CHAPTER – 11 (THREE DIMENSION GEOMETRY)

CASE/SOURCE BASED QUESTIONS

Sl. No.	Read the passage given below and answer the following questions……..
1	A cricket match is organized between two Clubs A and B for which a team from each club is chosen. Remaining players of Club, A and Club B are respectively sitting on the plane represented by the equation to cheer the team of their own clubs.  Based on the above answer the following: **1.** The Cartesian equation of the plane on which players of Club A are seated is a. $2x - y + z = 3$ b. $2x - y + 2z = 3$ c. $2x - y + z = -3$ d. $x - y + z = 3$ **2.** The magnitude of the normal to the plane on which players of club B are seated, is a. $\sqrt{15}$ b. $\sqrt{14}$ c. $\sqrt{17}$ d. $\sqrt{20}$

	3. The intercept form of the equation of the plane on which players of Club B are seatedis a. $\frac{x}{8}+\frac{y}{8}/\ 3+\frac{z}{2}=1$ b. $\frac{x}{5}+\frac{y}{8}/\ 3+\frac{z}{3}=1$ c. $\frac{x}{8}+\frac{y}{8}/\ 3+\frac{z}{4}=1$ d. $\frac{x}{8}+\frac{y}{8}+\frac{z}{2}=1$ **4.** Which of the following is a player of Club B? a. Player sitting at (1, 2,1) b. Player sitting at (0, 1,2) c. Player sitting at (1, 4,1) d. Player sitting at (1, 1,2)
2	The Indian coast guard, while patrolling, saw a suspicious boat with people. They were nowhere looking like fishermen. The coast guard were closely observing the movement of the boat for an opportunity to seize the boat. They observed that the boat is moving along a planar surface. At an instant of time, the coordinates of the position of the coast guard helicopter and the boat is (1, 3, 5) and (2, 5, 3) respectively. Based on the above answer the following:

1. If the line joining the positions of the helicopter and the boat is perpendicular to the plane in which the boat moves, then the equation of the planeis

a. -x + 2y – 2z = 6

b. x + 2y + 2z =6

c. x + 2y – 2z =6

d. x - 2y – 2z = 6

2. If the coast guard decide to shoot the boat at that given instant of time, then whatis the distance (in meters) that the bullet has totravel?

a. 5m

b. 3m

c. 6m

d. 4m

3. If the coast guard decides to shoot the boat at that given instant of time, when the speedofbulletis36m/sec,then what is the time taken for the bullet to travel and hit the boat?

a. $\frac{1}{8}$ seconds

b. $\frac{1}{14}$ seconds

c. $\frac{1}{10}$ seconds

d. $\frac{1}{12}$ seconds

4. Atthatgiveninstantoftime,theequationoflinepassingthroughthepositionsofthe helicopter and boatis

	a. $\frac{x-1}{1}=\frac{y-3}{2}=\frac{z-5}{-2}$ b. $\frac{x-1}{2}=\frac{y+3}{1}=\frac{z-5}{-2}$ c. $\frac{x+1}{1}=\frac{y-3}{-2}=\frac{z+5}{-2}$ d. $\frac{x-1}{2}=\frac{y-3}{-2}=\frac{z+5}{2}$
3	A pole is standing on the ground. Consider the ground on which the pole stands as a plane having point A(2,5,-3) B(-2,-3,5) and C(5,3,-3) on it. Pole is tied with three rope from points A, B and C. The top of the pole is at the point (2,1,-3). Based on the above answer the following. (1) Equation of plane in which pole is standing. (a) 4x-3y-4z+18=0 (b) 4x+3y-4z+18=0 (c) 4x+3y+4z+19=0 (d) 4x-3y+4z+19=0
	(2) Height of the pole from the ground is (a) $\frac{18}{\sqrt{41}}$ (b) $\frac{17}{\sqrt{41}}$ (c) $\frac{16}{\sqrt{41}}$

	(d) $\frac{15}{\sqrt{41}}$
	(3) coordinates of foot of the pole on the ground are (a) (10/41, 13/41, 195/41) (b) (10/41, 13/41, -195/41) (c) (-10/41, 13/41, -195/41) (d) (10/41, -13/41, -195/41)
	(4) direction cosine of rope tied to point A and B (a) 1/3, 2/3,2/3 (b) -1/3, 2/3, 1/3 (c) 2/3, -1/3,2/3 (d) -1/3, -2/3, 2/3
4.	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.

	Based on the above answer the following: Based on the above answer the following:  Based on the above answer the following:
1.	What is the path of the missile? a. Straight line b. Parabola c. Circle d. Ellipse
2.	Which of the following points lie on the path of the missile? a. (6, 8, 2) b. (6, -8, -2) c. (6, -8, 2) d. (-6, -8, 2)
3.	At what distance will the rocket be from the starting point (0, 0, 0) in 5 seconds?

	a. √550 kms b. √650 kms c. √450 kms d. √750 kms
4.	The position of rocket at a certain instant of time is (5, -8, 10), then what will be the height of the rocket from the ground? (The ground is considered as the xy – plane). a. 12 km b. 11 km c. 20 km d. 10 km
5.	At a certain instant of time, if the missile is above the sea level, where the equation of the surface of sea is given by $2x + y + 3z = 1$ and the position of the missile at that instant of time is (1, 1, 2), then the image of the position of the rocket in the sea is a. (−97,−17,−107) b. (97,−17,−107) c. (−97,17,−107) d. (−97,−17,107)

5	Read the passage given below and answer the following questions……..

Suppose the given tower is situated on the plane 2x+y-z=5. The coordinate of the tip of the tower is (1,2,3).

i) Consider the tower as a line, what would be the direction ratios of the tower.

