YAKEEN NEET 2.0

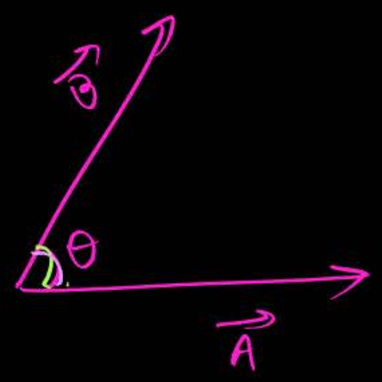
2026

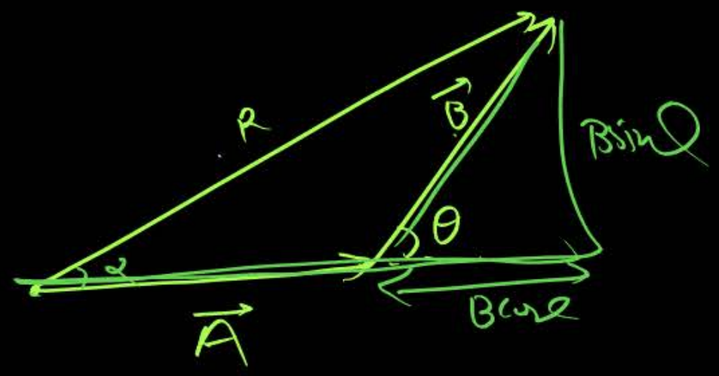
Vectors

Physics

Homework Solution 01 (of Lec-04)

By- Manish Raj (MR Sir)





$|\vec{A}| = A$

$|\vec{B}| = B$

$|\vec{R}| = R$

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

$$\tan\alpha = \frac{B\sin\theta}{A + B\cos\theta}$$

α = ∠ between $\vec{R}$ and $\vec{A}$

$\theta = 0^\circ$

$R = A + B$

$\vec{A} \parallel \vec{B}$

$\vec{R} = \vec{A} + \vec{B}$, $\theta = 0^\circ$

$R = A + B$ (max)

$|\vec{A}| = |\vec{B}| = A$

$R = 2A\cos(\theta/2)$

$\theta = 0^\circ$: $R = 2A$

$\theta = 60^\circ$: $R = \sqrt{3}A$

$\theta = 120^\circ$: $R = A$

$\theta = 180^\circ$: $R = A - B$ (min)

$\theta = 90^\circ$

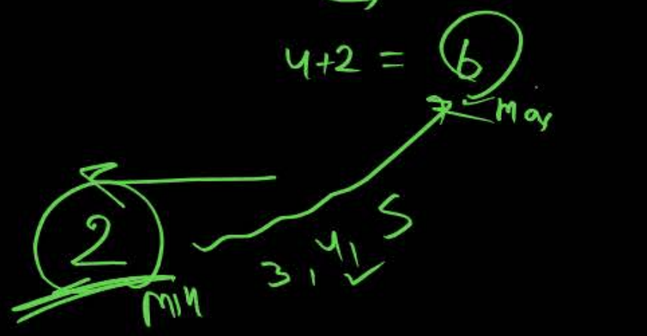
$R = \sqrt{A^2 + B^2}$

$R^2 = A^2 + B^2$

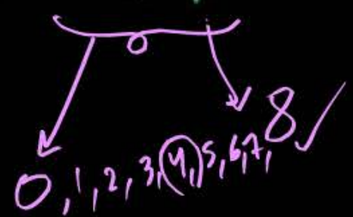
Which of the following pair can't give resultant of

① Magnitude 4.

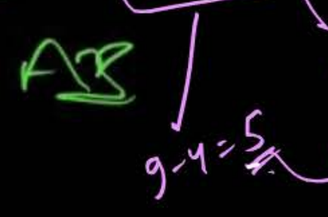
(a) 2, 4 //



(b) 4, 4



(c) 4, 9



(d) 1, 5

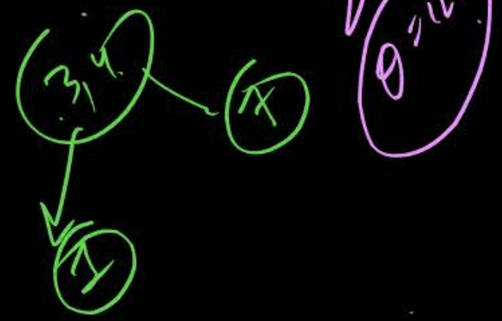
$R = 2A\cos\theta/2$

$A = 2A\cos\theta/2$

$\frac{1}{2} = \cos\theta/2$

$\frac{\theta}{2} = 60$

$\theta = 120$



Ans - (c)

H/W

Question H/w

Two forces of magnitude 8 N and 15 N respectively act at a point. If the resultant forces is 17 N, the angle between the forces has to be

1. 60°
2. 45°
3. 90°
4. 30°

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

$$(17)^2 = 8^2 + (15)^2 + 2 \times 8 \times 15 \cos\theta$$

$$289 = 64 + 225 + 16 \times 15 \cos\theta$$

$$289 = 289 + 16 \times 15 \cos\theta$$

$$0 = 16 \times 15 \cos\theta$$

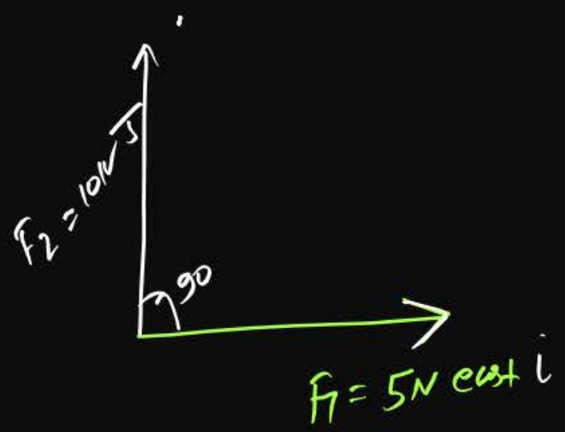
$$\cos\theta = \frac{0}{16 \times 15} = 0$$

$$\theta = 90$$

Question H/W

Two force $\vec{F}_1 = 5\text{N}$ due east and $F_2 = 10$ N due north then resultant of these two force is

1. $5\sqrt{5}$ N ✓
2. 15 N
3. 5 N
4. $\sqrt{5}$ N



$$R = \sqrt{f_1^2 + f_2^2 + 2f_1 f_2 \cos\theta}$$

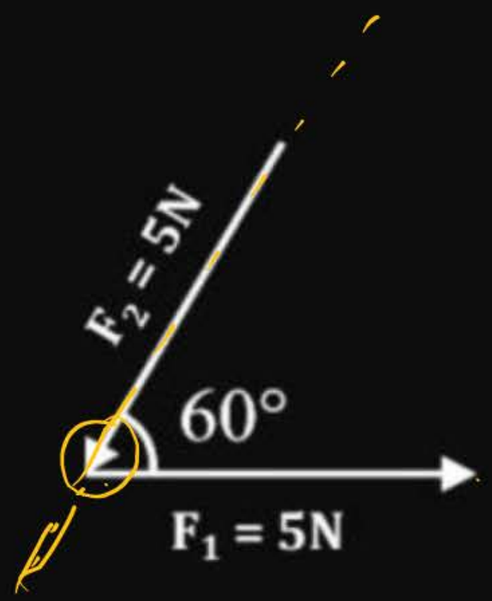
$$= \sqrt{25 + 100 + 2 \times 10 \times 5 \cos 90^\circ}$$

$$= \sqrt{125}$$

$$= \sqrt{25 \times 5} = 5\sqrt{5}$$

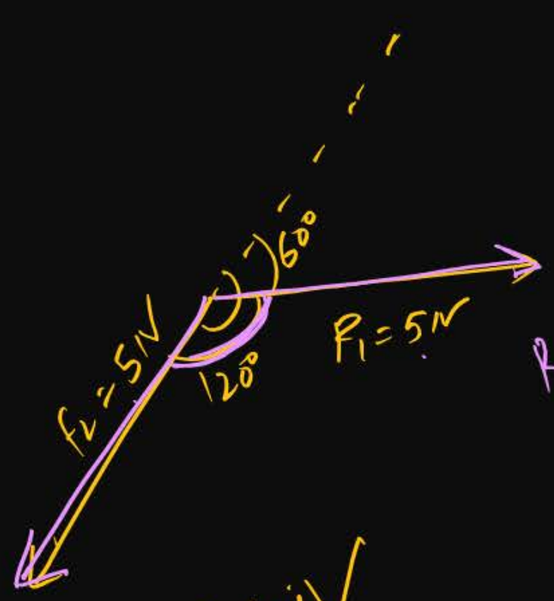
Question

Find net force $(\vec{F}_1 + \vec{F}_2) = ?$



equal magnitud of force

f_1 & f_2 ke bich 60° Angle hai



Parallelogram

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

$= \sqrt{25 + 25 + 2 \times 5 \times 5 \cos 120°}$

$= \sqrt{50 + 2 \times 25 \left(-\frac{1}{2}\right)}$

$= \sqrt{50 - 25}$

$= \sqrt{25}$

$= 5$

Imp

$R = 2A\cos\theta/2$

$= 2 \times 5 \cos 60°$

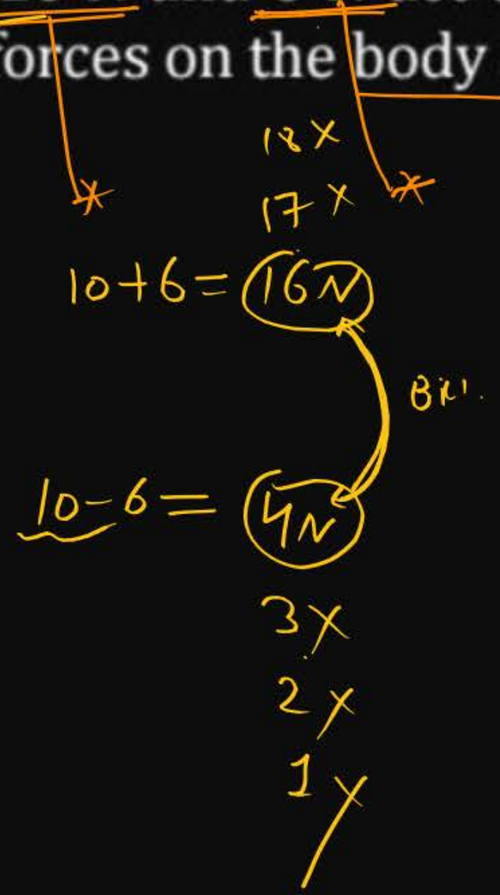
$= 5$

Question

H|W

Two forces of 10 N and 6 N act upon a body. The direction of the forces are unknown. The resultant forces on the body may be

1. 15 N
2. 3 N
3. 17 N
4. 2 N



Question

H/W

If $\vec{R} = \vec{A} + \vec{B}$ and $R = A + B$ then angle between $\vec{A}$ and $\vec{B}$ must be

1. $90°$
2. $60°$
3. $0°$
4. $180°$

$\theta = 0°$

$\rightarrow A$

$\rightarrow B$

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

$(A+B)^2 = A^2 + B^2 + 2AB\cos\theta$

$A^2 + B^2 + 2AB = A^2 + B^2 + 2AB\cos\theta$

$2AB = 2AB\cos\theta$

$1 = \cos\theta$

$\cos\theta = 1$

$\theta = 0$

Question

H/W

If $\vec{R} = \vec{A} + \vec{B}$ and $R^2 = A^2 + B^2$ then angle between $\vec{A}$ and $\vec{B}$ may be

