UNIT–IV : VECTO

CHAPTER

10

Syllabus

Q. 3. The value of $\hat{i}.(\hat{j}\times\hat{k})+\hat{j}.(\hat{i}\times\hat{k}$

(A) 0 (B)

(C) 1 (D)

Ans. Option (C) is correct.

> ***Explanation :***
>
> $\hat{i}.(\hat{j}\times\hat{k})+\hat{j}.(\hat{i}\times\hat{k})+\hat{k}.(\hat{i}\times\hat{j})$

Q. 4. If θ is the angle between any

then $|\vec{a}.\vec{b}|=|\vec{a}\times\vec{b}|$ when θ is e

(A) 0 (B)

(C) $\frac{\pi}{2}$ (D)

Ans. Option (B) is correct.

Therefore, the area of the
$\left|\overrightarrow{AB} \times \overrightarrow{BC}\right| = 2$sq. units.

Q. 7. If $\vec{a}$ is a non-zero vector of
non-zero scalar, then $\lambda\vec{a}$ is u

(A) $\lambda = 1$ **(B)**

(C) $a = |\lambda|$ **(D)**

Ans. Option (D) is correct.

Explanation :

Vector $\lambda\vec{a}$ is a unit vector if

$$|\lambda\vec{a}| = 1$$

$$\Rightarrow \quad |\lambda||\vec{a}| = 1$$

$$\Rightarrow \quad |\vec{a}| = \frac{1}{|\lambda|}$$

$$\Rightarrow \quad a = \frac{1}{|\lambda|}$$

(C) $\frac{\pi}{2}$ (D)

Ans. Option (B) is correct.

Explanation :

Here, $|\vec{a}| = \sqrt{3}$, $|\vec{b}| = 4$ and $\vec{a}.$

We know that,

$$\vec{a}.\vec{b} = |\vec{a}||\vec{b}|\cos$$

$$\Rightarrow \quad 2\sqrt{3} = \sqrt{3}.4.\cos$$

$$\Rightarrow \quad \cos\theta = \frac{2\sqrt{3}}{4\sqrt{3}}$$

$$= \frac{1}{2}$$

$$\therefore \quad \theta = \frac{\pi}{3}$$

Q. 13. Find the value of λ suc

$\vec{a} = 2\hat{i} + \lambda\hat{j} + \hat{k}$ and $\vec{b} = \hat{i} + 2\hat{j} +$

$$12 = 10 \times 2\,\text{co}$$

$$\Rightarrow \quad \cos\theta = \frac{12}{20}$$

$$= \frac{3}{5}$$

$$\Rightarrow \quad \sin\theta = \sqrt{1-\text{cos}}$$

$$\sin\theta = \pm\frac{4}{5}$$

$$\therefore \quad \left|\vec{a}\times\vec{b}\right| = |\vec{a}|\left|\vec{b}\right|\text{sin}$$

$$= 10 \times 2 \times$$

$$= 16$$

Q. 18. The vectors $\lambda\hat{i}+\hat{j}+2\hat{k},\ \ \hat{i}+\lambda$
are coplanar, if

(A) $\lambda = -2$ **(B)**

at $\lambda = -3$

$|\lambda\vec{a}| = |0|4 = 0$

at $\lambda = 0$

and $|\lambda\vec{a}| = |2|$

$4 = 8,$

at $\lambda = 2$

So, the range of $|\lambda\vec{a}|$ is [0,12].

Q. 23. The number of vectors of unit

to the vectors $\vec{a} = 2\hat{i} + \hat{j} + 2\hat{k}$ a

(A) one (B)

(C) three (D)

Ans. Option (B) is correct.

Explanation : The number

length perpendicular to the

(say)

i.e., $\vec{c} = \pm(\vec{a} \times \vec{b})$.

So, there will be two vec

Reason (R): $\vec{a}.(\vec{b}+\vec{c})=\vec{a}.\vec{b}$

Ans. Option (B) is correct.

Explanation: Assertion (A)
are individually correct.
Reason (R) is the distribut
product.

Q. 4. Assertion (A): The area of
diagonals $\vec{a}$ and $\vec{b}$ is $\frac{1}{2}\left|\vec{a}\times\vec{b}\right|$

Reason (R): If $\vec{a}$ and $\vec{b}$ re
sides of a triangle, then the a
obtained by evaluating $\left|\vec{a}\times\vec{b}\right|$

Ans. Option (C) is correct.

Explanation: If $\vec{a}$ and $\vec{b}$ rep
sides of a triangle, then the
be obtained by evaluating $\frac{1}{2}$

Q. 2. Write the vector in standard f

$\hat{k}$ (where $\hat{i}$, $\hat{j}$ and $\hat{k}$ are the

three axes).

(A) $15\hat{i}+0\hat{j}+0\hat{k}, 0\hat{i}+8\hat{j}+6\hat{k}$

(B) $0\hat{i}+6\hat{j}+8\hat{k}, 15\hat{i}+0\hat{j}+0\hat{k}$

(C) $0\hat{i}+0\hat{j}+0\hat{k}, 0\hat{i}+8\hat{j}+6\hat{k}$

(D) $15\hat{i}+0\hat{j}+0\hat{k}, 6\hat{i}+8\hat{i}+0\hat{k}$

Ans. Option (A) is correct.

Q. 3. What are the magnitudes of

and in what units?

(A) 9, 10 **(B**

(C) 15, 10 **(D**

Ans. Option (C) is correct.

Explanation:

$$|\vec{A}| = \sqrt{(15)^2+0^2+$$

Explanation:

$$|\vec{a}-\vec{b}|^2 = (\vec{a}-\vec{b}).(\vec{a}$$

$$= |\vec{a}|^2+|\vec{b}|$$

$$= 1+1-2(1$$

$$\Rightarrow \quad |\vec{a}-\vec{b}|^2 = 2-2\cos\theta$$

$$= 2(1-\cos$$

$$\Rightarrow \quad |\vec{a}-\vec{b}|^2 = 2\left(2\sin^2\frac{\theta}{2}\right.$$

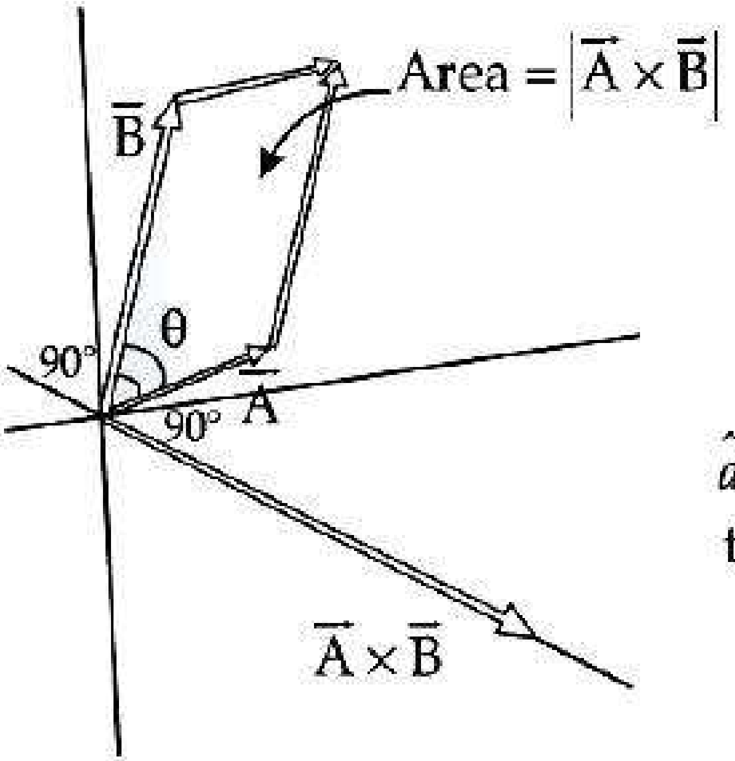
$$\Rightarrow \quad |\vec{a}-\vec{b}|^2 = 4\sin^2\frac{\theta}{2}$$

$$|\vec{a}-\vec{b}|^2 = 2\sin\frac{\theta}{2}$$

Q. 4. Let $\vec{a}, \vec{b}$ and $\vec{c}$ be uni

$\vec{a}\cdot\vec{b} = \vec{a}\cdot \vec{c} = 0$ and angle b

$\frac{\pi}{6}$ then $\vec{a}$ =



$\overline{A} \times \overline{\text{I}}$

$\hat{a}_n$ is a unit v
to the plan

Q. 1. $\hat{i} \times \hat{j}$ = ________.

(A) $\hat{k}$ **(I**

(C) 0 **(D**

Ans. Option (A) is correct.

> ***Explanation:*** $\hat{i} \times \hat{j} = \hat{k}$

Q. 2. $\hat{i} \cdot (\hat{j} \times \hat{k})$ = ________.

(A) $\hat{k}$ **(I**