Prachand NEET (2025)

PHYSICS

VECTORS

DPP 01

Q1 Which of the sets given below may represent the magnitudes of three vectors adding to zero?
(A) 2, 4, 8 (B) 4, 8, 16
(C) 1, 2, 1 (D) 0.5, 1, 2

Q2 Which of the following pair of forces will never give resultant force of $2\ \mathrm{N}$?
(A) $2\ \mathrm{N}$ and $2\ \mathrm{N}$
(B) $1\ \mathrm{N}$ and $1\ \mathrm{N}$
(C) $1\ \mathrm{N}$ and $3\ \mathrm{N}$
(D) $1\ \mathrm{N}$ and $4\ \mathrm{N}$

Q3 The angle between vectors $(\vec{A} \times \vec{B})$ and $(\vec{B} \times \vec{A})$ is
(A) Zero (B) π
(C) $\pi/4$ (D) $\pi/2$

Q4 Amongst the following quantities, which is not a vector quantity?
(A) Force (B) Acceleration
(C) Temperature (D) Velocity

Q5 If $\hat{n}$ is a unit vector in the direction of the vector $\vec{A}$, then
(A) $\hat{n} = \frac{\vec{A}}{|\vec{A}|}$
(B) $\hat{n} = \frac{|\vec{A}|}{\vec{A}}$
(C) $\hat{n} = |\vec{A}|\vec{A}$
(D) $\hat{n} = \vec{A}$

Q6 If two vectors $2\hat{i} + 3\hat{j} - \hat{k}$ and $-4\hat{i} - 6\hat{j} + \lambda\hat{k}$ are parallel to each other then value of λ will be
(A) 0 (B) 2
(C) 3 (D) 4

Q7 If a particle moves from point $P(2, 3, 5)$ to point $Q(3, 4, 5)$. Its displacement vector be:
(A) $\hat{i} + \hat{j} + 10\hat{k}$ (B) $\hat{i} + \hat{j} + 5\hat{k}$
(C) $\hat{i} + \hat{j}$ (D) $2\hat{i} + 4\hat{j} + 6\hat{k}$

Q8 If three forces $\vec{F} = 3\hat{i} - 4\hat{j} + 5\hat{k}$, $\vec{F}_2 = -3\hat{i} + 4\hat{j}$ 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

Q9 Which of the following vector identities is false?
(A) $\vec{P} + \vec{Q} = \vec{Q} + \vec{P}$
(B) $\vec{P} \times \vec{Q} = \vec{Q} \times \vec{P}$
(C) $\vec{P} \cdot \vec{Q} = \vec{Q} \cdot \vec{P}$
(D) $\vec{P} \times \vec{Q} \neq \vec{Q} \times \vec{P}$

Q10 If $\left|\vec{A} \times \vec{B}\right| = \sqrt{3}\ \vec{A} \cdot \vec{B}$, then the value of $\left|\vec{A} + \vec{B}\right|$ is
(A) $\left(A^2 + B^2 + \frac{AB}{\sqrt{3}}\right)^{1/2}$
(B) $A + B$
(C) $\left(A^2 + B^2 + \sqrt{3}AB\right)^{1/2}$
(D) $\left(A^2 + B^2 + AB\right)^{1/2}$

Q11 If $\vec{P} = 2\hat{i} - 3\hat{j}$ and $\vec{Q} = 6\hat{i} - 9\hat{j}$, which of the following statements is false?
(A) $\vec{P} \times \vec{Q} = \vec{O}$
(B) $|\vec{P}| = \sqrt{13}$

(C) $|\vec{Q}| = \sqrt{117}$
(D) $\vec{P} \cdot \vec{Q} = 0$

Q12 The angle between $\vec{A} = \hat{i} + \hat{j}$ and $\vec{B} = \hat{i} - \hat{j}$ is
(A) 45°
(B) 90°
(C) -45°
(D) 180°

Q13 Which of the following statements is/are incorrect?
I. A scalar quantity is the one that is conserved in a process.
II. A scalar quantity is the one that can never take negative values.
III. A scalar quantity has the same value for observers with different orientations of the axes.
(A) I and III (B) II only
(C) II and III (D) I and II

Q14 **Assertion**: A vector must have magnitude and direction
Reason: A physical quantity can not be called a vector if its magnitude is zero.
(A) Both assertion and reason are true and reason is the correct explanation of as Atrertion
(B) Both assertion and reason are true and reason is not the correct explanation of assertion
(C) Assertion is true but reason is false
(D) Both are false.

