# Yakeen NEET 2.0 2026

**KPP -(PYQ)**

## Physics by Saleem Sir
## Vectors

1. If $\vec{A} = (2\hat{i} + 3\hat{j} - \hat{k})$m and $\vec{B} = (\hat{i} + 3\hat{j} + 2\hat{k})$m. The magnitude of component of vector $\vec{A}$ along vector $\vec{B}$ will be _____ m.

   **[JEE Main 2022]**

2. If the projection of $2\hat{i} + 4\hat{j} - 2\hat{k}$ on $\hat{i} + 2\hat{j} + \alpha\hat{k}$ is zero. Then, the value of $\alpha$ will be.

   **[JEE Main 2022]**

3. Which of the following relation is true for two unit vectors $\hat{A}$ and $\hat{B}$ making an angle $\theta$ to each other?

   **[JEE Main 2022]**

   (1) $\left|\hat{A}+\hat{B}\right|=\left|\hat{A}-\hat{B}\right|\tan\dfrac{\theta}{2}$

   (2) $\left|\hat{A}-\hat{B}\right|=\left|\hat{A}+\hat{B}\right|\tan\dfrac{\theta}{2}$

   (3) $\left|\hat{A}+\hat{B}\right|=\left|\hat{A}-\hat{B}\right|\cos\dfrac{\theta}{2}$

   (4) $\left|\hat{A}-\hat{B}\right|=\left|\hat{A}+\hat{B}\right|\cos\dfrac{\theta}{2}$

4. Two vectors $\vec{A}$ and $\vec{B}$ have equal magnitude. If magnitude of $\vec{A} + \vec{B}$ is equal to two times the magnitude of $\vec{A} - \vec{B}$, then the angle between $\vec{A}$ and $\vec{B}$ will be:

   **[JEE Main 2022]**

   (1) $\sin^{-1}\left(\dfrac{3}{5}\right)$   (2) $\sin^{-1}\left(\dfrac{1}{3}\right)$

   (3) $\cos^{-1}\left(\dfrac{3}{5}\right)$   (4) $\cos^{-1}\left(\dfrac{1}{3}\right)$

5. Vectors $a\hat{i} + b\hat{j} + \hat{k}$ and $2\hat{i} - 3\hat{j} + 4\hat{k}$ are perpendicular to each other when $3a + 2b = 7$, the ratio of a to b is $x/2$. The value of $x$ is _____.

   **[JEE Main 2023]**

6. $\vec{A}$ is a vector quantity such that $|\vec{A}| =$ non zero constant. Which of the following expression is true for $\vec{A}$?

   **[JEE Main 2022]**

   (1) $\vec{A} \cdot \vec{A} = 0$    (2) $\vec{A} \times \vec{A} < 0$

   (3) $\vec{A} \times \vec{A} = 0$    (4) $\vec{A} \times \vec{A} > 0$

7. If two vectors $\vec{P} = \hat{i} + 2\,m\hat{j} + m\hat{k}$ and $\vec{Q} = 4\hat{i} - 2\hat{j} + m\hat{k}$ are perpendicular to each other. Then, the value of m will be:

   **[JEE Main 2023]**

   (1) 1       (2) −1
   (3) −3      (4) 2

8. If $\vec{P} = 3\hat{i} + \sqrt{3}\hat{j} + 2\hat{k}$ . and $\vec{Q} = 4\hat{i} + \sqrt{3}\hat{j} + 2.5\hat{k}$ then, The unit vector in the direction of $\vec{P} \times \vec{Q}$ is $\dfrac{1}{x}\left(\sqrt{3}\hat{i} + \hat{j} - 2\sqrt{3}\hat{k}\right)$. The value of $x$ is:

   **[JEE Main 2023]**

9. The resultant of two vectors $\vec{A}$ and $\vec{B}$ is perpendicular to $\vec{A}$ and its magnitude is half that of $\vec{B}$. The angle between vectors $\vec{A}$ and $\vec{B}$ is _____°.

   **[JEE Main 2024]**

10. What will be the projection of vector $\vec{A} = \hat{i} + \hat{j} + \hat{k}$ on vector $\vec{B} = \hat{i} + \hat{j}$ ?

    **[JEE Main 2021]**

    (1) $\sqrt{2\left(\hat{i} + \hat{j} + \hat{k}\right)}$   (2) $2\left(\hat{i} + \hat{j} + \hat{k}\right)$

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

11. Two forces having magnitude $A$ and $A/2$ are perpendicular to each other. The magnitude of their resultant is:

    **[JEE Main 2023]**

    (1) $\dfrac{\sqrt{5}\,A}{4}$   (2) $\dfrac{\sqrt{5}\,A}{2}$

    (3) $\dfrac{5\,A}{2}$   (4) $\dfrac{\sqrt{5}\,A^2}{2}$

12. When vector $\vec{A} = 2\hat{i} + 3\hat{j} + 2\hat{k}$ is subtracted from vector $\vec{B}$, it gives a vector equal to $2\hat{j}$. Then the magnitude of vector $\vec{B}$ will be:

    **[JEE Main 2023]**

    (1) $\sqrt{5}$    (2) 3
    (3) $\sqrt{6}$    (4) $\sqrt{33}$

**13.** A vector in $x - y$ plane makes an angle of 30° with $y$-axis. The magnitude of $y$-component of vector is $2\sqrt{3}$. The magnitude of $x$-component of the vector will be:

**[JEE Main 2023]**

(1) $1/\sqrt{3}$      (2) 6

(3) 2      (4) $\sqrt{3}$

**14.** If two vectors $\vec{A}$ and $\vec{B}$ having equal magnitude $R$ are inclined at an angle $\theta$, then.

**[JEE Main 2024]**

(1) $|\vec{A} - \vec{B}| = \sqrt{2}R\sin\left(\dfrac{\theta}{2}\right)$

(2) $|\vec{A} + \vec{B}| = 2R\sin\left(\dfrac{\theta}{2}\right)$

(3) $|\vec{A} + \vec{B}| = 2R\cos\left(\dfrac{\theta}{2}\right)$

(4) $|\vec{A} - \vec{B}| = 2R\cos\left(\dfrac{\theta}{2}\right)$

**15.** A vector has magnitude same as that of $\vec{A} = 3\hat{i} + 4\hat{j}$ and is parallel to $\vec{B} = 4\hat{i} + 3\hat{j}$. The $x$ and $y$ components of this vector in first quadrant are $x$ and 3 respectively where $x =$ _____.

**[JEE Main 2024]**

**16.** Two forces $\vec{F}_1$ and $\vec{F}_2$ are acting on a body. One force has magnitude thrice that of the other force and the resultant of the two forces is equal to the force of larger magnitude. The angle between $\vec{F}_1$ and $\vec{F}_2$ is $\cos^{-1}\left(\dfrac{1}{n}\right)$. The value of $|n|$ is _____.

**[JEE Main 2024]**

**17.** The angle between vector $\vec{Q}$ and the resultant of $(2\vec{Q} + 2\vec{P})$ and $(2\vec{Q} - 2\vec{P})$ is:

**[JEE Main 2024]**

(1) $\tan^{-1}\dfrac{(2\vec{Q} - 2\vec{P})}{2\vec{Q} + 2\vec{P}}$

(2) $0°$

(3) $\tan^{-1}(P/Q)$

(4) $\tan^{-1}(2Q/P)$

**18.** If $\vec{a}$ and $\vec{b}$ makes an angle $\cos^{-1}\left(\dfrac{5}{9}\right)$ with each other, then $|\vec{a} + \vec{b}| = \sqrt{2}|\vec{a} - \vec{b}|$ for $|\vec{a}| = n|\vec{b}|$. The integer value of $n$ is _____.

**[JEE Main 2024]**

**19.** Three forces $F_1 = 10$ N, $F_2 = 8$ N, $F_3 = 6$ N are acting on a particle of mass 5 kg. The forces $F_2$ and $F_3$ are applied perpendicularly so that particle remains at rest. If the force $F_1$ is removed, then the acceleration of the particle is:

**[JEE Main 2023]**

(1) $7$ ms$^{-2}$      (2) $0.5$ ms$^{-2}$

(3) $4.8$ ms$^{-2}$      (4) $2$ ms$^{-2}$

**20.** Two particles are located at equal distance from origin. The position vectors of those are represented by $\vec{A} = 2\hat{i} + 3n\hat{j} + 2\hat{k}$ and $\vec{B} = 2\hat{i} - 2\hat{j} + 4p\hat{k}$, respectively. If both the vectors are at right angle to each other, the value of $n^{-1}$ is _____.

**[JEE Main 2025]**

**21.** Match List I with List II.

**[JEE Main 2021]**

| | List I | | List II. |
|---|---|---|---|
| (a) | $\vec{C} - \vec{A} - \vec{B} = 0$ | (i) |  |
| (b) | $\vec{A} - \vec{C} - \vec{B} = 0$ | (ii) |  |
| (c) | $\vec{B} - \vec{A} - \vec{C} = 0$ | (iii) |  |
| (d) | $\vec{A} + \vec{B} = -\vec{C}$ | (iv) |  |

Choose the correct answer from the options given below:

(1) (a)→(iv), (b)→(i), (c)→(iii), (d)→(ii)

(2) (a)→(iv), (b)→(iii), (c)→(i), (d)→(ii)

(3) (a)→(iii), (b)→(ii), (c)→(iv), (d)→(i)

(4) (a)→(i), (b)→(iv), (c)→(ii), (d)→(iii)

**22.** The sum of two $\vec{P}$ and $\vec{Q}$ is $\vec{R}$ such that $|\vec{R}| = |\vec{P}|$. The angle θ (in degree) that the resultant of $2\vec{P}$ and $\vec{Q}$ will make $\vec{Q}$ is:
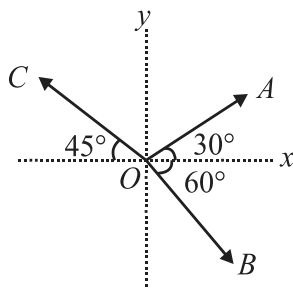
[JEE Main 2020]

**23.** If $\vec{A}$ and $\vec{B}$ are two vectors satisfying the relation $\vec{A} \cdot \vec{B} = |\vec{A} \times \vec{B}|$. Then the value of $|\vec{A} - \vec{B}|$ will be:

[JEE Main 2021]

(1) $\sqrt{A^2 + B^2}$

(2) $\sqrt{A^2 + B^2 + \sqrt{2}AB}$

(3) $\sqrt{A^2 + B^2 + 2AB}$

(4) $\sqrt{A^2 + B^2 - \sqrt{2}AB}$

**24.** The magnitude of vectors $\overrightarrow{OA}, \overrightarrow{OB}$ and $\overrightarrow{OC}$ in the given figure are equal. The direction of $\overrightarrow{OA} + \overrightarrow{OB} - \overrightarrow{OC}$ with x-axis will be:

[JEE Main 2021]



(1) $\tan^{-1}\dfrac{\left(1 - \sqrt{3} - \sqrt{2}\right)}{\left(1 + \sqrt{3} + \sqrt{2}\right)}$

(2) $\tan^{-1}\dfrac{\left(\sqrt{3} - 1 + \sqrt{2}\right)}{\left(1 + \sqrt{3} - \sqrt{2}\right)}$

(3) $\tan^{-1}\dfrac{\left(\sqrt{3} - 1 + \sqrt{2}\right)}{\left(1 - \sqrt{3} + \sqrt{2}\right)}$

(4) $\tan^{-1}\dfrac{\left(1 + \sqrt{3} - \sqrt{2}\right)}{\left(1 - \sqrt{3} - \sqrt{2}\right)}$

**25.** Two vectors $\vec{P}$ and $\vec{Q}$ have equal magnitudes. If the magnitude of $\vec{P} + \vec{Q}$ is $n$ times the magnitude of $\vec{P} - \vec{Q}$, then angle between $\vec{P}$ and $\vec{Q}$ is:

[(JEE Main 2021]

(1) $\sin^{-1}\left(\dfrac{n-1}{n+1}\right)$    (2) $\cos^{-1}\left(\dfrac{n-1}{n+1}\right)$

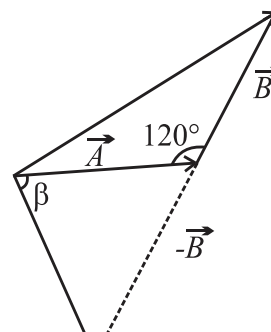(3) $\sin^{-1}\left(\dfrac{n^2-1}{n^2+1}\right)$    (4) $\cos^{-1}\left(\dfrac{n^2-1}{n^2+1}\right)$

**26.** Two vectors $\vec{X}$ and $\vec{Y}$ have equal magnitude. The magnitude of $(\vec{X} - \vec{Y})$ is n times the magnitude of $(\vec{X} + \vec{Y})$. The angle between $\vec{X}$ and $\vec{Y}$ is:

[JEE Main 2021]

(1) $\cos^{-1}\left(\dfrac{-n^2-1}{n^2-1}\right)$    (2) $\cos^{-1}\left(\dfrac{n^2-1}{-n^2-1}\right)$

(3) $\cos^{-1}\left(\dfrac{n^2+1}{-n^2-1}\right)$    (4) $\cos^{-1}\left(\dfrac{n^2+1}{n^2-1}\right)$

**27.** The angle between vector $(\vec{A})$ and $(\vec{A} - \vec{B})$ is:

[JEE Main 2021]



(1) $\tan^{-1}\left(\dfrac{-\dfrac{B}{2}}{A - B\dfrac{\sqrt{3}}{2}}\right)$

(2) $\tan^{-1}\left(\dfrac{A}{0.7B}\right)$

(3) $\tan^{-1}\left(\dfrac{\sqrt{3}B}{2A - B}\right)$

(4) $\tan^{-1}\left(\dfrac{B\cos\theta}{2 - B\sin\theta}\right)$

**28.** **Statement I:** If three forces $\vec{F}_1, \vec{F}_2$ and $\vec{F}_3$ are represented by three sides of a triangle and $\vec{F}_1 + \vec{F}_2 = \vec{F}_3$, then these three forces are concurrent forces and satisfy the condition for equilibrium.

**Statement II:** A triangle made up of three forces $\vec{F}_1, \vec{F}_2$ and $\vec{F}_3$ as its sides taken in the same order, satisfy the condition for translatory equilibrium.
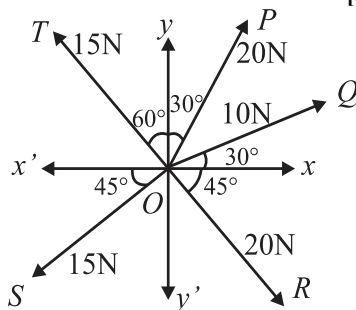
In the light of the above statements, choose the most appropriate answer from the options given below:

[JEE Main 2021]

(1) Statement-I is false but Statement-II is true

(2) Statement-I is true but Statement-II is false

(3) Both Statement-I and Statement-II are false
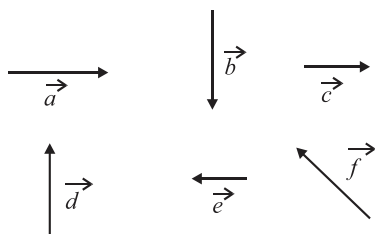
(4) Both Statement-I and Statement-II are true

**29.** The resultant of these forces $\overrightarrow{OP}, \overrightarrow{OQ}, \overrightarrow{OR}, \overrightarrow{OS}$ and $\overrightarrow{OT}$ is approximately ___ N.
[Take $\sqrt{3} = 1.7$, $\sqrt{2} = 1.4$ Given $\hat{\imath}$ and $\hat{\jmath}$ unit vectors along $x$, $y$ axis].

