YAKEEN NEET 2.0

2026

Kpp

Vectors

PHYSICS

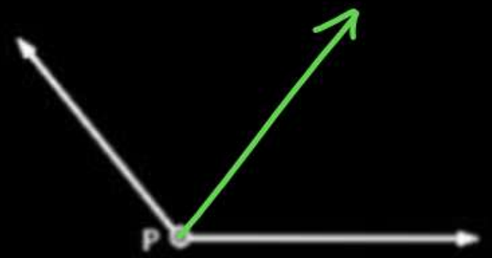
Lec 08

By- Saleem Ahmed Sir

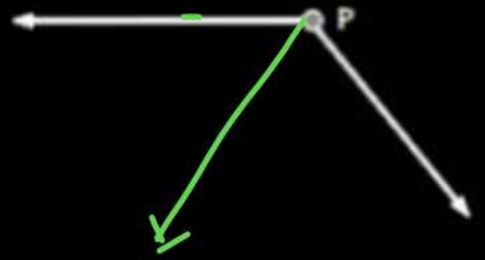
Question - 01

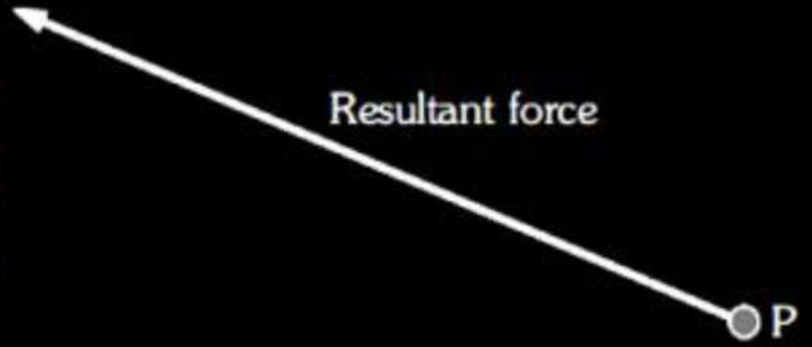
The vector below represents the resultant of two forces acting on a particle P.
Which of the following pair of vectors best represents two forces that combine to produce this resultant force vector?

1



2





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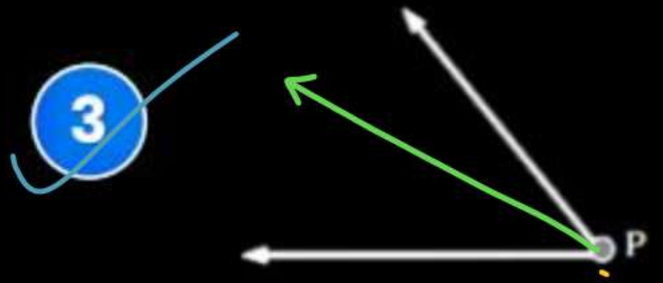
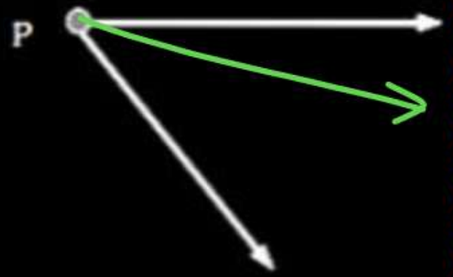
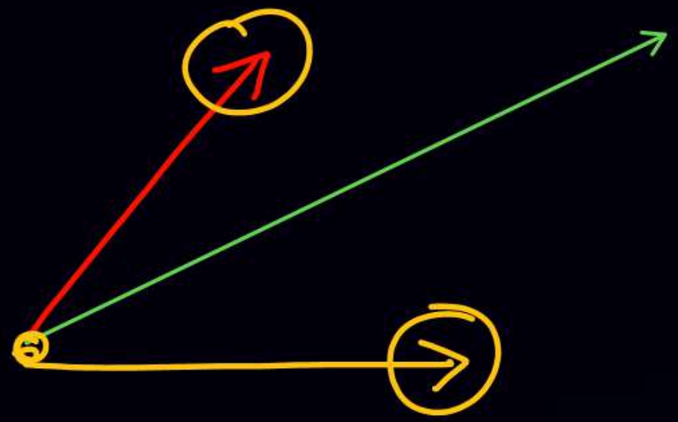
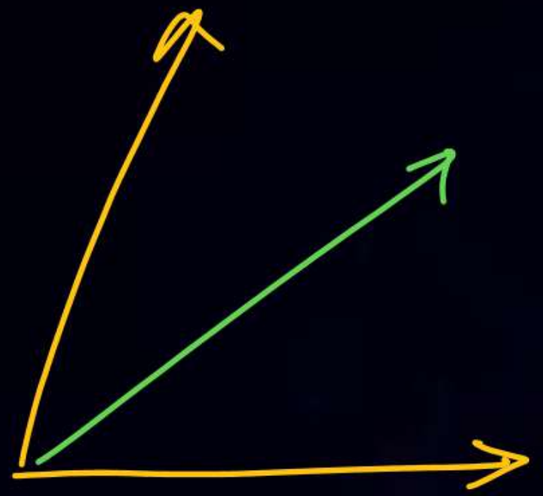


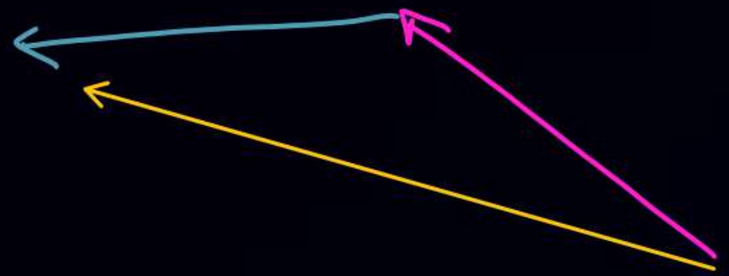
4



Ans : (3)



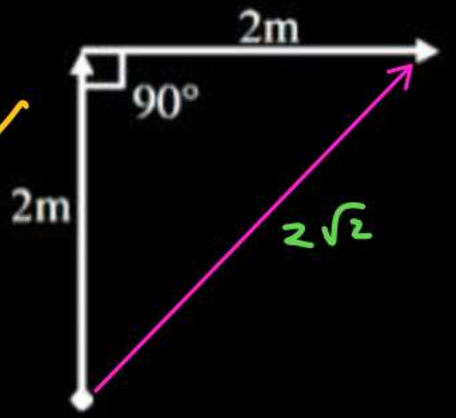




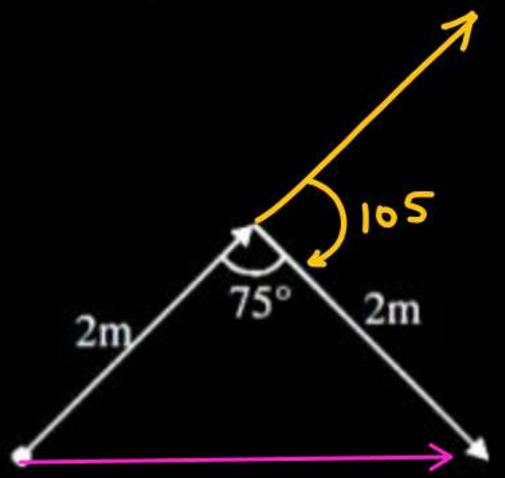
Question - 02

Which vector diagram represents the greatest magnitude of displacement for an object?

1

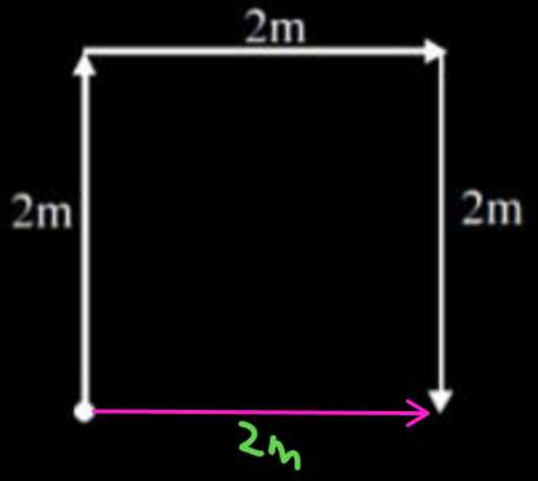


2

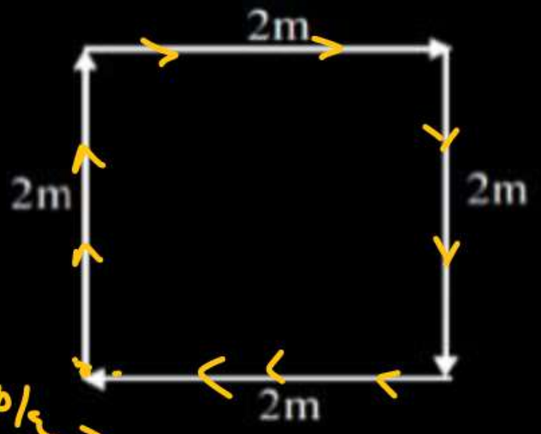


$R^2 = x^2 + x^2 + 2x \times \cos\theta$

3

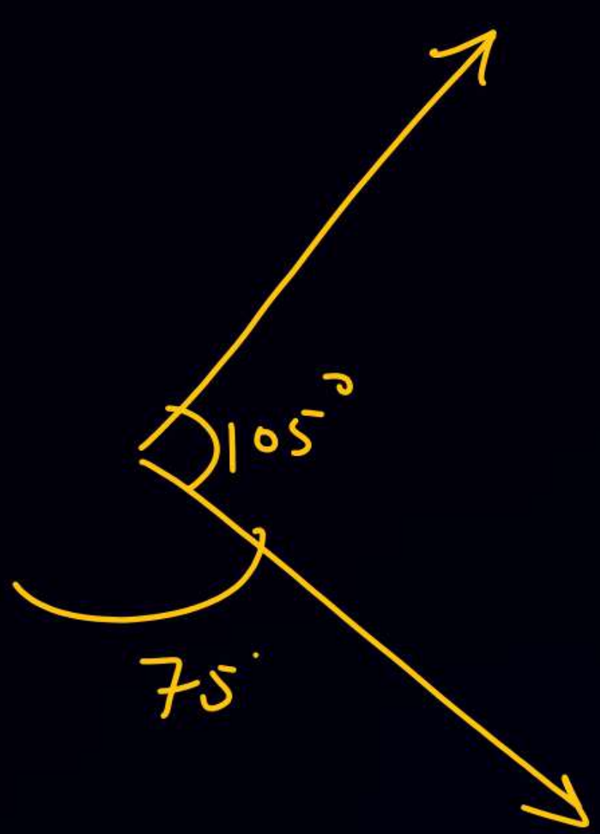


4



displ = 0

Ans : (1)


105°
75°

Question - 03

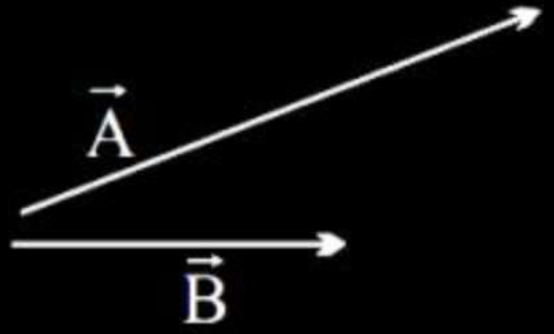
Two vectors $\vec{A}$ & $\vec{B}$ have magnitudes 2 & 1 respectively. If the angle between $\vec{A}$ & $\vec{B}$ is 60°, then which of the following vectors may be equal to $\frac{\vec{A}}{2}-\vec{B}$.

1

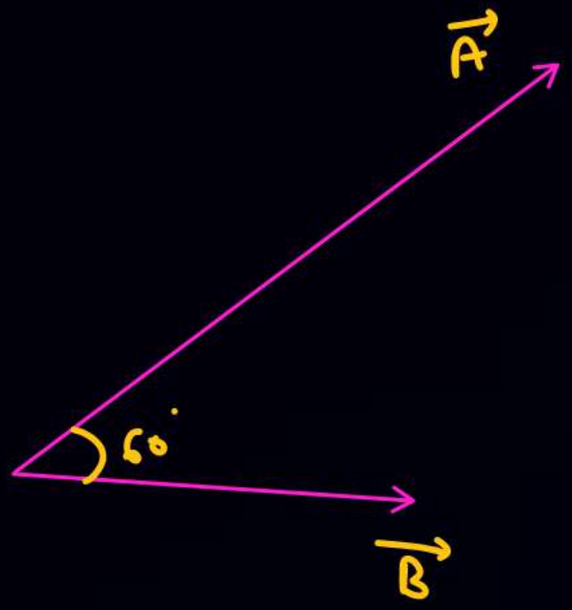
2

3

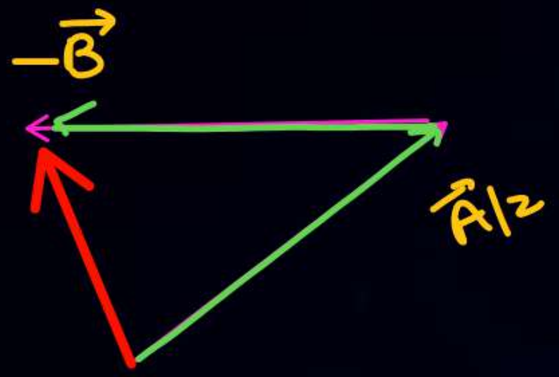
4



Ans : (2)



$=$

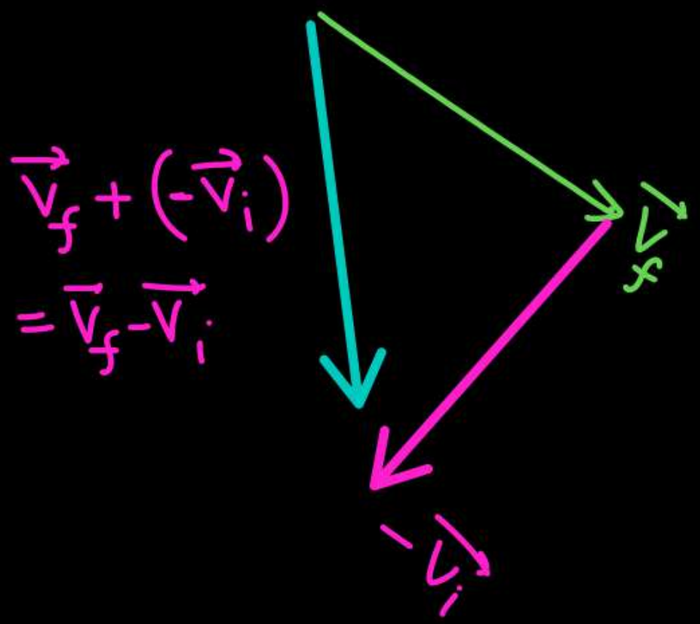


$$\frac{\vec{A}}{2} - \vec{B}$$

$$\frac{\vec{A}}{2} + (-\vec{B})$$

Question - 04

The initial and final velocities of an object are as shown in figure-(a). Which arrows shown in figure- (b) can represent change in velocity vector? $= \vec{v}_f - \vec{v}_i = \vec{v}_f + (-\vec{v}_i)$