Q15 If $\vec{A} = 3\hat{i} + 4\hat{j} + 2\hat{k}$, then find $|\vec{A}|$.
(A) $\sqrt{39}$
(B) $\sqrt{29}$
(C) 28
(D) 29

Q16 The vector $\vec{P} = a\hat{i} + a\hat{j} + 3\hat{k}$ and $\vec{Q} = a\hat{i} - 2\hat{j} - \hat{k}$ are perpendicular to each other. The positive value of a is :
(A) 3 (B) 2
(C) 1 (D) zero

Q17 A particle moves from position $3\hat{i} + 5\hat{j} - 8\hat{k}$ to $15\hat{i} - 20\hat{j} + 8\hat{k}$ due to uniform force of $\left(3\hat{i} + \hat{j} + 4\hat{k}\right)N$. If the displacement is in metre then work done will be:
(A) 70 J (B) 75 J
(C) 72 J (D) 80 J

Q18 For a body moving in circular path, angular velocity $\overrightarrow{\omega} = 2\hat{i} - 4\hat{j} + 6\hat{k}$ and the radius vector $\overrightarrow{r} = \hat{i} + \hat{j} + \hat{k}$. If the linear velocity $\overrightarrow{v} = \overrightarrow{\omega} \times \overrightarrow{r}$, then $\overrightarrow{v}$ is:
(A) $-10\hat{i} + 4\hat{j} + 6\hat{k}$ (B) $-10\hat{i} - 4\hat{j} - 6\hat{k}$
(C) $10\hat{i} + 4\hat{j} + 6\hat{k}$ (D) $10\hat{i} - 4\hat{j} - 6\hat{k}$

Q19 If $\vec{P} = 2\hat{i} + 3\hat{j} - 2\hat{k}$ and $\vec{Q} = 4\hat{i} - 2\hat{j} + \hat{k}$

Column-I		Column-II	
a.	$\left\|\overrightarrow{P} + \overrightarrow{Q}\right\|$	P	$\sqrt{89}$
b.	$\left\|\overrightarrow{P} - \overrightarrow{Q}\right\|$	Q	$\sqrt{38}$
c.	$\left\|2\overrightarrow{P} + \overrightarrow{Q}\right\|$	R	$-i - 10\hat{j} - 16\hat{k}$
d.	$\overrightarrow{P} \times \overrightarrow{Q}$	S	$\sqrt{50}$

(A) $a-P$ $b-Q$ $c-R$ $d-S$
(B) $a-S$ $b-Q$ $c-P$ $d-P$
(C) $a-Q$ $b-Q$ $c-P$ $d-R$
(D) $a-R$ $b-S$ $c-P$ $d-Q$

Q20 Match the following:

Column-I		Column-II	
a.	Unit vector	P	Same magnitude & directions
b.	Parallel vectors	Q	Magnitude is zero

c.	Equal vectors	R	Same directions
d.	Null vector	S	Magnitude is one

(A) $a \to S,\ b \to R,\ c \to P,\ d \to Q$
(B) $a \to P,\ b \to Q,\ c \to S,\ d \to R$
(C) $a \to Q,\ b \to R,\ c \to P,\ d \to S$
(D) $a \to R,\ b \to P,\ c \to Q,\ d \to R$

Q21 Find the magnitude of $3\hat{i} + 2\hat{j} + \hat{k}$?
(A) $\sqrt{14}$
(B) $\sqrt{13}$
(C) $\sqrt{12}$
(D) $\sqrt{10}$

Q22 Which of the following statements is false?
(A) Mass, speed and energy are scalars
(B) Momentum, force and torque are vectors
(C) Distance is a scalar while displacement is a vector
(D) A vector has only magnitude whereas as a scalar has both magnitude and direction

Q23 The value of $(\vec{A} + \vec{B}) \times (\vec{A} - \vec{B})$ is
(A) 0
(B) $A^2 - B^2$
(C) $\vec{B} \times \vec{A}$
(D) $2(\vec{B} \times \vec{A})$

Q24 The dot product of two vectors of magnitudes 3 units and 5 units cannot be
(A) 2 (B) -2
(C) 20 (D) zero

Q25 The value of λ for which the two vectors

$$\vec{a} = 5\hat{i} + \lambda\hat{j} + \hat{k} \text{ and } \vec{b} = \hat{i} - 2\hat{j} + \hat{k}$$

are perpendicular to each other is
(A) 2 (B) - 2
(C) 3 (D) - 3

Q26 Vector sum of two forces of 10 N and 6 N cannot be :
(A) 4 N
(B) 8 N
(C) 12 N
(D) 2 N

