

দুটা বিন্দু সংযোগে ভেক্টর
 (Vector joining two points)

প্রথম বিন্দু, $P_1(x_1, y_1, z_1)$
 and $P_2(x_2, y_2, z_2)$ দুটা বিন্দু
 (points.)

$\vec{P_1P_2} = ?$

ত্রিভুজ সূত্র \Rightarrow 10V,
 (by triangular law of vector addition)

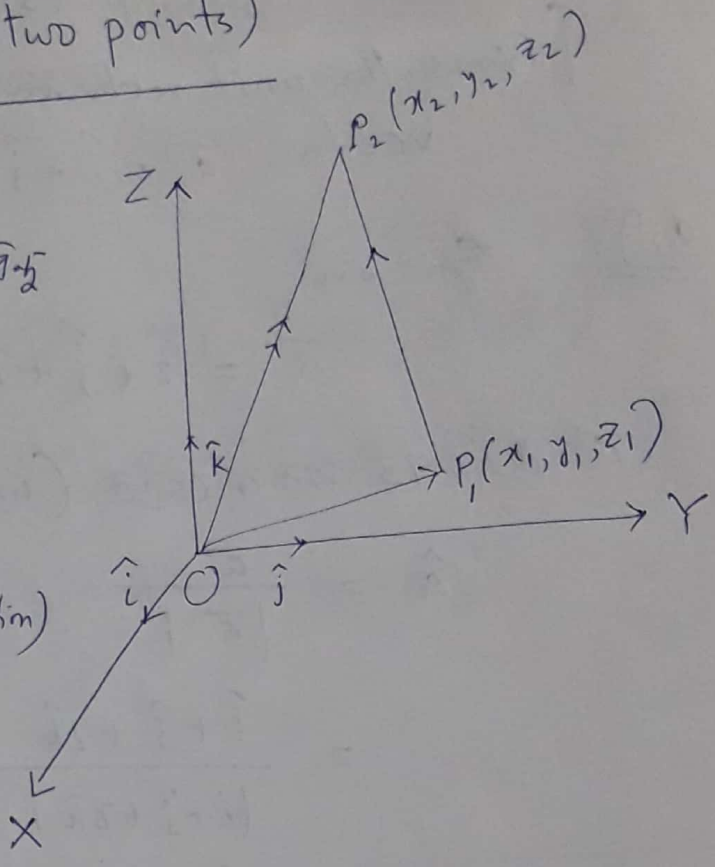
$\vec{OP_1} + \vec{P_1P_2} = \vec{OP_2}$

$\Rightarrow \vec{P_1P_2} = \vec{OP_2} - \vec{OP_1}$

$= (x_2\hat{i} + y_2\hat{j} + z_2\hat{k}) - (x_1\hat{i} + y_1\hat{j} + z_1\hat{k})$

$\Rightarrow \vec{P_1P_2} = (x_2 - x_1)\hat{i} + (y_2 - y_1)\hat{j} + (z_2 - z_1)\hat{k}$

$\& |\vec{P_1P_2}| = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}$



Exercise 10.2

(10)

Q No. ⑧: P and Q बिन्दु द्वारे क्रम (1, 2, 3) और (4, 5, 6).
 \vec{PQ} (वेक्टर) दिशात एकक (वेक्टर) - डालिउम ।

Sol. दिशा-अणु (Given)

P (1, 2, 3) और Q (4, 5, 6) द्वारे बिन्दु (Point).
 (x_1, y_1, z_1) (x_2, y_2, z_2)

$$\begin{aligned}\therefore \vec{PQ} &= (x_2 - x_1)\hat{i} + (y_2 - y_1)\hat{j} + (z_2 - z_1)\hat{k} \\ &= (4 - 1)\hat{i} + (5 - 2)\hat{j} + (6 - 3)\hat{k} \\ &= 3\hat{i} + 3\hat{j} + 3\hat{k}\end{aligned}$$

आक्रा, (again), \vec{PQ} -क अणु (magnitude),

$$\begin{aligned}|\vec{PQ}| &= \sqrt{3^2 + 3^2 + 3^2} \\ &= \sqrt{27} \\ &= 3\sqrt{3}\end{aligned}$$

$\therefore \vec{PQ}$ क दिशात एकक (वेक्टर) (unit vector along \vec{PQ})

$$\begin{aligned}&= \frac{\vec{PQ}}{|\vec{PQ}|} \\ &= \frac{3\hat{i} + 3\hat{j} + 3\hat{k}}{3\sqrt{3}} \\ &= \frac{1}{\sqrt{3}}(\hat{i} + \hat{j} + \hat{k}) \leftarrow \text{Ans.}\end{aligned}$$

[Ex. of the position vector of P and Q are $2\hat{i} + 3\hat{j} - 4\hat{k}$ and $\hat{i} - \hat{j} + 5\hat{k}$, Then find the unit vector in the direction of \overrightarrow{PQ}]

Ex. P and Q ବିନ୍ଦୁଙ୍କର ସ୍ଥାନାଙ୍କ $2\hat{i} + 3\hat{j} - 4\hat{k}$ and $\hat{i} - \hat{j} + 5\hat{k}$ । \overrightarrow{PQ} (ସଦିଶ) ଦିଗରେ ଏକକ ସଦିଶ ଖୋଜିବା ।

Sol. $\overrightarrow{PQ} = (\text{Q-ର ସ୍ଥାନାଙ୍କ vector}) - (\text{P-ର ସ୍ଥାନାଙ୍କ (ସଦିଶ)})$
 (position vector of Q) — (position vector of P)

$$\Rightarrow \overrightarrow{PQ} = (\hat{i} - \hat{j} + 5\hat{k}) - (2\hat{i} + 3\hat{j} - 4\hat{k})$$

$$= (1-2)\hat{i} + (-1-3)\hat{j} + \{5-(-4)\}\hat{k}$$

$$= -\hat{i} + (-4)\hat{j} + 9\hat{k}$$

Again,

$$|\overrightarrow{PQ}| = \sqrt{(-1)^2 + (-4)^2 + 9^2}$$

$$= \sqrt{1 + 16 + 81}$$

$$= \sqrt{98}$$

$$= 7\sqrt{2}$$

$$\begin{array}{r} 2 \overline{) 98} \\ \underline{4} \\ 7 \overline{) 49} \\ \underline{49} \\ 0 \end{array}$$

∴ Unit vector along \overrightarrow{PQ} is $(\overrightarrow{PQ} \text{ -ର ଦିଗରେ ଏକକ ସଦିଶ})$

$$= \frac{\overrightarrow{PQ}}{|\overrightarrow{PQ}|}$$

$$= \frac{-\hat{i} - 4\hat{j} + 9\hat{k}}{7\sqrt{2}} \quad \leftarrow \text{Ans.}$$

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