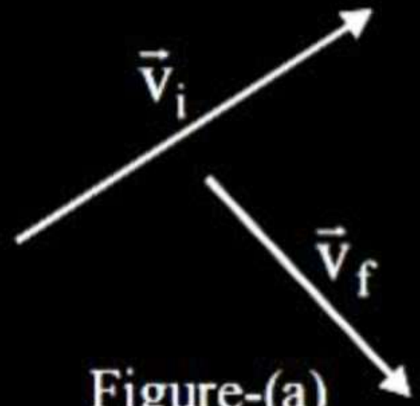


Figure-(a)

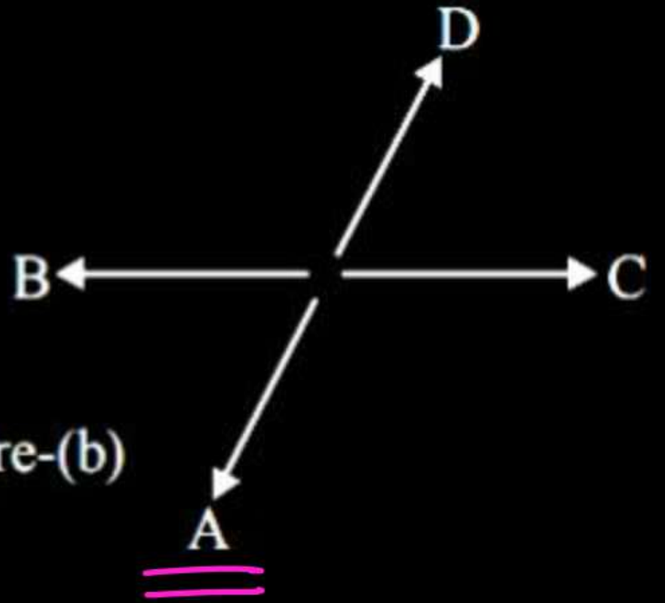
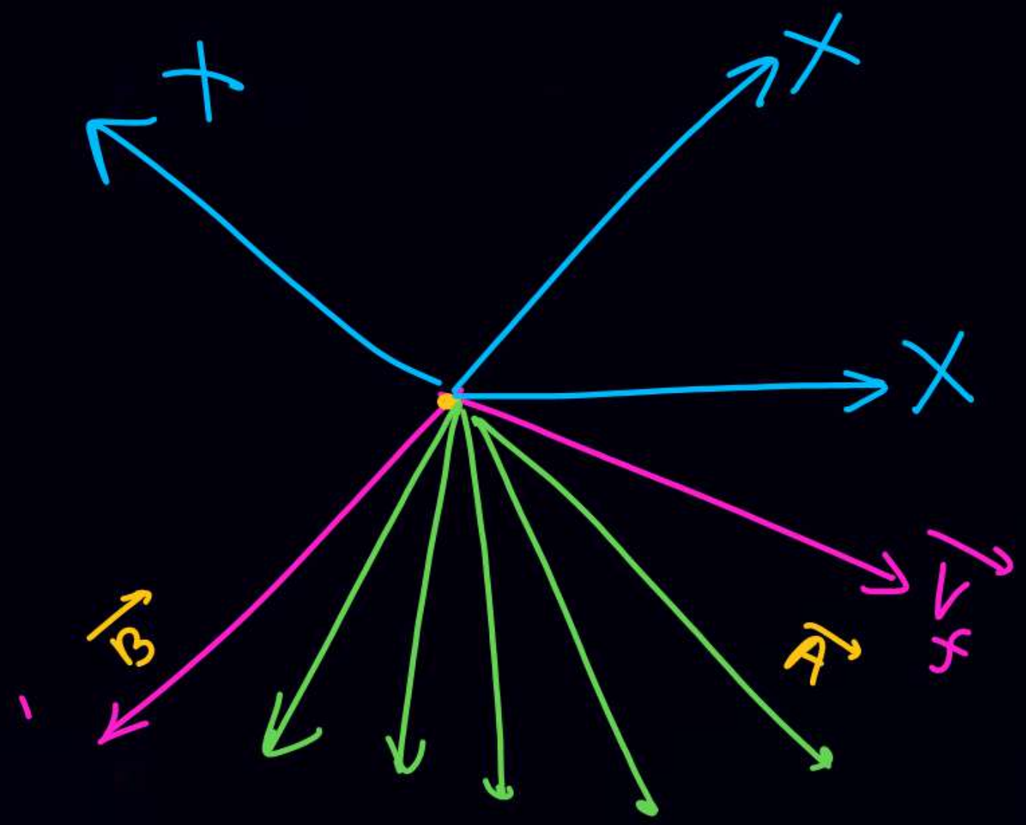


Figure-(b)

Ans (A)

Ans : (1)



$$\vec{V}_f - \vec{V}_i = \vec{V}_f + (-\vec{V}_i)$$

$$\| \qquad\qquad \|$$

$$\vec{A} + \vec{B}$$

Question - 05

If $|\vec{A}+\vec{B}|^2 = A^2 + B^2$, then

($\vec{A}, \vec{B}$ Non zero vector)

$$|\vec{A}+\vec{B}| = C = \sqrt{A^2+B^2+2AB\cos\theta}$$

$$|\vec{A}+\vec{B}|^2 = A^2+B^2+2AB\cos\theta = A^2+B^2$$

$2AB\cos\theta = 0$

$\cos\theta = 0$

$\theta = 90^\circ$

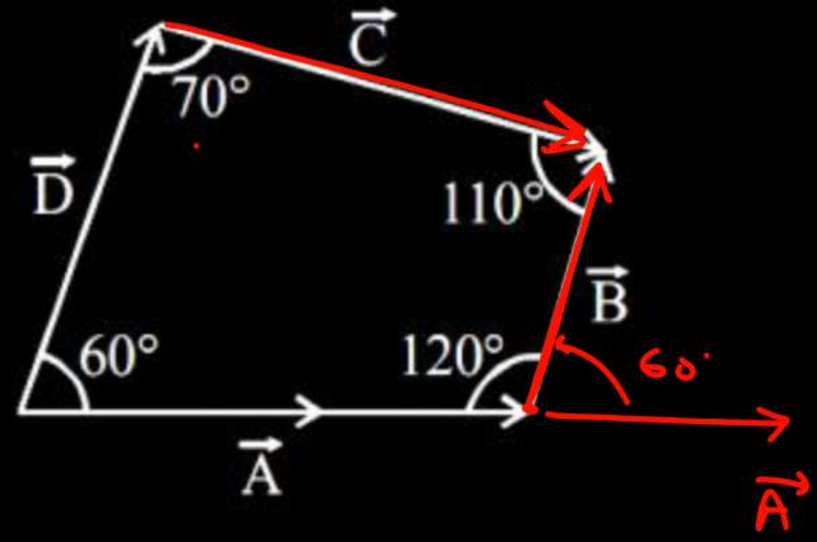
1. $\vec{A}$ and $\vec{B}$ must be parallel and in the same direction
2. $\vec{A}$ and $\vec{B}$ must be parallel and in opposite directions
3. either $\vec{A}$ or $\vec{B}$ must be zero
4. the angle between $\vec{A}$ and $\vec{B}$ must be 90° (Best)

Ans : (4)