A)2,1,-5

B)1,2,3

C)3,3,-2

D) 1,0,1

ii) What would be the height of tower?

A)

B)

C)

D)

iii)Consider the tower as a line, what is the Cartesian equation of the tower?

A) $\frac{x-1}{2} = \frac{y-2}{1} = \frac{z-3}{1}$

B) $\frac{x+1}{2} = \frac{y+2}{1} = \frac{z+3}{1}$

C) $\frac{x-1}{2} = \frac{y-2}{1} = \frac{z-3}{1}$

	D) $\frac{x-2}{3} = \frac{y}{1} = \frac{z+3}{1}$ iv) The normal vector of the plane 2x+y-z=5 is A) $2\hat{i} + 3\hat{j} - 3\hat{k}$ B) $2\hat{i} + \hat{j} - \hat{k}$ C) $2\hat{i} + 3\hat{j} + 3\hat{k}$ D) $2\hat{i} + \hat{j} + 3\hat{k}$ v) The equation of the plane which is parallel to the plane 2x+y-z=5 and contains the tip of tower i.e. point (1,2,3) A)x+y-z=1 B)2x+y-z=3 C)2x+y-z=2 D) 2x+y-z=1
6.	A football competition is organized between two schools A and B for which a team from each school is chosen. Students of schools A and B are sitting on the plane represented by the equation $\vec{r}.(3\hat{i} - \hat{j} + 2\hat{k}) = 3$ and $\vec{r}.(2\hat{i} + 3\hat{j} + \hat{k}) = 9$ to cheer their team.  Based on the above answer the following

	(1) cartesian equation of the plane on which students of School A are seated is (a) 3x-y+2z=3 (b) 3x-y+z =3 (c)2x-3y+z=-3 (d)x-y+z=3 (2) the magnitude of the normal to the plane on which students of school B are seated is (a) (b) (c) (d) (3) which of the following is a student of school B is (a) sitting at (0,2,1) (b) sitting at (1,1,2) (c)sitting at (1,3,2) (d) sitting at (1,1,2) (4) the distance of the plane on which students of school B are seated from the origin is (a) $8/\sqrt{14}$ (b) $7/\sqrt{14}$ (c) $6/\sqrt{14}$ (d) $9/\sqrt{14}$
7.	Read the passage given below and answer the following questions……..
	 Three friends are flying the kites in the sky .At some instant of time the coordinates of kites are (1,1,0) ,(1,2,1) and (-2,2,-1) . i) The vector equation of the plane containing all three kite is given by A) $\vec{r}\cdot(2\hat{i}+3\hat{j}-3\hat{k})=5$

B) $\vec{r}\cdot(2\hat{i} - \hat{j} - 3\hat{k}) = 5$

C) $\vec{r}\cdot(2\hat{i} - \hat{j} + 3\hat{k}) = 5$

D) $\vec{r}\cdot(-2\hat{i} + \hat{j} - 3\hat{k}) + 5=0$

ii) The cartesian equation of the plane containing all the three kites is given by

A)3x-2y+4z=5

B)2x+3y-3z=5

C)x+y+z=5

D)2x-3y+3z=5

iii) The normal unit vector of the plane containing all the three kites is given by

A)

B)

C)

D)

iv) The perpendicular distance of the plane containing all the three kites from the origin is given by

A))

B))

C))

D))

v) The foot of perpendicular on the plane containing all the three kite from the origin is given by

A) $\left(\frac{5}{11}, \frac{15}{22}, \frac{-15}{22}\right)$

B) $\left(\frac{-5}{11}, \frac{15}{22}, \frac{15}{22}\right)$

C) $\left(\frac{5}{11}, \frac{-15}{22}, \frac{-15}{22}\right)$

D) $\left(\frac{-5}{22}, \frac{-15}{22}, \frac{-15}{22}\right)$

ANSWERS KEY

CASE/SOURCE BASED QUESTIONS:

Q.No.	Answer
1	1. a. $2x-y+z=3$ 2. b. $\sqrt{14}$ 3. c. $\frac{x}{8}+\frac{y}{8}/3+\frac{z}{4}=1$ 4. d.Player sitting at (1, 1,2)
2	1. c. $x + 2y – 2z =6$ 2. b. 3 m 3. d. $\frac{1}{12}$ seconds 4. a. $\frac{x-1}{1}=\frac{y-3}{2}=\frac{z-5}{-2}$
3.	(1)c (2)a (3)d (4)d
4	1. a 2. c 3. b 4. d 5. a
5	(i) a (ii) b (iii) c (iv) d (v) b

6	(1)a (2)b (3)b (4)d
7	(i) a (ii) b (iii) c (iv) d (v) a

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