CBT CLASS XII MATHS NOVEMBER-2023

GENERAL INSTRUCTION :

CHAPTER: STRAIGHT LINE

Sr.No	Question	Marks
	Case Study 1 ***Based on the information given below answer the following questions*** An Aeroplane was hovering over a terrorist camp with a shooter sitting inside it. The shooter was closely observing the movement of the terrorists and was looking for an opportunity to shoot terrorist. At any particular instance the coordinates of the position of the Aeroplane and the terrorist are (- 2,- 1, - 3) and (1, - 3, 3)respectively. 	
1	**The Direction Ratios of the line joining points (- 2,- 1, - 3) and (1, - 3, 3) are** (a) 3, -2, 1 (b) 1, 2, 6 (c) 3, -2, 6 (d) 3, -2, 5	1
2	**Equation of the line joining the points (- 2,- 1, - 3) and (1, - 3, 3) is*** (a) (x+4)/3=(y-3)/(-2)=(z+3)/6 (b) (x-2)/4=(y-1)/2=(z+3)/6 (c) (x+2)/5=(y-1)/(-2)=(z-3)/6 (d) (x+2)/3=(y+1)/(-2)=(z+3)/6	1
3	**The distance between the given two points is** (a) 10 units (b) 2 units (c) 7 units (d) 5 units	1
4	**The Direction Cosines of the line joining points (- 2,- 1, - 3) and (1, - 3, 3) are** (a) 3/7, -2/7, 6/7 (b) 3/7, -2/7, 1/7 (c) 1/7, 2/7, 6/7 (d) 3/7, -2/7, 5/7	1
	Case Study 2 **Read the following passage and answer the following questions** The equation of motion of a missile are x = 3t, y = - 4t, z = t where the time t is given in seconds and the distance is measured in kilometers 	
5	**Equation of path of the missile is** (a) x/(-3) = y/4 =z/1 (b) x/3 = y/(-4) = z/1 (c) x/3 = y/4 = z/(-1) (d) x/3 =y /4 = z/1	1
6	**The distance of the missile from the starting point (0,0,0) in 5 second** (a) √ 650 km (b) √750 km (c) √550 km (d) √ 450 km	1
7	**If the position of the missile at a certain instant of the time is (5 - 8 10) than the height of the missile from the ground (consider ground as XY- plane) is:** (a) 5 kms (b) 8 kms (c) 10 kms (d) √89 kms	1
8	**If equations of path of two missiles are as follows, which are perpendicular to each other than value of *k* is** $\frac{x-1}{2}=\frac{y-1}{3}=\frac{z-1}{k}$ *and* $\frac{x-2}{-2}=\frac{y-3}{-1}=\frac{z-5}{7}$ (a) k = 2 (b) k = -1 (c) k = 1 (d) k = -2	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): Cosine of the angle between the two vector $2\hat{i}+2\hat{j}-3\hat{k}$ and $6\hat{i}-3\hat{j}+2\hat{k}$ is $\frac{16}{21}$ Reason (R): Cosine of the angle between the two vector $\vec{a}$ and $\vec{b}$ is $\cos\theta = \frac{\vec{a}.\vec{b}}{\lvert\vec{a}\rvert \lvert\vec{b}\rvert}$ a b c d	1
10	Assertion(A): If $\vec{a} = 3\hat{i}-2\hat{j}+2\hat{k}$, $\vec{b} = 3\hat{i}+3\hat{j}+3\hat{k}$ then $\vec{a}.\vec{b} = 9$ Reason(R) : If $\vec{a} = a_1\hat{i}+a_2\hat{j}+a_3\hat{k}$ then its magnitude $\lvert\vec{a}\rvert = \sqrt{a_1^2+a_2^2+a_3^2}$ a b c d	1

Answer Key

Ans1	**(c)**
Feedback	*Option (c) is correct, since direction ratio of two points (x_1y_1,z_1), (x_2,y_2,z_2) = $x_2 - x_1$, $y_2 - y_1$, $z_2 - z_1$ = 3,-2, 6*
Ans2	**(d)**
Feedback	*Option (d) (x+2)/3=(y+1)/(-2)=(z+3)/6 is correct, since equation of line passes through two points (x_1y_1,z_1), (x_2,y_2,z_2) is: ($x - x_1$)/($x_2 - x_1$), = ($y - y_1$)/($y_2 - y_1$) = ($z - z_1$)/($z_2 - z_1$)*
Ans3	**(c)**
Feedback	*Option (c) is correct, since distance between two points (x_1y_1,z_1), (x_2,y_2,z_2) is $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2+(z_2-z_1)^2}$ so distance between (-2,-1,-3) and (1,-3,3) is 7*
Ans4	**(a)**
Feedback	*Option (a) 3/7 , -2/7, 6/7 is correct, since direction cosine of two points (x_1y_1,z_1), (x_2,y_2,z_2) is:* $(x_2 - x_1),/(\sqrt{(x_2-x_1)^2+(y_2-y_1)^2+(z_2-z_1)^2}), (y_2 - y_1)/(\sqrt{(x_2-x_1)^2+(y_2-y_1)^2+(z_2-z_1)^2}), (z_2 - z_1)/(\sqrt{(x_2-x_1)^2+(y_2-y_1)^2+(z_2-z_1)^2})$
Ans5	**(b)**
Feedback	*Correct option is (b), since given equation of motion of a missile be x = 3t , y = -4t , z = t $\Rightarrow$ x/3 = y/-4 =z/1 which is a straight line.*
Ans6	**(a)**
Feedback	*Option (a) $\sqrt{}$ 650 km is correct, since position of missile after 5 seconds x= 3*5=15, y =-4 *5 =-20, z = 5 , so distance between (0,0,0) and (15,-20,5) is $\sqrt{}$ 650*
Ans7	**(c)**
Feedback	*Correct option is (c) 10 kms, since position of missile certain time is (5,-8,10) so height of missile from ground = distance between points (5,-8,0) and (5,-8,10) is 10 kms*
Ans8	**(c)**
Feedback	*Option (c) is correct, since if two lines are perpendicular and it's direction ratio a_1, b_1, c_1 and a_2, b_2, c_2 than $a_1.a_2 + b_1.b_2 + c_1.c_2 = 0$ so here -4 -3+7k =0 and k=1*
Ans9	**(d)**
Feedback	*Option (d) is correct, since Assertion is false, (Here angle between vectors cosθ = 4/21) and Reason is true*
Ans10	**(b)**
Feedback	*Correct option is (b), since dot product of vector a and vector b is 9 and reason also correct but reason is not explaining scalar product*