Q27 A vector is represented by $3\hat{i} + \hat{j} + 2\hat{k}$. Its length in XY plane is
(A) 2
(B) $\sqrt{14}$
(C) $\sqrt{10}$
(D) $\sqrt{5}$

Q28 The displacement of a particle from a point having position vector $2\hat{i} + 4\hat{j}$ to another point having position vector $5\hat{i} + 1\hat{j}$ is
(A) 3 units
(B) $3\sqrt{2}$ units
(C) 5 units
(D) $5\sqrt{3}$ units

Q29 Multi Statement Based Question:
Given below 3 Statements, choose the correction option.
S_1 - Acceleration is a vector quantity.
S_2- Two vectors of different kind may be added.
S_3- Work done is equal to dot product of force and velocity.
(A) S_1 and S_2 are correct, S_3 is wrong.
(B) S_1 and S_3 are correct, S_2 is wrong.
(C) S_1 is *correct,* S_2 and S_3 are wrong.
(D) S_2 is correct, $S_1$and S_3 are wrong.

Q30 For two vectors $\vec{a}$ and $\vec{b}$, choose the correct option
(A) $\vec{a} \cdot \vec{b} = \vec{b} \cdot \vec{a}$
(B) $\vec{a} \times \vec{b} = -\vec{b} \times \vec{a}$
(C) $\vec{a} \perp \vec{a} \times \vec{b}$
(D) All of the above

Answer Key

Q1	(C)	Q16	(A)
Q2	(D)	Q17	(B)
Q3	(B)	Q18	(A)
Q4	(C)	Q19	(C)
Q5	(A)	Q20	(A)
Q6	(B)	Q21	(A)
Q7	(C)	Q22	(D)
Q8	(C)	Q23	(D)
Q9	(B)	Q24	(C)
Q10	(D)	Q25	(C)
Q11	(D)	Q26	(D)
Q12	(B)	Q27	(C)
Q13	(D)	Q28	(B)
Q14	(D)	Q29	(C)
Q15	(B)	Q30	(D)

Hints & Solutions

Note: scan the QR code to watch video solution

Q1 Text Solution:

Given that the three vectors adding to zero.

$\Rightarrow \vec{A}+\vec{B}+\vec{C}=\vec{O}$

$\Rightarrow \vec{C}=-\left(\vec{A}+\vec{B}\right)$

$\Rightarrow A-B \leq C \leq A+B$

This condition is only satisfied in (Option C)

Video Solution:

Q2 Text Solution:

If two vectors $\vec{A}$ and $\vec{B}$ are given then range of their resultant can be written as

$\left(\vec{A}-\vec{B}\right) \leq \vec{R} \leq \left(\vec{A}+\vec{B}\right)$.

i.e.,

$\vec{R}_{\max}=\vec{A}+\vec{B}$ and $\vec{R}_{\min}=\vec{A}-\vec{B}$

If magnitude of $\vec{B}=1$ and that of $\vec{A}=4$ then the magnitude of resultant will lie in between 3N and 5N. It can never be 2N.

Video Solution:

Q3 Text Solution:

Given that,

$\vec{A} \times \vec{B}=-\vec{B} \times \vec{A}$

$\left(\vec{A} \times \vec{B}\right) \cdot\left(\vec{B} \times \vec{A}\right)=\left(\vec{A} \times \vec{B}\right) \cdot\left(-\vec{A} \times \vec{B}\right)$

$\left|\vec{A} \times \vec{B}\right|\left|\vec{B} \times \vec{A}\right| \cos \theta=-\left(\vec{A} \times \vec{B}\right) \cdot\left(\vec{A} \times \vec{B}\right)$

$\left|\vec{A} \times \vec{B}\right|^2 \cos \theta=-\left|\vec{A} \times \vec{B}\right|^2$

$\cos\theta=-1$

$\cos\theta=\cos\pi$

$\theta=\pi$

Video Solution:

Q4 Text Solution:

Temperature is a scalar quantity.