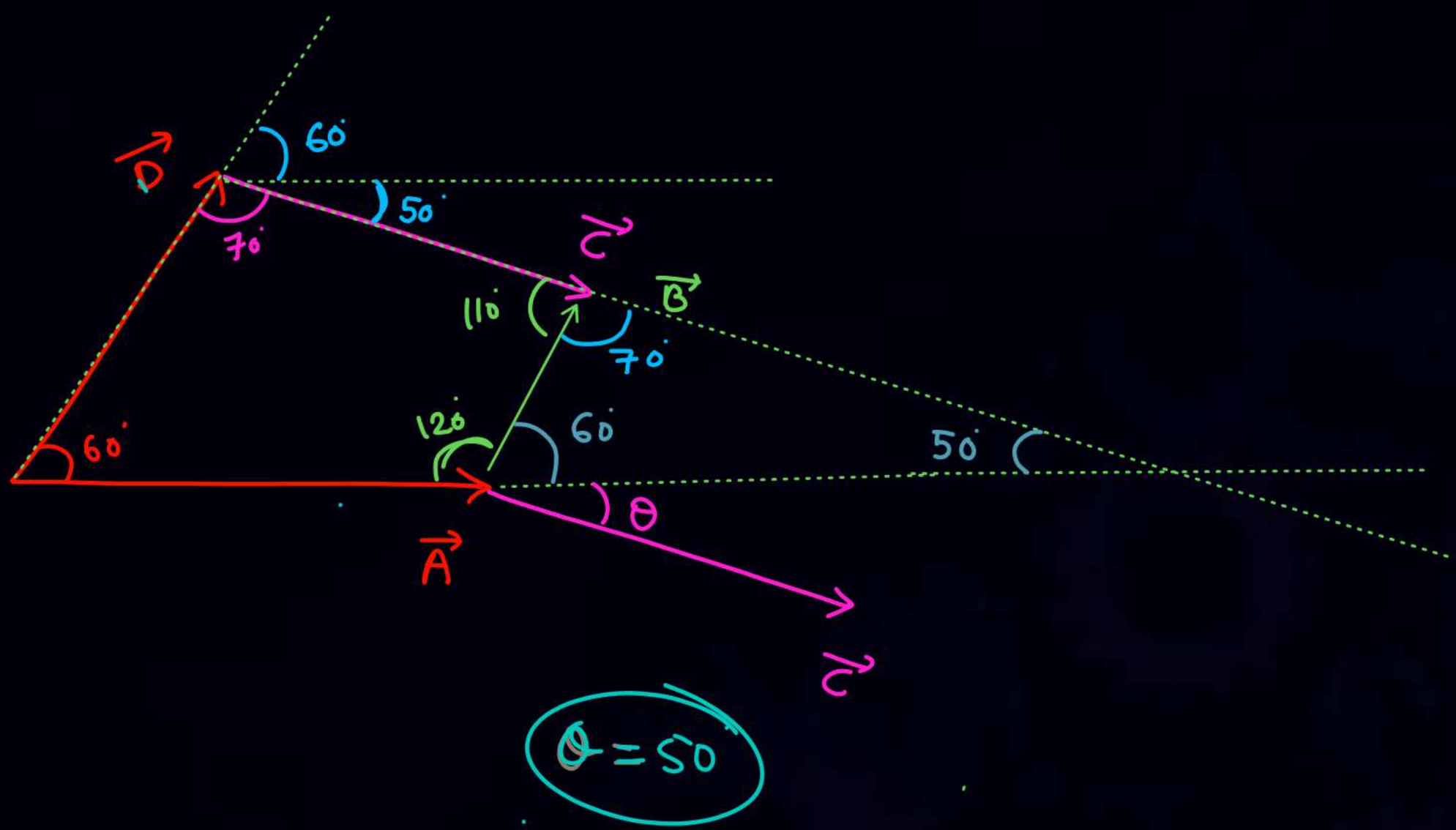
Question - 06

Four vector $\vec{A}, \vec{B}, \vec{C}, \vec{D}$ are shown as figure. Then:

1. Angle between $\vec{A}$ and $\vec{B}$ is 60°.
2. Angle between $\vec{D}$ and $\vec{C}$ is 70°.
3. Angle between $\vec{A}$ and $\vec{C}$ is 50°.
4. Angle between $\vec{B}$ and $\vec{C}$ is 110°.



Ans : (1,3,4)



$\theta = 50$

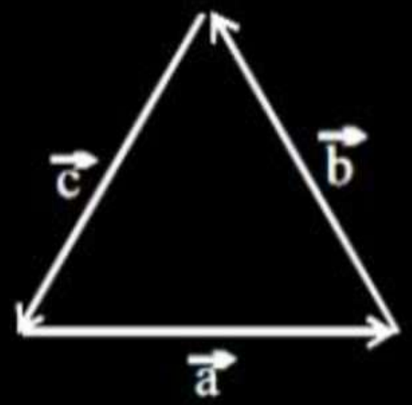
PARAGRAPH FOR QUESTION NO. 7 TO 9

Some conditions are given in the questions & different graphical representations are given in the options. Identify the correct graphical representation satisfying the given conditions

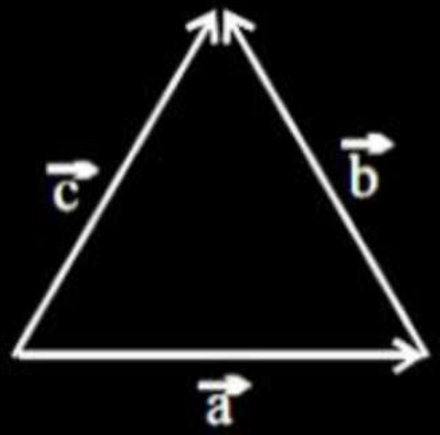
Question - 07

$\vec{a} + \vec{b} = \vec{c}$ & $a + b = c$. Which of the option is correct?

1

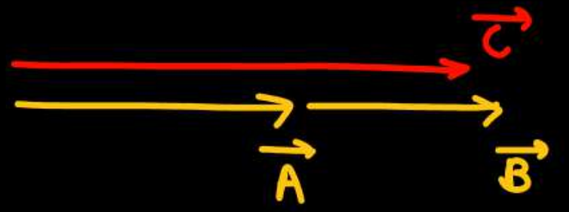


2

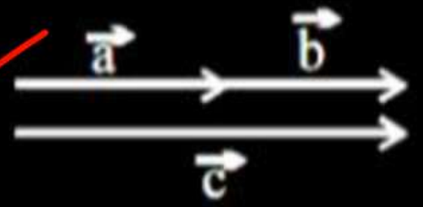


$\vec{A} + \vec{B} = \vec{C}$

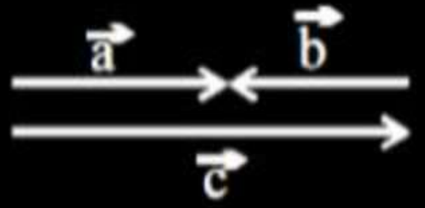
$A + B = C$



3



4



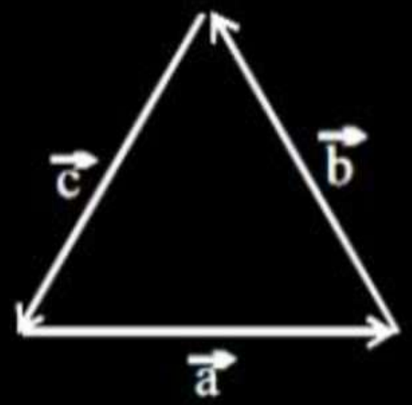
Ans : (3)

Question - 08

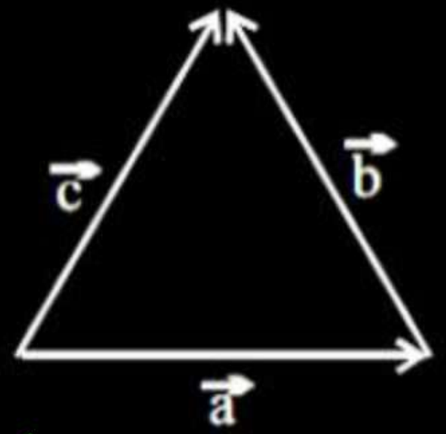
$\vec{a} = \vec{b} + \vec{c}$

$\vec{a} - \vec{b} = \vec{c}$ & $a + b = c$

1

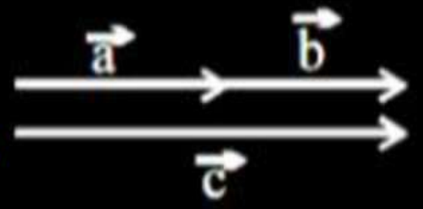


2



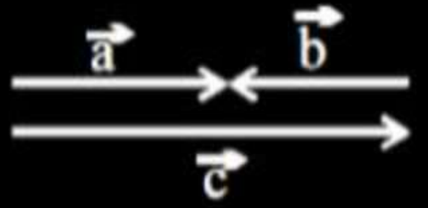
$\vec{a} + \vec{b} = \vec{c}$

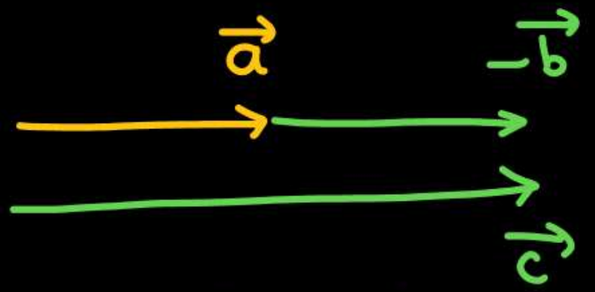
3



$\vec{a} + \vec{b} = \vec{c}$

4





$\vec{a} + (-\vec{b}) = \vec{c}$

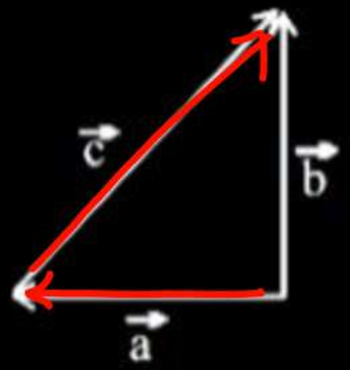
Ans : (4)

Question - 09

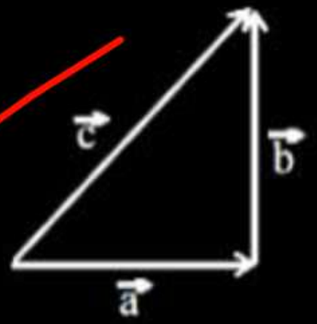
$\vec{a} + \vec{b} = \vec{c}$ & $c = \sqrt{2}\, a$; $a = b$

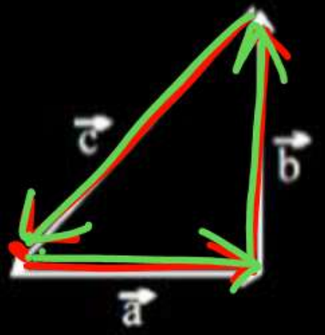
1 

$\vec{a}+\vec{c}=\vec{b}$

2 

$\vec{a}+\vec{c}=\vec{b}$

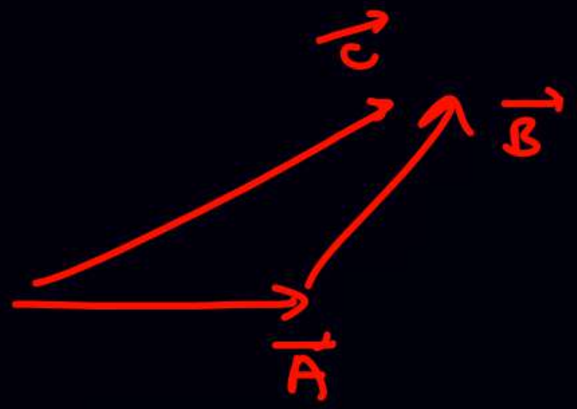
3 

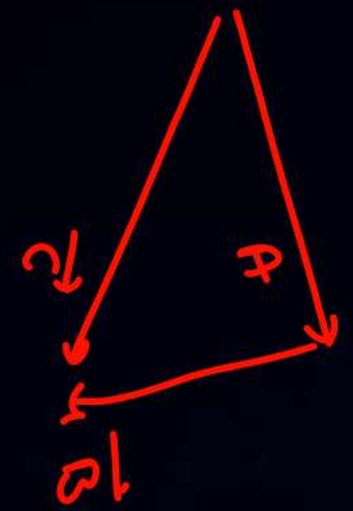
4 

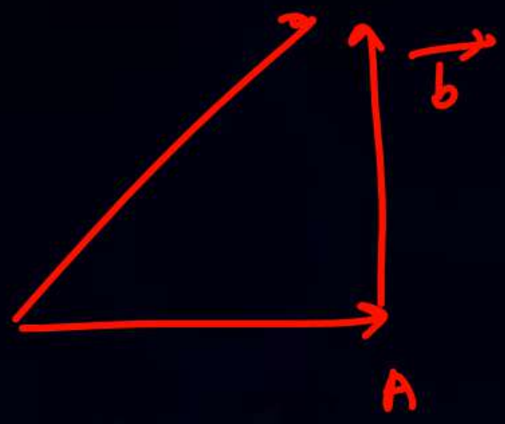
$\vec{a}+\vec{b}+\vec{c}=0$

Ans : (3)

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







Question - 10

The maximum and minimum magnitudes of the resultant of two given vectors are 17 units and 7 units respectively. If these two vectors are at right angles to each other, the magnitude of their resultant is

$A + B = 17$

$A - B = 7$

$A = 12$

$B = 5$

$\sqrt{12^2 + 5^2}$

1. 14
2. 16
3. 18
4. 13

Ans : (4)

Question - 11

Let $\vec{C} = \vec{A} + \vec{B}$ then

1. $|\vec{C}|$ is always greater then $|\vec{A}|$
2. It is possible to have $|\vec{C}| < |\vec{A}|$ and $|\vec{C}| < |\vec{B}|$
3. C is always equal to A + B
4. C is never equal to A + B

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

$A = 10$

$B = 6$

$4 \leq C \leq 16$

$(\theta = 0)$

$C = 4$

Ans : (2)

Question - 12

What is the angle between $\vec{P}$ and the resultant of $(\vec{P}+\vec{Q})$ and $(\vec{P}-\vec{Q})$

1. Zero
2. $\tan^{-1}(P/Q)$
3. $\tan^{-1}(Q/P)$
4. $\tan^{-1}(P-Q)/(P+Q)$

$\vec{P}$, $2\vec{P}$

$\vec{P}+\vec{Q}+\vec{P}-\vec{Q}=2\vec{P}$

Ans : (1)

Question - 13

Let the angle between two non zero vectors $\vec{A}$ and $\vec{B}$ be $120°$ and resultant be $\vec{C}$

1. $|\vec{C}|$ must be equal to $|\vec{A}-\vec{B}|$
2. $|\vec{C}|$ must be less than $|\vec{A}-\vec{B}|$
3. $|\vec{C}|$ must be greater than $|\vec{A}-\vec{B}|$
4. $|\vec{C}|$ may be equal to $|\vec{A}-\vec{B}|$

$$C=\sqrt{A^2+B^2+2AB\cos 120^\circ}$$

Ans : (3)

Question - 14

The sum of the magnitudes of two forces acting at point is 18 and the magnitude of their resultant is 12. If the resultant is at 90° with the force of smaller magnitude, what are the, magnitudes of forces

1. 12,5 (Class Notes)
2. 14,4
3. 5,13
4. 10,8

Ans : (3)

Question - 15

(Class Notes)

The resultant of two vectors A and B is perpendicular to the vector A and its magnitude is equal to half the magnitude of vector B. The angle between A and B is

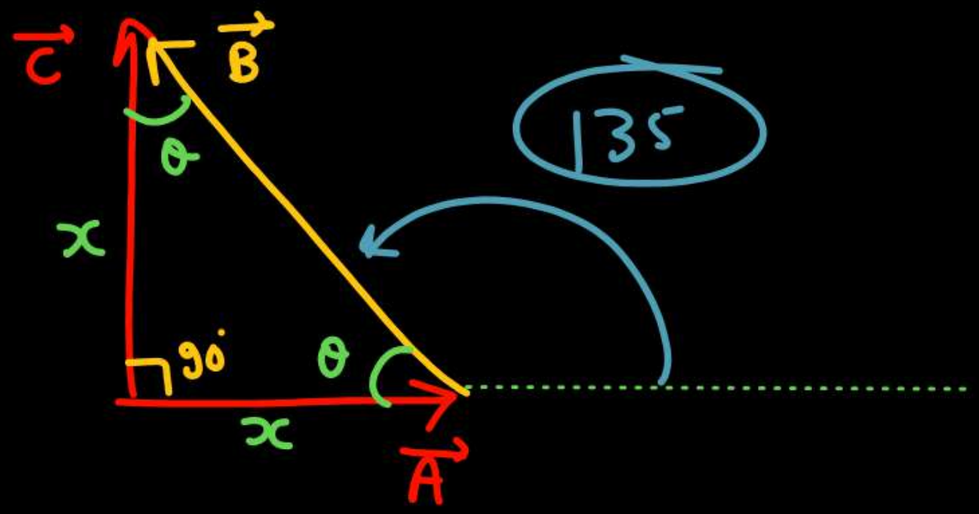
1. 120°
2. 150°
3. 135°
4. None of these

Ans : (2)

Question - 16

Given that $\vec{A} + \vec{B} = \vec{C}$ and that $\vec{C}$ is $\perp$ to $\vec{A}$. Further if $|\vec{A}| = |\vec{C}|$, then what is the angle between $\vec{A}$ and $\vec{B}$

1. $\frac{\pi}{4}$ radian
2. $\frac{\pi}{2}$ radian
3. $\frac{3\pi}{4}$ radian
4. π radian



$\theta + 90 + \theta = 180$

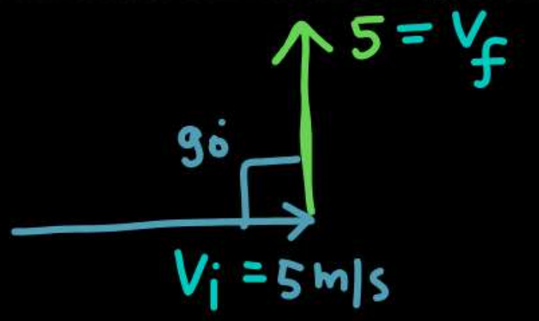
$2\theta = 90$

$\theta = 45$

Ans : (3)

Question - 17

A particle moves towards east with velocity 5 m/s. After 10 seconds its direction changes towards north with same ~~Velocity~~ speed. The average acceleration of the particle is



1. Zero
2. $\frac{1}{\sqrt{2}}$ m/s^2 N − W
3. $\frac{1}{\sqrt{2}}$ m/s^2 N − E
4. $\frac{1}{\sqrt{2}}$ m/s^2 S − W

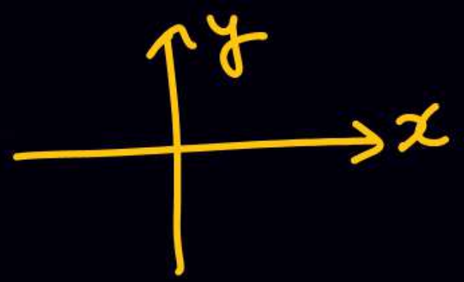
$$\text{Avg Acc} = \frac{\vec{V}_f - \vec{V}_i}{\text{time}}$$

$$\vec{V}_i = 5\hat{i}$$

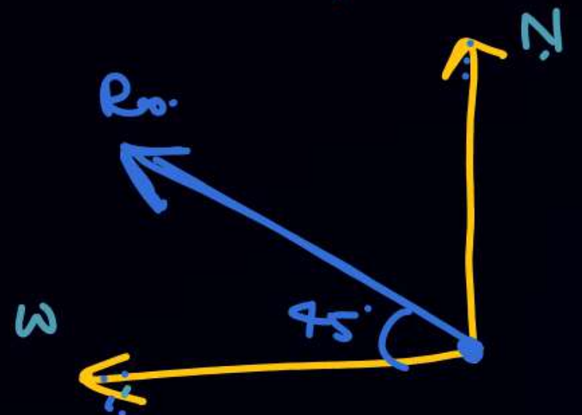
$$\vec{V}_f = 5\hat{j}$$

$$\text{Avg Acc} = \frac{\vec{V}_f - \vec{V}_i}{10} = \frac{5\hat{j} - 5\hat{i}}{10}$$

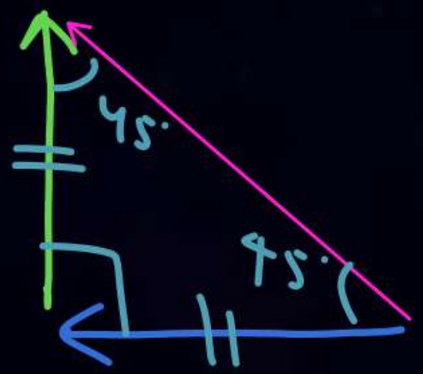
Ans : (2)



$$\text{Avg acc} = \frac{5\hat{j} - 5\hat{i}}{10} = \frac{-5\hat{i} + 5\hat{j}}{10} = \boxed{-\frac{\hat{i}}{2} + \frac{\hat{j}}{2}}$$



$$\sqrt{\left(\frac{1}{2}\right)^2 + \left(\frac{1}{2}\right)^2} = \frac{1}{2}\sqrt{2} = \frac{1}{\sqrt{2}}$$



Question - 18

The $|\vec{A}+\vec{B}| = |\vec{A}| + |\vec{B}|$, then angle between $\vec{A}$ and $\vec{B}$ will be

1. $90°$
2. $120°$
3. $0°$
4. $60°$

$|\vec{A}+\vec{B}| = |\vec{C}| = \sqrt{A^2+B^2+2AB\cos\theta} = A + B$

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

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

$\theta = 0$

$\cos\theta = 1$

$\theta = 0$

Ans : (3)

Question - 19

The maximum and minimum magnitudes of the resultant of two vectors of magnitudes P and Q are in the ratio 3 : 1. Which of the following relations is true?

1. $P = 2Q$
2. $P = Q$
3. $PQ = 1$
4. None of these

$$\frac{P+Q}{P-Q} = \frac{3}{1}$$

$$P+Q = 3P-3Q$$

$$4Q = 2P$$

$$P = 2Q$$

Ans : (1)

Question - 20

Which pair of the following forces will never give resultant force of 2 N?

1. 2 N and 2 N ⇒ [0, 4]
2. 1 N and 1 N = [0, 2]
3. 1 N and 3 N = [2, 4]
4. 1 N and 4 N [3, 5]

Ans : (4)

Question - 21

Two forces, while acting on a particle in opposite directions, have the resultant of 10 N. If they act at right angles to each other, the resultant is found to be 50 N. Find the two forces.

$A - B = 10$

$\sqrt{A^2 + B^2} = 50$

$A^2 + B^2 = 2500$

$A^2 + B^2 - 2AB = 100$

$2500 - 2AB = 100$

$\boxed{AB = 1200}$

$A = \frac{1200}{B}$

$\frac{1200}{B} - B = 10$

$1200 - B^2 = 10B$

$B^2 + 10B - 1200 = 0$

$\boxed{B = 30, -40}$

$B = 30$

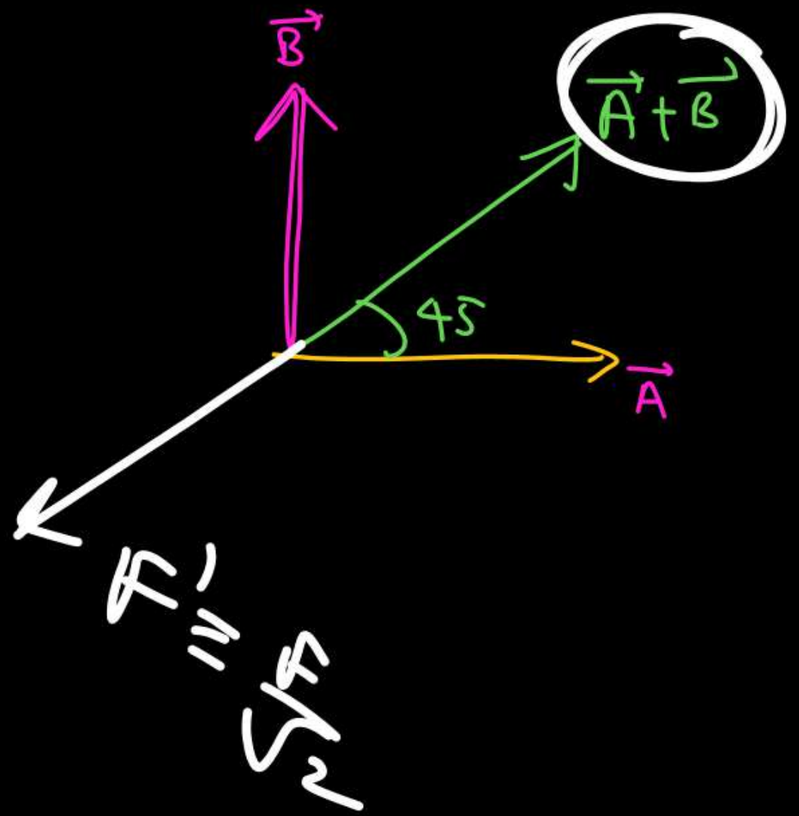
$A = 40$

Ans : (40 N, 30 N)

Question - 22

Two forces each equal to F/2 act at right angle. Their effect may be neutralized by a third force acting along their bisector in the opposite direction. What is the magnitude of that third force?

F_{net} of two forces $= \sqrt{\left(\frac{F}{2}\right)^2 + \left(\frac{F}{2}\right)^2} = \frac{F}{2}\sqrt{2} = \frac{F}{\sqrt{2}}$

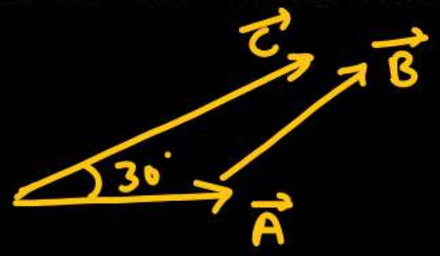


$F/\sqrt{2}$

Ans : (~~F/3~~)

Question - 23

The resultant of two forces has magnitude 20 N. One of the forces is of magnitude $20\sqrt{3}$ N and makes an angle of 30° with the resultant. Then what is the magnitude of the other force?



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

$$|\vec{C}| = 20 = C$$

$$|\vec{A}| = 20\sqrt{3} = A$$

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

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

$$B = \sqrt{C^2 + A^2 - 2AC\cos\theta}$$

$$= \sqrt{(20)^2 + (20\sqrt{3})^2 - 2 \times 20\sqrt{3} \times 20 \cos 30^\circ}$$

$$= \sqrt{400 + 1200 - \frac{800\sqrt{3}\sqrt{3}}{2}}$$

$$= \underline{\underline{20}}$$

Ans : (20 N)

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

$\vec{A}$ और $\vec{C}$ के बीच Angle θ है

$\theta = 30^\circ$

$B = \sqrt{A^2 + C^2 - 2AC\cos\theta}$

Question - 24

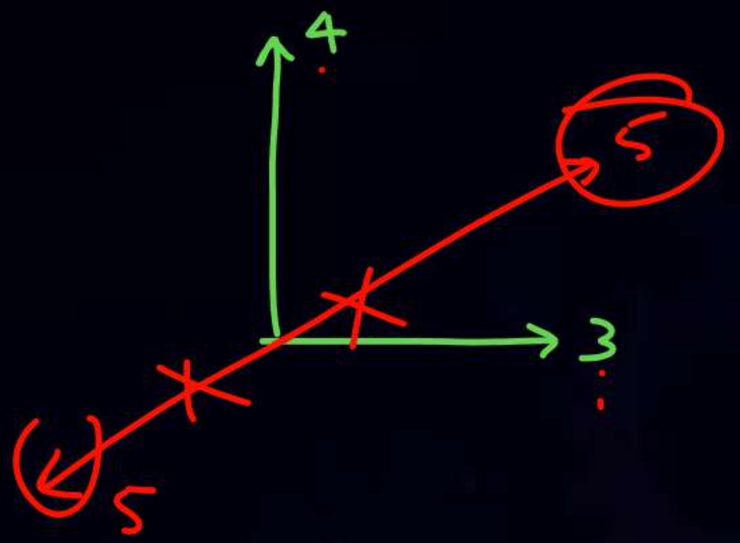
Out of the following set of forces, the resultant of which cannot be zero?

1. 10, 10, 10 → [0, 20] → can be zero
2. 10, 10, 20 → can be zero
3. 10, 20, 20 → [10, 30]
4. 10, 20, 40 → (10, 30)

Ans : (4)

(3, 4, 5)

[1, 7]



Question - 25

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

1. $|\vec{b}|$
2. $2|\vec{b}|$
3. $3|\vec{b}|$
4. $4|\vec{b}|$

$$\frac{A+B}{A-B} = \frac{3}{1}$$

$$3A - 3B = A + B$$

$$2A = 4B$$

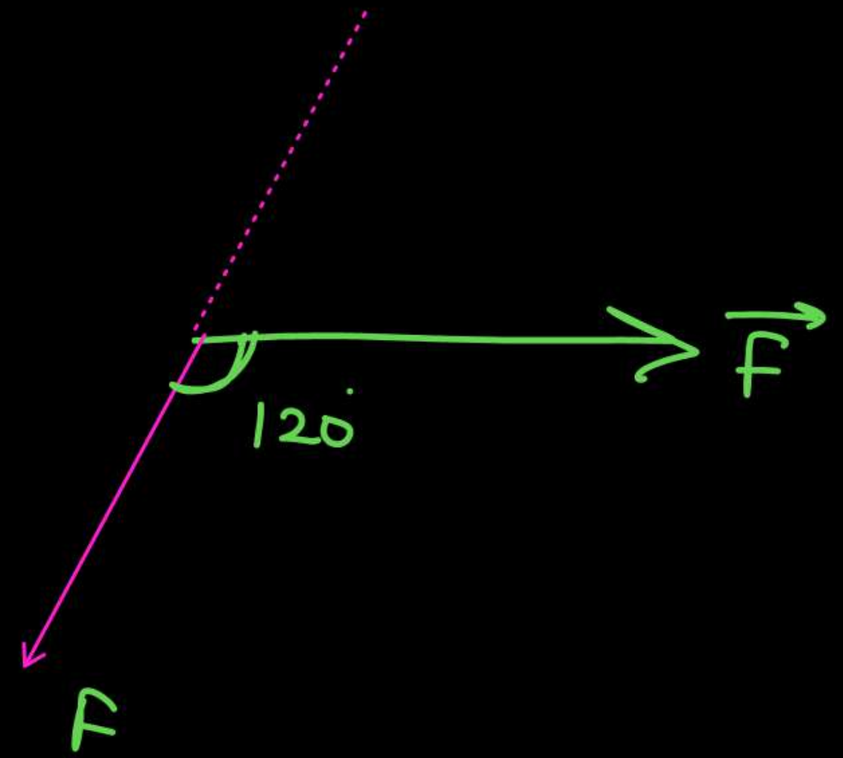
$$A = 2B$$

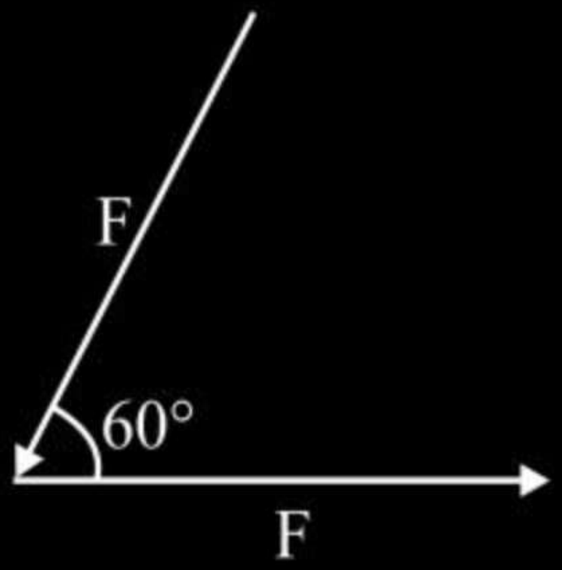
Ans : (2)

Question - 26

Two forces, each equal to F, act as shown in figure. Their resultant is

1. F/2
2. F
3. $\sqrt{3}F$
4. $\sqrt{5}F$

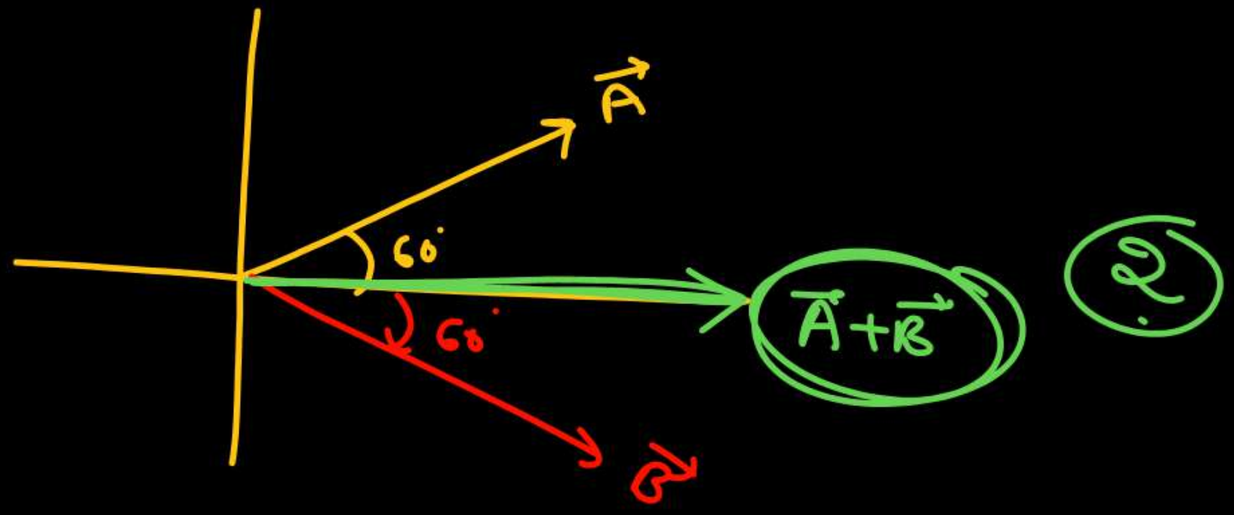




Ans : (2)

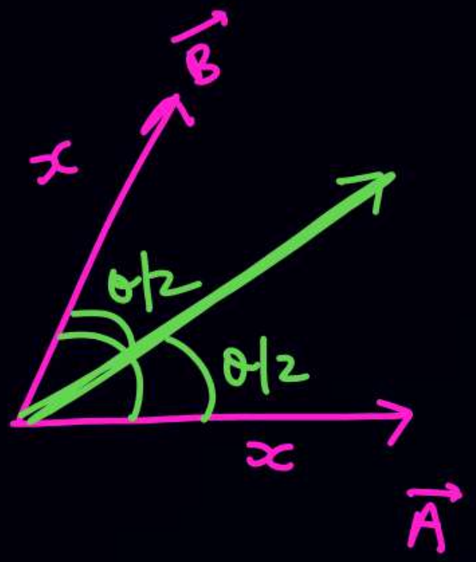
Question - 27

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



1. 2 cm along positive y-axis
2. 2 cm along positive x-axis
3. 2 cm along negative y-axis
4. 2 cm along negative x-axis.

Ans : (2)


B
x
θ/2
θ/2
x
A

Question - 28

What is the angle between two vector forces of equal magnitude such that their resultant is one-third of either of the original forces?

1. $\cos^{-1}\left(-\frac{17}{18}\right)$
2. $\cos^{-1}\left(-\frac{1}{3}\right)$
3. $45°$
4. $120°$

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

$$\left(\frac{x}{3}\right)^2 = x^2 + x^2 + 2x \times x\cos\theta$$

$$\frac{1}{9} = 1 + 1 + 2\cos\theta$$

$$\frac{1}{9} - 2 = 2\cos\theta$$

$$\frac{-17}{18} = \cos\theta$$

Ans : (1)

Question - 29

Mark the correct statement.

$C > A+B$

1. $|\vec{a}+\vec{b}| \geq |\vec{a}| + |\vec{b}|$
2. $|\vec{a}+\vec{b}| \leq |\vec{a}| + |\vec{b}|$
3. $|\vec{a}-\vec{b}| \geq |\vec{a}| + |\vec{b}|$
4. All of the above

$\vec{A}+\vec{B}=\vec{C}$ $\quad |\vec{a}|=a$

$|\vec{C}|=C$ $\quad |\vec{A}|=A$

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

Ans : (2)

$\vec{A} - \vec{B} = \vec{C}$, (let)

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

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

$C \leq P + Q$

$C \leq A + B$.

$\vec{A} = 10\hat{i}$

$\vec{B} = -6\hat{i}$

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

$\vec{A} + \vec{B} = (4)\hat{i}$

$\vec{A} - \vec{B} = (16)\hat{i}$

$4 \leq C \leq 16$

$C > 10 + 6$

$C > 16$

$\vec{A}+\vec{B}=\vec{C}$ $\quad |A-B| \leq C \leq (A+B)$

$\vec{A}-\vec{B}=\vec{C}$ $\quad |A-B| \leq C \leq (A+B)$

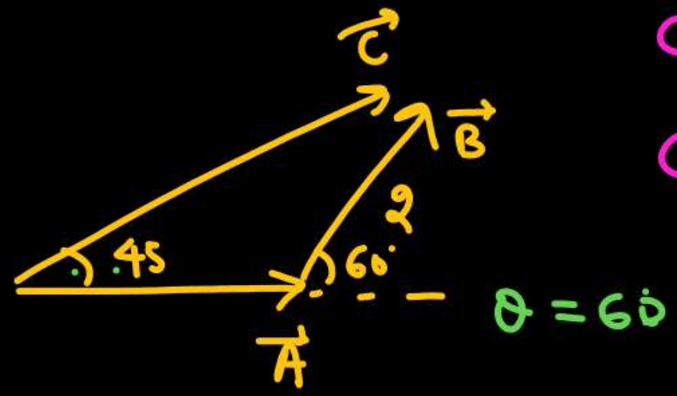
Question - 30

$A+1=\sqrt{3}$

$A=\sqrt{3}-1$

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

1. $\sqrt{3}$
2. $\sqrt{3}-1$
3. $\sqrt{3}+1$
4. $\sqrt{3}/2$



$C^2 = A^2 + 2^2 + 2 \times A \times 2 \cos 60$

$C^2 = A^2 + 4 + 2A$

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

$\tan 45 = \frac{2\sqrt{3}/2}{A + 2 \times \frac{1}{2}}$

$1 = \frac{\sqrt{3}}{A+1}$

Ans : (2)

thankyou