Yakeen NEET 2.0 2026

Physics By Manish Raj Sir
Practice Sheet
Vectors

Q1 A truck travelling due north with $20\ \mathrm{m/s}$ turns towards west and travels at the same speed. Then the change in velocity is -
(A) $40\ \mathrm{m/s}$ due north-west
(B) $20\sqrt{2}\ \mathrm{m/s}$ due north-west
(C) $40\ \mathrm{m/s}$ due south-west
(D) $20\sqrt{2}\ \mathrm{m/s}$ due south-west

Q2 Cross product of two vectors $\vec{a}$ and $\vec{b}$ is maximum in magnitude when angle between them is
(A) 0°
(B) 180°
(C) 90°
(D) 45°

Q3 A vector $\vec{R}$ is in y - z plane. If z-component of $\vec{R}$ is 5 unit and y-component is $-5\sqrt{3}$ unit, then the angle made by $\vec{R}$ with the z-axis will be:
(A) 30°
(B) 60°
(C) 120°
(D) 150°

Q4 ABCDEF is a regular hexagon. The center of hexagon is at point O. Then the value of $\overrightarrow{\mathrm{AB}}+\overrightarrow{\mathrm{AC}}+\overrightarrow{\mathrm{AD}}+\overrightarrow{\mathrm{AE}}+\overrightarrow{\mathrm{AF}}$ is
(A) $\overrightarrow{2\mathrm{AO}}$
(B) $\overrightarrow{4\mathrm{AO}}$
(C) $\overrightarrow{6\mathrm{AO}}$
(D) Zero

Q5 Two forces of 4 dyne and 3 dyne act upon a body. The resultant force on the body can only be -
(A) more than 3 dynes
(B) more than 4 dynes
(C) between 3 and 4 dynes
(D) between 1 and 7 dynes

Q6 The component of vector $\vec{V}=3\hat{i}+2\hat{j}$ along the vector $\vec{R}=3\hat{i}-4\hat{j}$ will be :
(A) 1
(B) $\frac{1}{5}$
(C) 17
(D) 5

Q7 A unit radial vector $\hat{r}$ makes angles of $\alpha=30^\circ$ relative to the x-axis, $\beta=60^\circ$ relative to the y-axis, and $\gamma=90^\circ$ relative to the z-axis. The vector $\hat{r}$ can be written as :
(A) $\frac{1}{2}\hat{i}+\frac{\sqrt{3}}{2}\hat{j}$
(B) $\frac{\sqrt{3}}{2}\hat{i}+\frac{1}{2}\hat{j}$
(C) $\frac{\sqrt{2}}{3}\hat{i}+\frac{1}{\sqrt{3}}\hat{j}$
(D) None of these

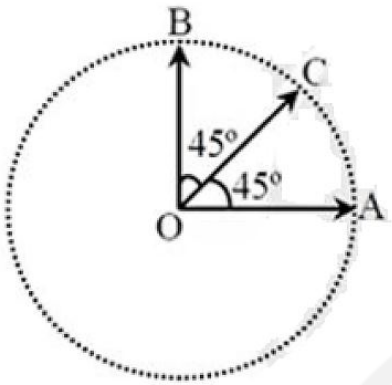
Q8 Square of the resultant of two forces of equal magnitude is equal to three times the product of their magnitude.The angle between them is:
(A) 0° (B) 45°
(C) 60° (D) 90°

Q9 The vector that must be added to the sum of vectors $\hat{i}-3\hat{j}+2\hat{k}$ and $3\hat{i}+6\hat{j}-7\hat{k}$ so that the resultant vector is a unit vector along the y-axis is
(A) $4\hat{i}+4\hat{j}+5\hat{k}$
(B) $-4\hat{i}-2\hat{j}+5\hat{k}$
(C) $3\hat{i}+4\hat{j}+5\hat{k}$
(D) Null vector

Q10 Two forces, F_1 and F_2 are acting on a body. One force is double that of the other force and the resultant is equal to the greater force. Then the angle between the two forces is -

(A) $\cos^{-1}(1/2)$
(B) $\cos^{-1}(-1/2)$
(C) $\cos^{-1}(-1/4)$
(D) $\cos^{-1}(1/4)$

Q11 The three vectors $\overrightarrow{\mathrm{OA}}$, $\overrightarrow{\mathrm{OB}}$ and $\overrightarrow{\mathrm{OC}}$ have the same magnitude R. Then the sum of these vectors have magnitude -



(A) R (B) $\sqrt{2}\mathrm{R}$
(C) $3\mathrm{R}$ (D) $\left(1+\sqrt{2}\right)\mathrm{R}$

Q12 There are two force vectors, one of $5\ \mathrm{N}$ and other of $12\ \mathrm{N}$. At what angle the two vectors be added to get resultant vector of $17N, 7N$ and $13N$ respectively
(A) $0^\circ, 180^\circ$ and 90°
(B) $0^\circ, 90^\circ$ and 180°
(C) $0^\circ, 90^\circ$ and 90°
(D) $180^\circ, 0^\circ$ and 90°

Q13 At what angle the forces of $2\ \mathrm{N}$ and $\sqrt{2}\ \mathrm{N}$ act so that their combined effect is that of a single force of $\sqrt{10}\ \mathrm{N}$?
(A) 0°
(B) 30°
(C) 45°
(D) 60°

Q14 The ratio of maximum and minimum magnitudes of the resultant of two vectors $\vec{a}$ and $\vec{b}$ is 3:1. Now, $|\vec{a}|$ is equal to
(A) $|\vec{b}|$
(B) $2|\vec{b}|$
(C) $3|\vec{b}|$
(D) $4|\vec{b}|$

Q15 If $\vec{A} = 2\hat{i} + \sqrt{7}\hat{\mathrm{j}}$ and $\vec{B} = 5\hat{i} + \sqrt{7}\hat{\mathrm{j}} - 3\hat{\mathrm{k}}$, then the vector whose magnitude is equal to $\overrightarrow{\mathrm{A}} \cdot \overrightarrow{\mathrm{B}}$ and parallel to $\vec{B} - \vec{A}$ is :
(A) $\frac{17}{\sqrt{2}}(\hat{\mathrm{k}} - \hat{\mathrm{j}})$
(B) $\frac{17}{\sqrt{2}}(\hat{i} - \hat{k})$
(C) $3\hat{\mathrm{i}} - 3\hat{\mathrm{k}}$
(D) $3\hat{k} - 3\hat{i}$

Q16 The maximum and minimum magnitude of resultant of two given vectors are 17 units and 7 units respectively. If these two vectors are at right angle to each other, then magnitude of their resultant is :-
(A) 18 (B) 16
(C) 13 (D) 14

Q17 If $\vec{b} = 3\hat{i} + 4\hat{j}$ and $\vec{a} = \hat{i} - \hat{j}$, the vector having the same magnitude as that of $\vec{b}$ and parallel to $\vec{a}$ is
(A) $\frac{5}{\sqrt{2}}(\hat{i} - \hat{j})$
(B) $\frac{5}{\sqrt{2}}(\hat{i} + \hat{j})$
(C) $5(\hat{i} - \hat{j})$
(D) $5(\hat{i} + \hat{j})$

Q18 The angle between two vectors $\vec{A}$ and $\vec{B}$ is θ. The resultant of these vectors $\vec{R}$ makes an angle of $\theta/2$ with A. Which of the following is true?
(A) $A = 2B$ (B) $A = B/2$
(C) $A = B$ (D) $AB = 1$

Q19 Two vectors $\vec{a}$ and $\vec{b}$ are at an angle of 60° with each other. Their resultant makes an angle of 45° with $\vec{a}$. If $|\vec{b}| = 2$ units, then $|\vec{a}|$ is
(A) $\sqrt{3}$
(B) $\sqrt{3} - 1$
(C) $\sqrt{3} + 1$
(D) $\sqrt{3}/2$

Q20 Which of the following quantities is/are not independent of the choice of the co-ordinate axes?
(A) $\overrightarrow{a} + \overrightarrow{b}$
(B)

$\left|\vec{a}+\vec{b}-\vec{c}\right|$

(C) angle between $\vec{a}$ & $\vec{b}$

(D) $a_x + b_y$

Q21 Two forces P and Q of magnitude $2F$ and $3F$, respectively are at an angle θ with each other. If the force Q is doubled, then their resultant also gets doubled. Then, the angle θ is

(A) 60°

(B) 120°

(C) 30°

(D) 90°

Q22 If $\vec{A} = 2\hat{i} + \hat{j} + \hat{k}$ and $\vec{B} = \hat{i} + \hat{j} + \hat{k}$ are two vectors then unit vector perpendicular to $\vec{A}$ and $\vec{B}$ is :

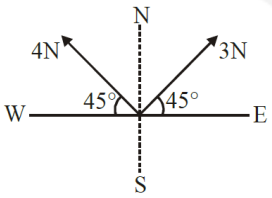
(A) $\left(\frac{-\hat{j}+\hat{k}}{\sqrt{2}}\right)$

(B) $\left(\frac{\hat{j}+\hat{k}}{\sqrt{2}}\right)$

(C) $\left(\frac{2\hat{i}+\hat{j}+\hat{k}}{\sqrt{6}}\right)$

(D) $\left(\frac{\hat{i}+\hat{j}+\hat{k}}{\sqrt{3}}\right)$

Q23 Find out the magnitude of resultant vector of 4N and 3N force:



(A) 7N (B) 6N

(C) 5N (D) 10N

Q24 A vector $\vec{a}$ is turned without a change in its length through a small angle $d\theta$. The value of $|\Delta\vec{a}|$ and Δa are respectively

(A) $0, ad\theta$

(B) $ad\theta, 0$

(C) 0,0

(D) None of these

Q25 A vector of length l is turned through an angle θ about its tail. What is the change in the position vector of its head?

(A) $l\cos\theta/2$

(B) $2l\sin\theta/2$

(C) $2l\cos\theta/2$

(D) $l\sin\theta/2$

Q26 A ray of light is incident along vector $\frac{1}{\sqrt{2}}\hat{i} - \frac{1}{\sqrt{2}}\hat{j} + \hat{k}$ on plane mirror placed in XY-plane normal on incidence point is along Z-axis

(A) The normal on incidence point is along Z-axis

(B) The angle of incidence is 30°

(C) The angle of reflection is 30°

(D) The angle of incidence is 45°

Q27 What is the torque of the force $\vec{F} = (2\vec{i} - 3\vec{j} + 4\vec{k})N$ acting at the point $\vec{r} = (3\vec{i} + 2\vec{j} + 3\vec{k})m$ about the origin:

(A) $6\vec{\mathrm{i}} - 6\vec{\mathrm{j}} + 12\vec{\mathrm{k}}$

(B) $17\vec{i} - 6\vec{j} - 13\vec{k}$

(C) $-6\vec{i} + 6\vec{j} - 12\vec{k}$

(D) $-17\vec{i} + 6\vec{j} + 13\vec{k}$

Q28 The value of λ for which the two vectors

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

are perpendicular to each other is

(A) 2 (B) - 2

(C) 3 (D) - 3

Q29 What displacement must be added to the displacement $25\hat{i} - 6\hat{j}m$ to give a displacement of $7.0\ \mathrm{m}$ pointing in the x-direction?