Video Solution:

Q5 Text Solution:

$\hat{n}=\frac{\vec{A}}{\left|\vec{A}\right|}$

Video Solution:

Q6 **Text Solution:**

Let $\overrightarrow{A} = 2\overrightarrow{i} + 3\overrightarrow{j} - \overrightarrow{k}$ and $\overrightarrow{B} = -4\overrightarrow{i} - 6\overrightarrow{j} + \lambda\overrightarrow{k}$

$\overrightarrow{A}$ and $\overrightarrow{B}$ are parallel to each other

$\frac{a_1}{b_1} = \frac{a_2}{b_2} = \frac{a_3}{b_3}$

$\frac{3}{-6} = \frac{-1}{\lambda}$

$\lambda = 2$

Video Solution:

Q7 **Text Solution:**

Displacement vector $\overrightarrow{r} = \Delta x\hat{i} + \Delta y\hat{j} + \Delta z\hat{k}$

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

Video Solution:

Q8 **Text Solution:**

Given

$\overrightarrow{F_1} = 3\hat{i} - 4\hat{j} + 5\hat{k}$

$\overrightarrow{F_2} = 3\hat{i} + 4\hat{j}$

$\overrightarrow{F_3} == 5\hat{k}$

Resultant force $\left(\overrightarrow{F}\right) = \overrightarrow{F_1} + \overrightarrow{F_2} + \overrightarrow{F_3}$

$3\hat{i} + 4\hat{j} + 5\hat{k} - 3i + 4\hat{j} + 5\hat{k} = 10\hat{k}$

Video Solution:

Q9 **Text Solution:**

$\vec{P} + \vec{Q} = \vec{Q} + \vec{P}$

$\vec{P} \times \vec{Q} = -\vec{Q} \times \vec{P}$

$\vec{P} \cdot \vec{Q} = \vec{Q} \cdot \vec{P}$

Identity given in option B is false.

Video Solution:

Q10 **Text Solution:**

$\left|\overrightarrow{A} \times \overrightarrow{B}\right| = \sqrt{3}\overrightarrow{A}.\overrightarrow{B}$

$AB\sin\theta = \sqrt{3}AB\cos(\theta)$

$\Rightarrow \tan\theta = \sqrt{3} \Rightarrow \theta = 60^\circ$

$\left|\overrightarrow{A} \times \overrightarrow{B}\right| = \sqrt{A^2 + B^2 + 2AB\cos(60^\circ)}$

$\left|\overrightarrow{A} \times \overrightarrow{B}\right| = \left[A^2 + B^2 + AB\right]^{1/2}$

Video Solution:

Q11 **Text Solution:**

$$\overrightarrow{P} \times \overrightarrow{Q} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 2 & -3 & 0 \\ 6 & -9 & 0 \end{vmatrix} = \overrightarrow{0}$$

B) $\left|\overrightarrow{P}\right| = \sqrt{2^2 + 3^2} = \sqrt{13}\ unit$

C) $\left|\overrightarrow{Q}\right| = \sqrt{6^2 + 9^2} = \sqrt{117}\ unit$

D) $\overrightarrow{P} \cdot \overrightarrow{Q} = \left(2\hat{i} - 3\hat{j}\right) \cdot \left(6\hat{i} - 9\hat{j}\right) = 12 + 27 = 39$

Hence, (D) is false

Video Solution:

Q12 **Text Solution:**

Given that,

$\overrightarrow{A} = \hat{i} + \hat{j}$

$\overrightarrow{B} = \hat{i} - \hat{j}$

The scaler product of these two vector

$\overrightarrow{A} \cdot \overrightarrow{B} = 0$

We know that, if scaler or dot product of two vector is zero then it means vectors are perpendicular to each other.

Hence, option (B) is correct.

Video Solution:

Q13 **Text Solution:**

Conceptual

I – It depends on scalar quantity and the process, its not always true.

II – Scalar quantity may take negative values like time, current etc.

III- It's true.

Video Solution:

Q14 **Text Solution:**

A vector with zero magnitude is called as null vector.

