MATHS

BOOKS - NAGEEN MATHS (HINGLISH)

VECTORS

Miscellaneous Exercise

1. Write down a unit vector in XY-plane, making an angle of 30 with the positive direction of x-axis.

Watch Video Solution

2. Find the scalar components and magnitude of the vector joining the points $P(x_1, y_1, z_1)$ and $Q(x_2, y_2, z_2)$

Watch Video Solution

3. A girl walks 4 km towards west, and then she walks 3 km in a direction 30^0 east of north and

stops. Determine the girls displacement from her initial point of departure.

Watch Video Solution

4. If $\rightarrow a = \rightarrow b + \rightarrow c$, then is it true that $|\rightarrow a| = |\rightarrow b| + |\rightarrow c|$? Justify your answer.

Watch Video Solution

5. Find the value of x for which $x\left(\hat{i}+\hat{j}+\hat{k}\right)$ is a unit vector.

Watch Video Solution

6. Find a vector of magnitude 5 units and parallel to the resultant of the vectors $\vec{a}=2\hat{i}+3\hat{j}-\hat{k}$ and $\vec{b}=\hat{i}-2\hat{j}+\hat{k}$

Watch Video Solution

7. If $\vec{a} = \hat{i} + \hat{j} + \hat{k}$, $\vec{b} = 2\hat{i} - \hat{j} + 3\hat{k}$ and $\vec{c} = \hat{i} - 2\hat{j} + \hat{k}$ find a unit vector parallel to the vector $2\vec{a} - \vec{b} + 3\vec{c}$.

Watch Video Solution

8. Show that the points $A(1, -2, -8), B(5, 0, -2) and C(1, 3, 7)$ are collinear, and find the ratio in which B divides AC.

Watch Video Solution

9. Find the position vector of a point R which divides the line joining two points P and Q whose position vectors are $\left(2\vec{a}+\vec{b}\right)$ and ($\vec{a}-3\vec{b}\Big)$ respectively, externally in the ratio 1:2.Also, show that P is the mid-point of the line segment RQ.

Watch Video Solution

10. The two adjacent sides of a parallelogram are $2\hat{i}-4\hat{j}+5\hat{k}$ and $\hat{i}-2\hat{j}-3\hat{k}$. Find the

unit vector parallel to its diagonal. Also, find its area.

A. $13\sqrt{5}$ sq. units

B. $6\sqrt{5}$ sq. units

C. $11\sqrt{2}$ sq. units

D. $11\sqrt{5}$ sq. units

Answer: D

Watch Video Solution

11. Show that the direction cosines of a vector equally inclined to the axes OX, OY and OZ are $\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}}$.

Watch Video Solution

12. Let $\rightarrow a = \hat{i} + 4\hat{j} + 2\hat{k}, \rightarrow b = 3\hat{i} - 2\hat{j} + 7\hat{k}$ and $\rightarrow c = 2\hat{i} - \hat{j} + 4\hat{k}$. Find a vector $\rightarrow d$ which is perpendicular to both $\rightarrow a$ and $\rightarrow b$ and $\rightarrow c . \rightarrow d = \quad 15$.

Watch Video Solution

13. The scalar product of the vector $\vec{a} = \hat{i} + \hat{j} + \hat{k}$ with a unit vector along the sum of the vectors $\vec{b} = 2\hat{i} + 4\hat{j} - 5\hat{k}$ *and* $\vec{c} = \lambda\hat{i} + 2\hat{j} + 3\hat{k}$ is equal to 1. Find the value of λ and hence find the unit vector along $\vec{b} + \vec{c}$.

Watch Video Solution

14. If $\vec{a}, \vec{b}, \vec{c}$ are mutually perpenedicular vectors of equal magnitudes, show that the vector $\vec{a} + \vec{b} + \vec{c}$ is equally inclined to $\vec{a}, \vec{b}, and \vec{\cdot}$

Watch Video Solution

15. Prove that $(\rightarrow a + \rightarrow b) \rightarrow a \dot{+} \rightarrow c| \rightarrow a|^2 + | \rightarrow b|^2$, if and only if $\rightarrow a, \rightarrow b$ are perpendicular, given $\rightarrow a \neq \rightarrow 0, \rightarrow b \neq \rightarrow 0$

Watch Video Solution

16. If θ is the angle between two vectors $\vec{a}$ and $\vec{b}$, then $\vec{a} \cdot \vec{b} \geq 0$ only when `0

A. $0 < \theta < \frac{\pi}{2}$

B. $0 \leq \theta \leq \frac{\pi}{2}$

C. $0 < \theta < \pi$

D. $0 \leq \theta \leq \pi$

Answer: B

Watch Video Solution

17. Let $\vec{a}$ and $\vec{b}$ be two unit vectors and α be the angle between them, then $\vec{a} + \vec{b}$ is a unit vectors, if

A. $\alpha = \frac{\pi}{4}$

B. $\alpha = \frac{\pi}{3}$

C. $\alpha = \frac{\pi}{2}$

D. $\alpha = \frac{2\pi}{3}$

Answer: D

Watch Video Solution

18. The value of $\hat{i}.\left(\hat{j}\times\hat{k}\right)+\hat{j}.\left(\hat{i}\times\hat{k}\right)+\hat{k}.\left(\hat{i}\times\hat{j}\right)$

A. 0

B. -1

C. 1

D. 3

Answer: C

Watch Video Solution

19. If is the angle between any two vectors $\vec{a}$ and $\vec{b}$, then $\left|\vec{a}\,\dot{\vec{b}}\right| = \left|\vec{a} \times \vec{b}\right|$ when θ is equal to (a) 0 (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{2}$ (d) π

A. 0

B. $\frac{\pi}{4}$

C. $\frac{\pi}{2}$

D. π

Answer: b

Watch Video Solution