(A) $18\hat{\mathrm{i}} - 6\hat{\mathrm{j}}$

(B) $32\hat{i} - 13\hat{j}$

(C) $-18\hat{\mathrm{i}} + 6\hat{\mathrm{j}}$

(D) $-25\hat{\mathrm{i}} + 13\hat{\mathrm{j}}$

Q30 If $\left|\vec{Q}\right| = 100$ and it is making 37° with negative x-axis and 53° with positive y-axis then write it in

the form of $\hat{i}$ & $\hat{j}$:-

(A) $\overrightarrow{Q} = 80\hat{i} - 60\hat{j}$

(B) $\overrightarrow{Q} = -80\hat{i} + 60\hat{j}$

(C) $\overrightarrow{Q} = -80\hat{i} - 60\hat{j}$

(D) $\overrightarrow{Q} = -60\hat{i} + 80\hat{j}$

Q31 The linear velocity of a rotating body is given by $\overrightarrow{\mathrm{v}} = \vec{\omega} \times \overrightarrow{\mathrm{r}}$, where ω is the angular velocity and r isthe radius vector. The angular velocity of a body $\vec{\omega} = \hat{i} - 2\hat{j} + 2\hat{k}$ and their radius vector $\overrightarrow{\mathrm{r}} = 4\hat{j} - 3\hat{\mathrm{k}}, |\overrightarrow{\mathrm{v}}|$ is -

(A) $\sqrt{29}$ units

(B) 31 units

(C) $\sqrt{37}$ units

(D) $\sqrt{41}$ units

Q32 Two adjacent sides of a parallelogram are represented by the two vectors $\hat{i} + 2\hat{j} + 3\hat{k}$ and $3\hat{i} - 2\hat{j} + \hat{k}$. What is the area of parallelogram (having suitable unit)

(A) 8

(B) $8\sqrt{3}$

(C) $3\sqrt{8}$

(D) 192

Q33 The components of a vector along the x - and y-directions are $(n+1)$ and 1, respectively. If the coordinate system is rotated by an angle $\theta = 60^\circ$, then the components change to n and 3. The value of n is

(A) 2

(B) $\cos 60^\circ$

(C) $1 - \sqrt{3}$

(D) $1 \pm \sqrt{3}$

Q34 The sum and difference of two perpendicular vectors of equal length are

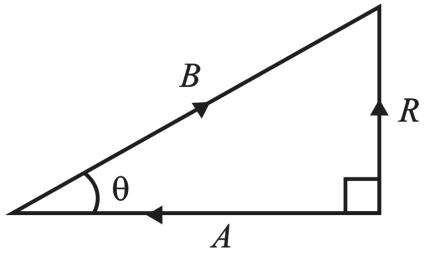
(A) Perpendicular to each other and of equal length

(B) Perpendicular to each other and of different lengths

(C) Of equal length and have an obtuse angle between them

(D) Of equal length and have an acute angle between them

Q35 In vector diagram shown in figure where $(\vec{R})$ is the resultant of vectors $(\vec{A})$ and $(\vec{B})$.



If $R = \frac{B}{\sqrt{2}}$, then value of angle θ is :

(A) 30°

(B) 45°

(C) 60°

(D) 75°

Q36 Vector $\vec{A}$ is of length $2\ \mathrm{cm}$ and is 60° above the x-axis in the first quadrant. Vector $\vec{B}$ is of length $2\ \mathrm{cm}$ and 60° below the x-axis in the fourth quadrant. The sum $\vec{A} + \vec{B}$ is a vector of magnitude -

(A) 2 along $+y$-axis

(B) 2 along $+x$-axis

(C) 1 along $-x$ axis

(D) 2 along $-x$ axis

Q37 If $\overrightarrow{A} = 4\hat{i} - 2\hat{j} + 6\hat{k}$ and $\overrightarrow{B} = -2\hat{j} - 6\hat{k}$, then angle made by vector $(\overrightarrow{A} + \overrightarrow{B})$ with positive y-axis is

(A) 30°

(B) 135°

(C) 45°

(D) 120°

Q38 If a vector $\overrightarrow{P}$ is making angles $\alpha,\ \beta$ and γ respectively with *X*, *Y* and *Z* axes respectively. Then $\sin^2\alpha + \sin^2\beta + \sin^2\gamma =$

(A) 0 (B) 1

(C) 2 (D) 3

Q39 The sum of the magnitudes of two vectors is 18 and the magnitude of their resultant is 12. If the

resultant is perpendicular to one of the vectors, then what are the magnitudes of the two vectors?

(A) 5, 13 (B) 6, 12

(C) 7, 11 (D) 8, 11

Q40 If two forces $\vec{F}_1 = 500$ N due east and $\vec{F}_2 = 250$ N due north have their common initial point, then $\vec{F}_2 - \vec{F}_1$ is

(A) $250\sqrt{5}$ N, $\tan^{-1}(2)$W of N

(B) 250 N, $\tan^{-1}(2)$W of N

(C) Zero

(D) 750 N, $\tan^{-1}(3/4)$N of W

Q41 If $\overrightarrow{A} = 4\hat{i} + 3\hat{j}$ and $\overrightarrow{B} = 4\hat{i} + 2\hat{j}$, then find a vector parallel to $\overrightarrow{A}$ but has magnitude five times that of $\overrightarrow{B}$.

(A) $\sqrt{20}\left(2\hat{i} + 3\hat{j}\right)$ (B) $\sqrt{20}\left(4\hat{i} + 3\hat{j}\right)$

(C) $\sqrt{20}\left(2\hat{i} + \hat{j}\right)$ (D) $\sqrt{10}\left(2\hat{i} + \hat{j}\right)$

Q42 If three forces $\overrightarrow{F} = 3\hat{i} - 4\hat{j} + 5\hat{k}$, $\vec{F}_2 = -3\hat{i} + 4\hat{j}$ 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

Q43 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) $\vec{P} \times \vec{Q} \neq \vec{Q} \times \vec{P}$

Q44 If $\vec{P} = 2\hat{i} + 3\hat{j} - 2\hat{k}$ and $\vec{Q} = 4\hat{i} - 2\hat{j} + \hat{k}$, then match the following:

	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	$\left\|2\overrightarrow{P} + \overrightarrow{Q}\right\|$	Q	$\hat{i} - 10\hat{j} - 16\hat{k}$
d	$\overrightarrow{P} \times \overrightarrow{Q}$	S	$\sqrt{50}$

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

(B) $a \to S,\ b \to Q,\ c \to P,\ d \to P$

(C) $a \to Q,\ b \to Q,\ c \to P,\ d \to R$

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

Q45 The unit vectors along the three co-ordinate axes are related as

(A) $\hat{i} > \hat{j} > \hat{k} > 1$

(B) $\hat{i} = \hat{j} = \hat{k} = 0$

(C) $\hat{\mathrm{i}} = -\hat{\mathrm{j}} = \hat{\mathrm{k}} = 1$

(D) $\hat{\mathrm{i}} = \hat{\mathrm{j}} = \hat{\mathrm{k}} = 1$

Answer Key

Q1	(D)
Q2	(C)
Q3	(B)
Q4	(C)
Q5	(D)
Q6	(B)
Q7	(B)
Q8	(C)
Q9	(B)
Q10	(C)
Q11	(D)
Q12	(A)
Q13	(C)
Q14	(B)
Q15	(B)
Q16	(C)
Q17	(A)
Q18	(C)
Q19	(B)
Q20	(D)
Q21	(B)
Q22	(A)
Q23	(C)
Q24	(B)
Q25	(B)
Q26	(D)
Q27	(B)
Q28	(C)
Q29	(C)
Q30	(B)
Q31	(A)
Q32	(B)
Q33	(D)
Q34	(A)
Q35	(B)
Q36	(B)
Q37	(B)
Q38	(C)
Q39	(A)
Q40	(A)
Q41	(B)
Q42	(C)
Q43	(B)
Q44	(C)
Q45	(D)