1. 90°
2. 60°
3. 120°
4. 80°

MR*

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

$\cos\theta = 0$

$\theta = 90°$

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

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

given in ques

$R^2 = A^2 + B^2$

$A^2 + B^2 = A^2 + B^2 + 2AB\cos\theta$

$A^2 + B^2 - A^2 - B^2 = 2AB\cos\theta$

$0 = 2AB\cos\theta$

$\cos\theta = \frac{0}{2AB} = 0$

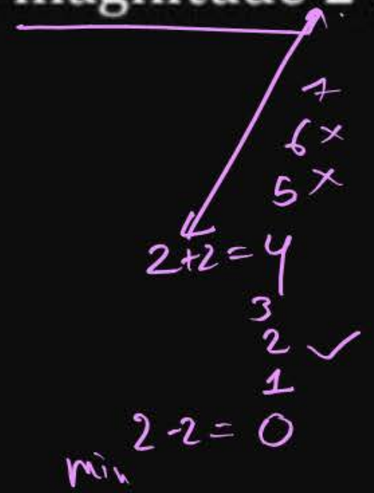
$\cos\theta = 0$

$\theta = 90$

Question

11/10

Two vector of magnitude 2 then resultant of these two vector may be ?



1. 2 ✓✓
2. 8 ×
3. 5 ×
4. 6 ×

H/W

Two force 5N and 2N acting on object then net force on object must Not be :→

(a) 2N ✗ (b) 1N ✓ (c) 6N ✓ (d) both (a) & (b)

Ans

9N ✓
8N ✗

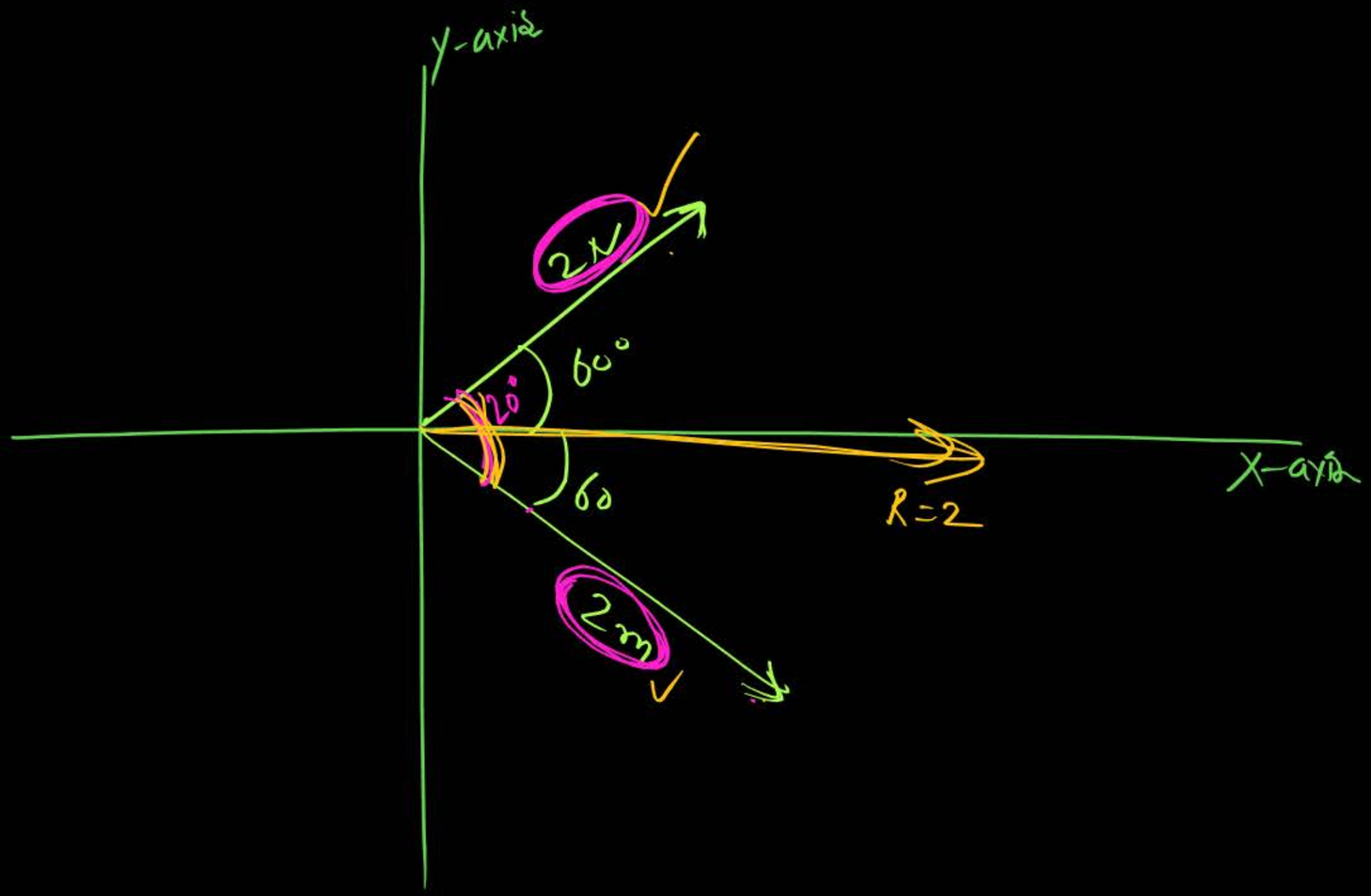
$(5N+2N)_{Max} =$ 7N ✓, 6 ✓, 5 ✓, 4N ✓, 3N ✓

$(5N-2N) =$

2N ✗

1N ✗

Vector $\vec{A}$ is 2m long at 60° above the +X axis and $\vec{B}$ is 2m long at 60° below the +x-axis then resultant will be:-



$R = 2$ m along x-axis ✓

$R = 2A\cos\theta/2$

$= 2 \times 2 \times \cos\left(\frac{120}{2}\right)^{60}$

$= 4 \times \frac{1}{2} = 2$

H/W

If vector Sum of Two unit vector is a unit vector

then:- find Angle B/W unit vectors ✓

$\hat{A} = 1$
$\hat{B} = 1$

$\hat{R} = 1$

$\theta = 120°$ ✓

$R = 2A \cos\theta/2$

$1 = 2 \times 1 \cos(\theta/2)$

$\frac{1}{2} = \cos(\theta/2)$

$\frac{\theta}{2} = 60$

$\theta = 120$ ✓

The ratio of maximum and minimum magnitude of Resultant of two vectors $\vec{a}$ and $\vec{b}$ is 3:1 then $|\vec{a}|$ in terms of $|\vec{b}|$

$$\frac{a+b}{a-b} = \frac{3}{1}$$

$$a+b = 3a-3b$$

$$4b = 2a$$

$$2b = a$$

$a-b \leq R \geq a+b$

min max

Find Angle b/w two force $2P$ & $\sqrt{2}P$ act so that resultant force is $P\sqrt{10}$.

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

$$10P^2 = 4P^2 + 2P^2 + 2 \times 2P\sqrt{2}P\cos\theta$$

$$10 = 6 + 4\sqrt{2}\cos\theta$$

$$4 = 4\sqrt{2}\cos\theta$$

$$\frac{1}{\sqrt{2}} = \cos\theta$$

$\theta = 45°$ ✓

H/W

Two Vector of magnitude 2, and 4, and resultant is $2\sqrt{3}$ find Angle B/W vectors.

easy done

H/W

The sum of the magnitude of two force is 18 and magnitude of their resultant is 12. If Resultant is is at 90° with the force of smaller magnitude, then what is magnitude of force

Next class

H/W

Which of the combination of three force can give zero resultant.

(a) 2, 4, 7

(b) (3, 1, 5)

(c) (2, 8, 11)

(d) (3, 4, 2)

Next Clue

THANK YOU