Vectors Test 2A

Name: Answers

7 8 9 10 11 **12**

Navigator Assessment Student 30 min

Question: 1

A vector of magnitude 6 in the opposite direction to: $\underset{\sim}{a} = 12\underset{\sim}{i} - 6\underset{\sim}{j} + 12\underset{\sim}{k}$

a) $2\left(2\underset{\sim}{i} - \underset{\sim}{j} + 2\underset{\sim}{k}\right)$

b) $2\left(-2\underset{\sim}{i} + \underset{\sim}{j} - 2\underset{\sim}{k}\right)$

c) $6\left(-2\underset{\sim}{i} + \underset{\sim}{j} - 2\underset{\sim}{k}\right)$

d) $12\left(4\underset{\sim}{i} - 2\underset{\sim}{j} + 4\underset{\sim}{k}\right)$

e) $12\left(2\underset{\sim}{i} - \underset{\sim}{j} + 2\underset{\sim}{k}\right)$

Question: 2

In the cube below, P is the midpoint of HG. Vector AP can be written as:

$\underset{\sim}{a}=OA$ $\underset{\sim}{e}=OE$

$\underset{\sim}{b}=OB$ $\underset{\sim}{h}=OH$

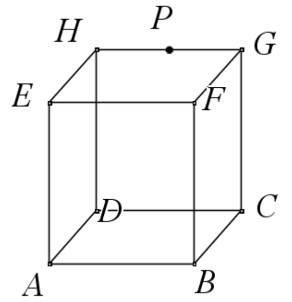
a) $\underset{\sim}{h} - \frac{1}{2}(\underset{\sim}{a} - \underset{\sim}{b})$

b) $\frac{1}{2}(\underset{\sim}{a} + \underset{\sim}{e} + \underset{\sim}{h})$

c) $\underset{\sim}{h} + \frac{1}{2}\underset{\sim}{b} - \frac{3}{2}\underset{\sim}{a}$

d) $\underset{\sim}{h} + \frac{1}{2}\left(\underset{\sim}{a} + \underset{\sim}{b}\right)$

e) $\frac{3}{2}\underset{\sim}{a} + \frac{1}{2}\underset{\sim}{b} + \underset{\sim}{e} + \underset{\sim}{h}$



Question: 3

Vector $\underset{\sim}{a} = 3\underset{\sim}{i} + m\underset{\sim}{j} + n\underset{\sim}{k}$ is perpendicular to vector $\underset{\sim}{b} = 4\underset{\sim}{i} + 2\underset{\sim}{j} + 4\underset{\sim}{k}$ and $\underset{\sim}{c} = 5\underset{\sim}{i} + \underset{\sim}{j} + \underset{\sim}{k}$ the values of m and n are:

a) $m = -24$, $n = 9$

b) $m = 9$, $n = -24$

c) $m = -22.5$, $n = 8.5$

d) $m = 8.5$, $n = -22.5$

e) None of these

Question: 4

The scalar resolute of $\underset{\sim}{a} = 3\underset{\sim}{i} + 3\underset{\sim}{k}$ in the direction of $\underset{\sim}{b} = 2\underset{\sim}{i} + \underset{\sim}{j} + 2\underset{\sim}{k}$ is:

a) $2\sqrt{2}$

b) $2\sqrt{2}\left(2\underset{\sim}{i} + \underset{\sim}{j} + 2\underset{\sim}{k}\right)$

c) $2\sqrt{2}\left(3\underset{\sim}{i} + 3\underset{\sim}{k}\right)$

d) 4

e) $4\left(2\underset{\sim}{i} + \underset{\sim}{j} + \underset{\sim}{k}\right)$

Question: 5

The angle between vector $\underset{\sim}{a} = 3\underset{\sim}{i} + 3\underset{\sim}{k}$ and vector $\underset{\sim}{b} = 2\underset{\sim}{i} + 2\underset{\sim}{j} + n\underset{\sim}{k}$ is $\frac{\pi}{3}$, the value of n could be:

a) 2 b) $\frac{1}{6}$ c) $\frac{\sqrt{3}}{6}$ d) $\frac{\sqrt{2}}{2}$ e) 0

Question: 6

If $\underset{\sim}{a} = 2\underset{\sim}{i} + \underset{\sim}{j} + 3\underset{\sim}{k}$, $\underset{\sim}{b} = 3\underset{\sim}{i} + 2\underset{\sim}{j} + 5\underset{\sim}{k}$ and $\underset{\sim}{c} = \underset{\sim}{i} + 4\underset{\sim}{j} + n\underset{\sim}{k}$ are linearly dependent then:

a) $n = 0$ b) $n = 5$ c) $n \neq 5$ d) $n = -5$ e) $n = 5$ or $n = -5$

Question: 7

Which one of the following is NOT a unit vector?

a) $\frac{1}{3}\left(\underset{\sim}{i} + \underset{\sim}{j} + \underset{\sim}{k}\right)$

b) $\frac{1}{3}\left(2\underset{\sim}{i} + \underset{\sim}{j} + 2\underset{\sim}{k}\right)$

c) $\frac{1}{13}\left(12\underset{\sim}{i} + 4\underset{\sim}{j} + 3\underset{\sim}{k}\right)$

d) $\frac{1}{6}\left(4\underset{\sim}{i} + 2\underset{\sim}{j} + 4\underset{\sim}{k}\right)$

e) $\frac{1}{5}\left(3\underset{\sim}{i} + 4\underset{\sim}{k}\right)$

Question: 8

If $|\underset{\sim}{a}| = 2$ and $|\underset{\sim}{b}| = 3$ and $\underset{\sim}{a} \cdot \underset{\sim}{b} = -3\sqrt{2}$ then $|\underset{\sim}{a} - \underset{\sim}{b}|^2$ is equal to:

a) 1 b) 25 c) $13 - 6\sqrt{2}$ d) $13 + 6\sqrt{2}$ e) $25 + 6\sqrt{2}$

Question: 9

If $\underset{\sim}{a} = \frac{1}{2}\left(\underset{\sim}{i} - \underset{\sim}{j} + \sqrt{2}\underset{\sim}{k}\right)$ and $\underset{\sim}{b} = \frac{1}{2}\left(\underset{\sim}{i} - \underset{\sim}{j} - \sqrt{2}\underset{\sim}{k}\right)$ then which one of the following is **NOT** true?

a) $\underset{\sim}{a}$ is perpendicular to $\underset{\sim}{b}$

b) $|\underset{\sim}{a}| = |\underset{\sim}{b}| = 1$

c) Both $\underset{\sim}{a}$ and $\underset{\sim}{b}$ make angles of 60° with the x axis.

d) Both $\underset{\sim}{a}$ and $\underset{\sim}{b}$ make angles of 120° with the y axis.

e) Vector $\underset{\sim}{a}$ make angles of 135° with the z axis, and vector $\underset{\sim}{b}$ make angles of 45° with the z axis,

Question: 10

A unit vector perpendicular to $\underset{\sim}{b} = -\underset{\sim}{i} + 2\underset{\sim}{j} + 2\underset{\sim}{k}$ passing through $\underset{\sim}{a} = 2\underset{\sim}{i} + 8\underset{\sim}{j} + 2\underset{\sim}{k}$ is given by:

a) $\frac{\sqrt{2}}{6}\left(-3\underset{\sim}{i} - 3\underset{\sim}{k}\right)$ b) $\frac{\sqrt{2}}{6}\left(-3\underset{\sim}{i} + 3\underset{\sim}{k}\right)$ c) $\frac{\sqrt{2}}{6}\left(3\underset{\sim}{i} - 3\underset{\sim}{k}\right)$

d) $\frac{1}{6}\left(4\underset{\sim}{i} + 4\underset{\sim}{j} - 2\underset{\sim}{k}\right)$ e) $\frac{1}{6}\left(-4\underset{\sim}{i} - 4\underset{\sim}{j} + 2\underset{\sim}{k}\right)$