# THREE DIMENSIONAL GEOMETRY

## PREVIOUS EAMCET BITS

1. The perimeter of the triangle with vertices at (1, 0, 0), (0, 1, 0) and (0, 0, 1) is **[EAMCET 2009]**

   1) 3 2) 2 3) $2\sqrt{2}$ 4) $3\sqrt{2}$

   Ans: 4

Sol. $AB = BC = CA = \sqrt{2}$

$\therefore$ Perimeter $= 3\sqrt{2}$

2. In $\Delta ABC$ the midpoints of the sides AB, BC and CA are respectively ($l$, 0, 0), (0, m, 0) and (0, 0, n). Then $\frac{AB^2 + BC^2 + CA^2}{\ell^2 + m^2 + n^2}$ **[EAMCET 2008]**

   1) 2 2) 4 3) 8 4) 16

   Ans: 3

Sol. $(\ell,0,0)(0,m,0)(0,0,n)$ are the midpoint of AB, BC, CA

$\Rightarrow A = (\ell,-m,n), B = (\ell,m,-n), C = (-\ell,m,n)$

$AB^2 + BC^2 + CA^2 = (\ell-\ell)^2 + (-m-m)^2 + (n+n)^2 + (\ell+\ell)^2 + (m-m)^2 + (-n-n)^2$

$+(-\ell-\ell)^2 + (m+m)^2 + (n-n)^2 = 0 + 4m^2 + 4n^2 + 0 + 4n^2 + 4\ell^2 + 4m^2 + 0$

$= 8\ell^2 + 8m^2 + 8n^2 = 8(\ell^2 + m^2 + n^2)$

$\Rightarrow \frac{AB^2 + BC^2 + CA^2}{\ell^2 + m^2 + n^2} = 8$

3. The ratio in which yz-plane divides the line segment joining (–3, 4, –2), (2, 1, 3) is **[EAMCET 2007]**

   1) – 4 : 1 2) 3 : 2 3) –2 : 3 4) 1 : 4

   Ans: 2

Sol. $-x_1 : x_2 = 3 : 2$

4. If OA is equally inclined to OX, OY and OZ and If A is $\sqrt{3}$ units from the origin, then A is **[EAMCET 2006]**

   1) (3, 3, 3) 2) (–1, 1, –1) 3) (–1, 1, 1) 4) (1, 1, 1)

   Ans: 4

Sol. $\alpha = \beta = \gamma$

$\cos\alpha = \cos\beta = \cos\gamma = \pm\frac{1}{\sqrt{3}}$

$|OA| = \sqrt{3}$

$A = (|OA|\cos\alpha, |OA|\cos\beta, |OA|\cos\gamma)$

$= (\pm 1, \pm 1, \pm 1)$

$= (1,1,1)$ or $(-1,-1,-1)$

5. The point collinear with (1, –2, –3) and (2, 0, 0) among the following is **[EAMCET 2005]**

1) (0, 4, 6) 2) (0, –4, –5) 3) (0, –4, –6) 4) (0, –4, 6)

Ans: 3

Sol. Three points are collinear

if $\frac{x_1 - x_2}{x_2 - x_3} = \frac{y_1 - y_2}{y_2 - y_3} = \frac{z_1 - z_2}{z_2 - z_3}$ verification

6. XOZ plane divides the join of (2, 3, 1) and (6, 7, 1) in the ratio : **[EAMCET 2003]**

1) 3 : 7 2) 2 : 7 3) –3 : 7 4) –2 : 7

Ans: 3

Sol. $-y_1 : y_2 = -3 : 7$

7. If the plane $7x + 11y + 13z = 3003$ meets the coordinate axes in A, B, C then the centroid of the $\Delta ABC$ is **[EAMCET 2002]**

1) $(143, 94, 77)$ 2) $(143, 77, 91)$ 3) $(91, 143, 77)$ 4) $(143, 66, 91)$

Ans: 1

Sol. $A(429, 0, 0)$

$B(0, 282, 0)$

$C(0, 0, 231)$

are vertices of $\Delta^{le}$ ABC

then centroid is $\left(\frac{\sum x_1}{3}, \frac{\sum y_1}{3}, \frac{\sum z_1}{3}\right) = (143, 94, 77)$

8. If the extremities of a diagonal of a square are (1, –2, 3), (2, –3, 5) then the length of its side is **[EAMCET 2001]**

1) $\sqrt{6}$ 2) $\sqrt{3}$ 3) $\sqrt{5}$ 4) $\sqrt{7}$

Ans: 2

Sol. Length of the diagonal = $\sqrt{6}$

$\therefore$ Length of the side = $\frac{d}{\sqrt{2}} = \sqrt{3}$

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