**[JEE Main 2021]**



(1) $9.25\hat{\imath} + 5\hat{\jmath}$      (2) $3\hat{\imath} + 15\hat{\jmath}$
(3) $2.5\hat{\imath} - 14.5\hat{\jmath}$      (4) $-1.5\hat{\imath} - 15.5\hat{\jmath}$

**30.** Six vectors, $\vec{a}$ through $\vec{f}$ have the magnitudes and directions indicated in the figure. Which of the following statements is true?

**[NEET - 2010]**



(1) $\vec{b} + \vec{c} = \vec{f}$      (2) $\vec{d} + \vec{c} = \vec{f}$
(3) $\vec{d} + \vec{e} = \vec{f}$      (4) $\vec{b} + \vec{e} = \vec{f}$

**31.** If a unit vector is represented by $0.5\hat{\imath} - 0.8\hat{\jmath} + c\hat{k}$ then the value of $c$ is:

**[NEET - 1999]**

(1) $\sqrt{0.01}$      (2) $\sqrt{0.11}$
(3) $1$      (4) $\sqrt{0.39}$

**32.** If the magnitude of sum of two vectors is equal to the magnitude of difference of the two vectors, the angle between these vectors is:

**[NEET-I, 2016]**

(1) $45°$      (2) $180°$
(3) $0°$      (4) $90°$

**33.** The vectors $\vec{A}$ and $\vec{B}$ are such that $|\vec{A} + \vec{B}| = |\vec{A} - \vec{B}|$. The angle between the two vectors is:

**[NEET - 2006, 1996, 1991]**

(1) $45°$      (2) $90°$
(3) $60°$      (4) $75°$

**34.** If $|\vec{A} + \vec{B}| = |\vec{A}| + |\vec{B}|$ then angle between $A$ and $B$ will be:

**[NEET - 2001]**

(1) $90°$      (2) $120°$
(3) $0°$      (4) $60°$

**35.** The magnitude of vectors $\vec{A}$, $\vec{B}$ and $\vec{C}$ are 3, 4 and 5 units respectively. If $\vec{A} + \vec{B} = \vec{C}$, the angle between $\vec{A}$ and $\vec{B}$ is:

**[NEET - 1988]**

(1) $\pi/2$      (2) $\cos^{-1}(0.6)$
(3) $\tan^{-1}(7/5)$      (4) $\pi/4$

**36.** A particle starting from the origin $(0, 0)$ moves in a straight line in the $(x, y)$ plane. Its coordinates at a later time are $(\sqrt{3}, 3)$. The path of the particle makes with the x-axis an angle of

**[NEET - 2007]**

(1) $45°$      (2) $60°$
(3) $0°$      (4) $30°$

## Answer Key

| | | | |
|---|---|---|---|
| 1. | (2) | 19. | (4) |
| 2. | (5) | 20. | (3) |
| 3. | (2) | 21. | (2) |
| 4. | (3) | 22. | (90) |
| 5. | (1) | 23. | (4) |
| 6. | (3) | 24. | (1) |
| 7. | (4) | 25. | (4) |
| 8. | (4) | 26. | (2) |
| 9. | (150) | 27. | (3) |
| 10. | (4) | 28. | (4) |
| 11. | (2) | 29. | (1) |
| 12. | (4) | 30. | (3) |
| 13. | (3) | 31. | (2) |
| 14. | (3) | 32. | (4) |
| 15. | (4) | 33. | (2) |
| 16. | (6) | 34. | (3) |
| 17. | (2) | 35. | (1) |
| 18. | (3) | 36. | (2) |