\lim_{x \to a} f(x) = \lim_{x \to a} g(x)/h(x)$** **= $\lim_{x \to a} g(x) / \lim_{x \to a} h(x)$, However if $h(a) = 0$ than two cases are arise** **(1) $g(a) \neq 0$ and** **(2) $g(a) = 0$ In first case we can say that limit does not exist and In second case we can find limit** **Based on above information answer the following question**	

5	$\lim_{x \to 5} (x^4 - 625)/(x - 5)$ **is equal to** (a) 250 (b) 375 (c) 500 (d) 625	1
6	$\lim_{x \to 0} \mathbf{sinax/sinbx}$ **is equal to** (a) a (b) b (c) b/a (d) a/b	1
7	$\lim_{x \to 2} (x^3 - 2x^2)/(x^2 - 5x + 6)$ (a) 4 (b) -4 (c) 2 (d) -2	1
8	$\lim_{x \to 0} \mathbf{(ax + xcosx)/\ bsinx}$ (a) -(a+1)/b (b) (a+1)/b (c) a/b (d) - a/b	1
	Directions: (Q.9 – Q.10) Each of these questions contains two statements: Assertion (A) and Reason (R). Each of these questions also has four alternative choices, any one of which is the correct answer . You have to select one of the options (a) , (b) , (c) and (d) given below : **(a) A is true , R is true and R is a correct explanation for A** **(b) A is true , R is true and R is not a correct explanation for Assertion** **(c) A is true and R is false** **(d) A is false and R is true**	
9	**Assertion(A):** If $d/dx\ (u/v) = (v\ dv/dx – u\ dv/dx)/v^2$ **Reason(R):** $d/dx\ (x+1)/(x-1) = -2/(x-1)^2$	1
10	Que 10: **Assertion(A):** If $f'(x) = \lim_{h \to 0} [f(x+h) -f(x)] / h$ **Reason(R):** $d/dx\ sin\ x = -cosx$ (a) (b) (c) (d)	1

Answer Key

Ans1	**(d)**
Feedback	*Option d is correct, Since B is in IV Octant*
Ans2	**(b)**
Feedback	*Option b is correct, Since in YOZ plane X-coordinate is zero*
Ans3	**(b)**
Feedback	*Option b is correct, since distance between D (4,8,-5) and E (-4,2,-5) is* $\sqrt{(-4 - 4)^2+(2 -8)^2+(-5+5)^2} = \sqrt{64+36+0} = 10$
Ans4	**(d)**
Feedback	*Option d is correct, Distance of point C from XY- Plane is 5 unit*
Ans5	**(c)**
Feedback	*Option (c) is correct, Since $\lim_{x \to 5} (x^4 - 625)/(x - 5)$ is equal to $4 \times 5^{4-1} = 4 \times 125 = 500$*
Ans6	**(d)**
Feedback	*Option (d) is correct, Since $\lim_{x \to 0} sinax/sinbx$ is equal to a/b*
Ans7	**(b)**
Feedback	*Option (b) is correct, Since $\lim_{x \to 2} (x^3 - 2x^2)/(x^2 -5x+6) = \lim_{x \to 2} x^2(x - 2)/(x-2)(x-3) = -4$*
Ans8	**(b)**
Feedback	*Option (b) is correct, Since $\lim_{x \to 0} (ax + xcosx)/\ bsinx = (a+1)/b$*
Ans9	**(a)**
Feedback	*Option (a) is Correct, Since assertion and reason both are correct and reason is correct explanation of assertion because by using quotient rule of differentiation we get $d/dx\ (x+1)/(x-1) = -2/(x-1)^2$*
Ans10	**(c)**
Feedback	*Option (c) is Correct, Since A is true and R is false because $d/dx\ sin\ x = cosx$*