

Answer on Question 51824, Physics, Mechanics | Kinematics | Dynamics

Question:

Which of the following quantities is an example of a vector or cross product?

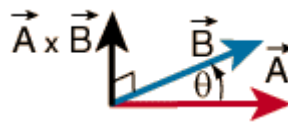
- a) Momentum
- b) Work
- c) Density
- d) Torque

Answer:

By the definition, the magnitude of the vector product (or cross product) of two vectors can be constructed by taking the product of the magnitudes of the vector times the sine of the angle ($< 180^\circ$) between them. The magnitude of the vector product can be expressed in the form:

$$\vec{A} \times \vec{B} = AB \sin \theta.$$

$\vec{A} \times \vec{B}$ is perpendicular to both A and B and the direction is given by the right-hand rule:



Torque (or moment of force) is example of the cross product of the lever-arm distance vector and the force vector, which tends to produce rotation:

$$\tau = \vec{r} \times \vec{F} = rF \sin \theta$$



So, the correct answer is **d) torque**.