Parishram (2025)

Physics

DPP: 2

Basic Mathematics

Q1 If a unit vector is represented by $0.5\hat{i} - 0.8\hat{j} + C\hat{k}$ then the value of C is
(A) $\sqrt{0.01}$
(B) $\sqrt{0.11}$
(C) 1
(D) $\sqrt{0.39}$

Q2 If three forces $\vec{F}_1 = 3i - 4\hat{j} + 5\hat{k}, \vec{F}_2 = -3\hat{i} + 4\hat{j}$ and $\vec{F}_3 = -5\hat{k}$ are acted on a body, then the direction of resultant force on the body is:
(A) Along x-axis
(B) Along y-axis
(C) Along z-axis
(D) In indeterminate form

Q3 A vector lying in $x - y$ plane has a magnitude 3 , and makes an angle 30° with the x-axis. Find its components along the two axes.
(A) $\frac{3}{2}, \frac{\sqrt{3}}{2}$
(B) $\frac{3}{2}, \frac{3\sqrt{3}}{2}$
(C) $\frac{\sqrt{3}}{2}, \frac{3}{2}$
(D) $\frac{3\sqrt{3}}{2}, \frac{3}{2}$

Q4 A boy walks $4\ \mathrm{m}$ east and then $3\ \mathrm{m}$ south. Find the resultant displacement of the boy.
(A) $4\ \mathrm{m}$
(B) $5\ \mathrm{m}$
(C) $7\ \mathrm{m}$
(D) $3\ \mathrm{m}$

Q5 Two forces, each of magnitude F have a resultant of the same magnitude F. The angle between the two force is
(A) 45°
(B) 120°
(C) 150°
(D) 60°

Q6 The resultant of $\vec{A} + \vec{B}$ is $\vec{R}_1$ on reversing the vector $\vec{B}$ the resultant becomes $\vec{R}_2$. What is the value of $R_1^2 + R_2^2$?
(A) $A^2 + B^2$
(B) $A^2 - B^2$
(C) $2\left(A^2 + B^2\right)$
(D) $2\left(A^2 - B^2\right)$

Q7 Force F_1 and F_2 act on a point mass in two mutually perpendicular directions. The resultant force on the point mass will be
(A) $F_1 + F_2$
(B) $F_1 - F_2$
(C) $\sqrt{F_1^2 + F_2^2}$
(D) $F_1^2 + F_2^2$

Q8 $\vec{A} = 2\hat{i} + \hat{j}, \vec{B} = 3\hat{j} - \hat{k}$ and $\vec{C} = 6\hat{i} - 2\hat{k}$. Value of $\vec{A} - 2\vec{B} + 3\vec{C}$ would be
(A) $20\hat{i} + 5\hat{j} + 4\hat{k}$
(B) $20\hat{i} - 5\hat{j} - 4\hat{k}$
(C) $4\hat{i} + 5\hat{j} + 20\hat{k}$
(D) $5\hat{i} + 4\hat{j} + 10\hat{k}$

Q9 Two force $F_1 = 1\ \mathrm{N}$ and $F_2 = 2\ \mathrm{N}$ act along the lines $x = 0$ and $y = 0$ respectively. Then the resultant of forces would be
(A) $\hat{i} + 2\hat{j}$

(B) $\hat{i}+\hat{j}$
(C) $3\hat{i}+3\hat{j}$
(D) $2\hat{i}+\hat{j}$

Q10 Following forces starts acting on a particle at rest at the origin of the co-ordinate system simultaneously
$\vec{F}_1=-4\hat{i}-5\hat{j}+5\hat{k}, \vec{F}_2=5\hat{i}+8\hat{j}+6\hat{k}$,
$\vec{F}_3=-3\hat{i}+4\hat{j}-7\hat{k}$ and $\vec{F}_4=2\hat{i}-3\hat{j}-2\hat{k}$
then the particle will move
(A) In $x-y$ plane
(B) In $y-z$ plane
(C) In $x-z$ plane
(D) Along x-axis

Answer Key

Q1	(B)	Q6	(C)
Q2	(C)	Q7	(C)
Q3	(D)	Q8	(B)
Q4	(B)	Q9	(D)
Q5	(B)	Q10	(B)

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Video Solution:

Q2 Video Solution:

Q3 Video Solution:

Q4 Video Solution:

Q5 Text Solution:

$R = \sqrt{A^2 + B^2 + 2AB\cos\theta}$

By substituting $A = F, B = F \text{ and } R = F \text{ we get};$

$\cos\theta = \frac{1}{2} \because \theta = 120^\circ$

Video Solution:

Q6 Video Solution:

Q7 Text Solution:

We know that resultant,

$R = \sqrt{A^2 + B^2 + 2AB\cos\theta}$

$R = \sqrt{F_1^2 + F_2^2 + 2F_1F_2\cos 90^\circ}$

$= \sqrt{F_1^2 + F_2^2}$

Video Solution:

Q8 Video Solution:

Q9 Text Solution:

Given that,

$\overrightarrow{F_1} = \hat{j}$ (along the line $x = 0$)

and $\overrightarrow{F_2} = 2\hat{i}$ (along the line $y = 0$)

Hence resultant is,

$\overrightarrow{\mathrm{F}} = 2\hat{i} + \hat{j}$

Video Solution:

Q10 **Text Solution:**

Here particle is on rest so we can write that,

$$\vec{F}_1 + \vec{F}_2 + \vec{F}_3 + \vec{F}_4$$
$$= \left(-4\hat{i} - 5\hat{j} + 5\hat{k}\right) + \left(5\hat{i} + 8\hat{j} + 6\hat{k}\right)$$
$$+ \left(-3\hat{i} + 4\hat{j} - 7\hat{k}\right) + \left(2\hat{i} - 3\hat{j} - 2\hat{k}\right)$$
$$= 4\,\hat{j} + 2\hat{k}$$

Hence motion in y-z plane.

Video Solution: