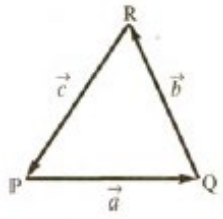
11. (2)
Let $\overrightarrow{PQ}$ and $\overrightarrow{QR}$ represents $\vec{a}$ and $\vec{b}$ in the same order, then according to triangle law of vector addition, the resultant of $\vec{a}$ and $\vec{b}$ is represented by $\overrightarrow{PR}$ i.e. $\overrightarrow{PR} = \vec{a} + \vec{b}$
Since $\overrightarrow{PR} = -\overrightarrow{RP} = -\vec{c} \therefore -\vec{c} = \vec{a} + \vec{b}$ or $\vec{a} + \vec{b} + \vec{c} = 0$



12. (3)
Let θ be the angle between $\vec{A}$ and $\vec{B}$.

$$\therefore \cos\theta = \frac{\vec{A} \cdot \vec{B}}{|\vec{A}\| \vec{B}|}$$

$$= \frac{(5\hat{i} - 5\hat{j}) \cdot (5\hat{i} - 5\hat{j})}{\sqrt{(5)^2 + (-5)^2}\sqrt{(5)^2 + (-5)^2}}$$

$$= \frac{50}{\sqrt{50}\sqrt{50}} = 1$$

or $\theta = \cos^{-1}(1) = 0°$

13. (4)
The vector product of two non-zero vectors is zero if they are in the same direction or in the opposite direction. Hence vector $\vec{B}$ must be parallel or antiparallel to vector $\vec{A}$, i.e. along $\pm z$ -axis.

14. (1)

$$\vec{A} - \vec{B} = 2\hat{i} + 2\hat{j} + 2\hat{k} = 2\vec{A}$$

ie., $\vec{A} - \vec{B}$ and $\vec{A}$ are parallel

15. (1)
When a vector is displaced parallel to itself, neither its magnitude nor its direction changes.

16. (4)
$\vec{A} = 4$ units due east;$\therefore -4\vec{A} = -16$
The magnitude of a vector $-4\vec{A}$ is 16 units and its direction is due west.

17. (2)
Given : $\vec{A} = 2\hat{i} + 3\hat{j}$
Let θ be the angle that vector $\vec{A}$ makes with y -axis.

$$\therefore cos\theta = \frac{(2\hat{i} + 3\hat{j}) \cdot \hat{j}}{\sqrt{2^2 + 3^2}} = \frac{3}{\sqrt{13}}$$

$tan\theta = \frac{2}{3}$ or $\theta = tan^{-1}\left(\frac{2}{3}\right)$

18. (1)
Multiplying a vector A with a negative number λ gives a vector whose magnitude is changed by the factor λ but direction is reversed.

19. (4)
Among the given physical quantities impulse is a vector quantity whereas all others are scalar quantities.

20. (1)
Here, v = 80 km h^{-1} Let v_x = 40 km h^{-1}, v_y =? We know $v^2 = v_x^2 + v_y^2$

$$v_y^2 = v^2 - v_x^2 = 80^2 - 40^2$$

$$= 6400 - 1600 = 4800$$

$v_y = \sqrt{4800}$ = 69.28 unit .

NEET 220 Medical Seats out of 240