Video Solution:

Q15 **Text Solution:**

$\left|\overrightarrow{A}\right| = \sqrt{(A_x)^2 + (A_y)^2 + (A_z)^2} = \sqrt{29}$

Video Solution:

Q16 **Text Solution:**

$\overrightarrow{P}$ is perpendicular to $\overrightarrow{Q}$

$\overrightarrow{P} \cdot \overrightarrow{Q} = O$

$\left(a\hat{i} + a\hat{j} + 3\hat{k}\right) \cdot \left(a\hat{i} - 2\hat{j} - \hat{k}\right) = O$

$a^2 - 2a - 3 = 0$

$a^2 - 3a + a - 3 = 0$

$a(a-3) + 1(a-3) = 0$

$a = -1 \text{ or } a = 3$

Video Solution:

Q17 **Text Solution:**

$\text{Displacement } \left(\overrightarrow{r}\right) = \left(15\hat{i} - 20\hat{j} + 8\hat{k}\right) - \left(3\hat{i} + 5\hat{j} - 8\hat{k}\right)$

$\left(\overrightarrow{r}\right) = \left(12\hat{i} - 25\hat{j} + 16\hat{k}\right)M$

$\overrightarrow{F} = \left(3\hat{i} - \hat{j} + 4\hat{k}\right)N$

$Work\ \left(W\right) = \overrightarrow{F}\ .\ \overrightarrow{S} = \left(3\hat{i} + \hat{j} + 4\hat{k}\right) . \left(12\hat{i} - 25\hat{j} + 16\hat{k}\right)$

$= 36 - 25 + 64 = 75J$

Video Solution:

Q18 **Text Solution:**

$\omega = 2\hat{i} - 4\hat{j} + 6\hat{k}$

$\overrightarrow{r} = \hat{i} + \hat{j} + \hat{k}$

$\overrightarrow{v} = \overrightarrow{\omega} \times \overrightarrow{r}$

$= \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 2 & -4 & 6 \\ 1 & 1 & 1 \end{vmatrix}$

$= \hat{i}\left(-4 - 6\right) - \hat{j}\left(2 - 6\right) + \hat{k}\left(2 + 4\right) =$

$-10\hat{i} + 4\hat{j} + 6\hat{k}$

Video Solution:

Q19 **Text Solution:**

Given

$\overrightarrow{P} = 2\hat{i} + 3\hat{j} - 2\hat{k}$

$\overrightarrow{Q} = 4\hat{i} - 2\hat{j} + \hat{k}$

$A)\ \ \overrightarrow{P} + \overrightarrow{Q} = \left(2\hat{i} + 3\hat{j} - 2\hat{k}\right) + \left(4\hat{i} - 2\hat{j} + \hat{k}\right)$

$= \left(6\hat{i} + \hat{j} - \hat{k}\right)$

$\left|\overrightarrow{P} + \overrightarrow{Q}\right| = \sqrt{6^2 + 1^2 + 1^2} = \sqrt{38}\ \ unit$

$B)\ \ \overrightarrow{P} - \overrightarrow{Q} = \left(2\hat{i} + 3\hat{j} - 2\hat{k}\right) + \left(4\hat{i} - 2\hat{j} + \hat{k}\right)$

$= -2\hat{i} + 5\hat{j} - 3\hat{k}$

$\left|\overrightarrow{P} + \overrightarrow{Q}\right| = \sqrt{2^2 + 5^2 + 3^2} = \sqrt{38}\ unit$

$\overrightarrow{B} + \overrightarrow{Q}$

$C)\ \ 2\overrightarrow{P} + \overrightarrow{Q} = 2\left(2\hat{i} + 3\hat{j} - 2\hat{k}\right) + \left(4\hat{i} - 2\hat{j} + \hat{k}\right)$

$= 4\hat{i} + 6\hat{j} - 4\hat{k} + 4\hat{i} - 2\hat{j} + \hat{k}$

$= 8\hat{i} + 4\hat{j} - 3\hat{k}$

$$\left|2\vec{P}+\vec{Q}\right|=\sqrt{8^2+4^2+3^2}$$

$$=\sqrt{64+16+9}=\sqrt{89}\ unit$$

$$D)\ \vec{P}\times\vec{Q}=\begin{vmatrix}\hat{i} & \hat{j} & \hat{k}\\ 2 & 3 & -2\\ 4 & -2 & 1\end{vmatrix}$$

$$=\hat{i}\left(3-4\right)-\hat{j}\left(2+8\right)+\hat{k}\left(-4-12\right)$$

$$\vec{P}\times\vec{Q}=-\hat{i}-10\hat{j}-16\hat{k}$$

$$D\rightarrow R$$

Video Solution:

Q20 **Text Solution:**

a) A unit vector has magnitude equal to one.

b) Parallel vectors have same directions.

c) Equal vectors have same magnitudes and same directions

d) A null vector has zero magnitude

Video Solution:

Q21 **Text Solution:**

$$Let\ \ 3\hat{i}+2\hat{j}+\hat{k}=\vec{P}$$

$$\left|\vec{P}\right|=\sqrt{3^2+2^2+1^2}$$

$$=\sqrt{14}\ \ unit$$

Video Solution:

Q22 **Text Solution:**

A vector has only magnitude whereas as a scalar has both magnitude and direction

Video Solution:

Q23 **Text Solution:**

$$\left(\vec{A}+\vec{B}\right)\times\left(\vec{A}-\vec{B}\right)$$

$$=\vec{A}\times\vec{A}-\left(\vec{A}\times\vec{B}\right)+\vec{B}+\vec{A}-\left(\vec{B}+\vec{B}\right)$$

$$=\vec{O}\ -\vec{A}\times\vec{B}-\vec{A}\times\vec{B}-\vec{O}$$

$$=-2\left(\vec{A}\times\vec{B}\right)=2\left(\vec{B}\times\vec{A}\right)$$

Video Solution:

Q24 **Text Solution:**

$Let\ \left|\overrightarrow{P}\right| = 3\ unit$

$\left|\overrightarrow{Q}\right| = 5\ unit$

$\overrightarrow{P}\ .\ \overrightarrow{Q}$

$= \left|\overrightarrow{P}\right|\left|\overrightarrow{Q}\right| \cos\theta = 15\cos\theta$

$-1 \le \cos q \le 1$

$-15 \le 15\cos q \le 15$

But 20 > 15, so (C) is not possible.

Video Solution:

Q25 **Text Solution:**

$\overrightarrow{a} = 5\hat{i} + \lambda\hat{j} + \hat{k}$

$\overrightarrow{b} = \hat{i} - 2\hat{j} + \hat{k}$

$\overrightarrow{a}\ is\ perpendicular\ to\ \overrightarrow{b}$

$\therefore\ \overrightarrow{a}\ .\ \overrightarrow{b}$

$\left(5\hat{i} + \lambda\hat{j} + \hat{k}\right).\left(\hat{i} - \lambda\hat{j} + \hat{k}\right) = 0$

$5 - 2\lambda + 1 = 0 \Rightarrow \lambda = 3$

Video Solution:

Q26 **Text Solution:**

$Let\ \left|\overrightarrow{F_1}\right| = 10\ N$

$\left|\overrightarrow{F_2}\right| = 6\ N$

$\left|\overrightarrow{F_1}\right| - \left|\overrightarrow{F_2}\right| \le \left|\overrightarrow{F_1} + \overrightarrow{F_2}\right| \le \left|\overrightarrow{F_1} + \overrightarrow{F_2}\right|$

(By the property of parallelogram law of addition)

$10 - 6 \le \left|\overrightarrow{F_1} + \overrightarrow{F_2}\right| \le 10 + 6$

$\Rightarrow$ Vector sum can lie between 4N to 16N (including 4N and 16N)

Hence, 2N cannot be an answer.

Video Solution:

Q27 **Text Solution:**

we have to find length in xy plane therefore, only x & y component will count.

$\sqrt{3^2 + 1^2} = \sqrt{10}$

Video Solution:

Q28 **Text Solution:**

Initial position $\left(A\right) = \left(2\hat{i} + 4\hat{j}\right)\ unit$

Final position $\left(B\right) = \left(5\hat{i} + 1\hat{j}\right)$

Displacement

$\left(\overrightarrow{AB}\right) = \left(5\hat{i} + 1\hat{j}\right) - \left(2\hat{i} + 4\hat{j}\right)$

$= \left(3\hat{i} + 3\hat{j}\right)\ unit$

$\left|\overrightarrow{AB}\right| = \sqrt{3^2 + 3^2}\ unit$

$= 3\sqrt{2}\ unit$

Video Solution:

Q29 **Text Solution:**

(C)

Acceleration has magnitude and direction both, so S_1 is correct.

- Two vectors of same kind e.g. force-force, momentum-momentum may be added, so S_2 is wrong.
- Work (W) = $\vec{F} \cdot \vec{S}$ (where $\vec{S}$ is displacement)

Hence S_3 is wrong.

Video Solution:

Q30 **Text Solution:**

(a) $\vec{a} \cdot \vec{b} = \vec{b} \cdot \vec{a}$ because dot product follows the commutative law.

(b) $\vec{a} \times \vec{b} = -\vec{b} \times \vec{a}$ as cross product does not follow commutative law.

(c) Any vector is always perpendicular to its cross product with another vector so, $\vec{a} \perp \vec{a} \times \vec{b}$ will be correct

Video Solution: