Exercise

Vector

(Physicsaholics)

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Exercise-2

(Objective Type: Multi Correct)

Q 1. The two vectors $\vec{A}$ and $\vec{B}$ are drawn from a common point and $\vec{C} = \vec{A} + \vec{B}$, then angle between $\vec{A}$ and $\vec{B}$ is :

(A) 90° if $C^2 = A^2 + B^2$ (B) greater than 90° if $C^2 < A^2+B^2$

(C) greater than 90° if $C^2 > A^2 + B^2$ (D) less than 90° if $C^2 > A^2 + B^2$

Q 2. $\vec{A} + \vec{B} = \vec{C}$ Vectors A and B if rotated by θ in the same sense to from $\vec{A}'$ and $\vec{B}'$ then

(A) $\vec{A}'+\vec{B}' = \vec{C}$ (B) $\vec{A}'+\vec{B}' \neq \vec{C}$ (C) $\vec{A}'.\vec{B}' = \vec{A}.\vec{B}$ (D) $|\vec{A}'+\vec{B}'| = |\vec{C}|$

Q 3. If $\vec{a}$ and $\vec{b}$ are two vectors with $|\vec{a}| = |\vec{b}|$ and $|\vec{a}+\vec{b}| + |\vec{a}-\vec{b}| = 2|\vec{a}|$, then angle between $\vec{a}$ and $\vec{b}$ –

(A) 0º (B) 90º (C) 60º (D) 180º

Q 4. Vector $\vec{R}$ is the resultant of the vectors $\vec{A}$ and $\vec{B}$. Ratio of maximum value of $|\vec{R}|$ to the minimum value of $|\vec{R}|$ is $\frac{3}{1}$. The $\frac{|\vec{A}|}{|\vec{B}|}$ may be equal to -

(A) $\frac{2}{1}$ (B) $\frac{1}{2}$ (C) $\frac{4}{1}$ (D) $\frac{3}{1}$

Q 5. Regarding vectors, which of the following is a correct statement?

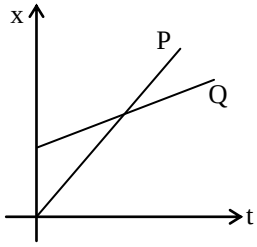
(A) Two equal vectors can never give zero resultant

(B) Three non-coplanar vectors can not give zero resultant

(C) If $\vec{a}.(\vec{b}\times\vec{c})=0$ and $|\vec{a}| \neq |\vec{b}| \neq |\vec{c}|$, then $\vec{a}+\vec{b}+\vec{c}$ can never be a null vector

(D) If $\vec{a}\times\vec{b}=0$ and $|\vec{a}| = |\vec{b}|$, then $\vec{a}+\vec{b}$ can be zero

Q 6. Two bodies P and Q are moving along positive x-axis their position-time graph is shown below if $\vec{V}_{PQ}$ is velocity of P w.r.t Q and $\vec{V}_{QP}$ is velocity of Q w.r.t P then –



(A) $|\vec{V}_{PQ}| = |\vec{V}_{QP}|$ = constant

(B) $\vec{V}_{PQ}$ is towards origin

(C) $\vec{V}_{QP}$ is towards origin

(D) $\vec{V}_{PQ}$ and $\vec{V}_{QP}$ both can be towards origin at same time

Q 7. Given, $\vec{a}+\vec{b}+\vec{c}+\vec{d}=0$. Which of the following statement(s) is (are) correct)?

(A) $\vec{a},\vec{b},\vec{c}$ *and* $\vec{d}$ must each be a null vector

(B) The magnitude of $\vec{a}+\vec{c}$ equals the magnitude of $\vec{b}+\vec{d}$

(C) The magnitude of $\vec{a}$ can never be greater than the sum of the magnitudes of $\vec{b},\vec{c}$ *and* $\vec{d}$

(D) $\vec{b}+\vec{c}$ must lie in the plane of $\vec{a}$ and $\vec{d}$ if $\vec{a}$ and $\vec{d}$, are not collinear and in the line of $\vec{a}$ and $\vec{d}$, if they are collinear

Q 8. Two vectors of magnitude 5 unit and 8 unit are added, sum may have magnitude –

(A) 5 unit (B) 8 unit (C) 2 unit (D) 14 unit

Q 9. If $\vec{P} = 5a\hat{i} + 6\hat{j}$ and $\vec{Q} = 3a\hat{i} + 10\hat{j}$. The vectors $\vec{P} + \vec{Q}$ makes an angle α with $\vec{P}$ and β with $\vec{Q}$ then –

(A) $\alpha = \beta$ if a = 2 (B) $\alpha > \beta$ if a > 2 (C) $\alpha < \beta$ if a > 2 (D) $\alpha > \beta$ if a = 0

Q 10. The resultant of three forces of magnitude (P – Q), P and (P + Q) acting at a point in directions parallel to the sides of equilateral triangle, taken in order is $\vec{R}$, then -

(A) $|\vec{R}| = \sqrt{3}Q$ (B) $|\vec{R}| = \frac{Q}{\sqrt{3}}$

(C) $\vec{R}$ is perpendicular to $\vec{P}$ (D) $\vec{R}$ is parallel to $\vec{P}$

Q 11. Select the correct statements -

(A) The sum of two vectors may be zero

(B) Two vectors are said to be equal if they have same direction and same magnitude

(C) The sum of two vectors may not be zero

(D) None of these

Q 12. Select the correct statements -

(A) A null vector is vector whose magnitude is zero

(B) A vector has never zero magnitude

(C) A null vector does not exist

(D) none of these

Q 13. Select the correct statements -

(A) Multiplying any vector by an scalar is a meaningful operation

(B) A vector has both magnitude and direction

(C) Acceleration is a vector quantity

(D) None of these

Q 14. If $\vec{A} = 2\hat{i} + \hat{j} + \hat{k}$ and $\vec{B} = \hat{i} + \hat{j} + \hat{k}$ are two vectors, then the unit vector-

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

(B) parallel to $\vec{A}$ is $\frac{(2\hat{i}+\hat{j}+\hat{k})}{\sqrt{6}}$

(C) perpendicular to $\vec{B}$ is $\left(\frac{-\hat{j}+\hat{k}}{\sqrt{2}}\right)$

(D) parallel to $\vec{A}$ is $\frac{\hat{i}+\hat{j}+\hat{k}}{\sqrt{3}}$

Q 15. Let three vectors $\vec{a}$, $\vec{b}$ and $\vec{c}$ are related as $\vec{a} + \vec{b} = \vec{c}$. The angle between $\vec{a}$ and $\vec{b}$ is θ Select the correct alternative

(A) Angle$|\vec{a}| > |b|$ between $\vec{c}$ and $\vec{b}$ is greater than $\frac{\theta}{2}$ if

(B) $|\vec{a}| > |\vec{b}|$Angle between is $\vec{c}$ and $\vec{a}$ greater than if $\frac{\theta}{2}$

(C) Angle between $\vec{c}$ and $\vec{b}$ can be$\pi-\theta$, for some values of$\vec{a}$, $\vec{b}$

(D) Angle between $\vec{c}$ and $\vec{b}$ can not be$\pi-\theta$, for any values of$\vec{a}$, $\vec{b}$

Answer Key

Q.1) ABD	Q.2) BCD	Q.3) AD	Q.4) AB	Q.5) ABD
Q.6) AC	Q.7) BCD	Q.8) AB	Q.9) AC	Q.10) AC
Q.11) ABC	Q.12) A	Q.13) ABC	Q.14) BD	Q.15) ABC