PRACTICE QUESTIONS

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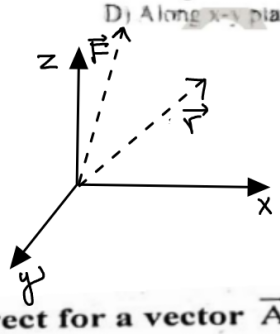
Q1

If the position vector r and Force F lies in x–z plane. Then direction of torque is

(A) Along y-axis
B) Along z-axis
C) Along x-axis
D) Along x-y plane

$\vec{\tau} = \vec{r} \times \vec{F}$



Q2

Which one is not correct for a vector $\vec{A} = \sqrt{2}\hat{i} + \sqrt{2}\hat{j}$

(a) has direction θ=45° with x-axis ✗
(b) has magnitude 2 ✗
(c) has magnitude 2 and direction θ=45° with y-axis
(d) has magnitude –2

$\tan^{-1}\left(\frac{y}{x}\right) = \tan^{-1}(1) = 45 = \theta$.

$(\sqrt{2})^2 + (\sqrt{2})^2 = 4$

$\sqrt{4} = |\vec{A}| = 2$

Q3

The cross product of two vectors is zero when

(a) they are parallel vectors

(b) they are anti parallel vectors

(c) they are perpendicular vector

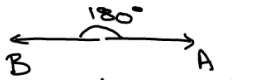
(d) both a and b are correct

$$\vec{A} \times \vec{B} = AB \sin\theta \, \hat{n}$$

$\sin\theta = 0 \Rightarrow \vec{A} \times \vec{B} = 0$

$\theta = 0^\circ, 180^\circ$

Parallel.



Anti parallel.

Q4

Which of the following can't rotate

A) $r_1 = 0$, $r_2 = 0$, $\tau = 0$

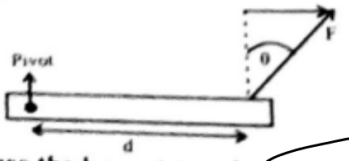
B) $\tau \neq 0$

C) $r \times F = 0$, $\vec{r} = 0$, $r \times F = \tau \neq 0$

D) $\tau \neq 0$

Q5

A force F is applied to a beam at a distance "d" from pivot. The force at an angle line perpendicular to the beam.



$\vec{\tau}$

Which combination will be cause the largest turning effect about the pivot.

	F	d	θ
A)	Large	Large	Large
B)	Large	Large	Small
C)	Small	Small	Large
D)	small	Large	Small

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

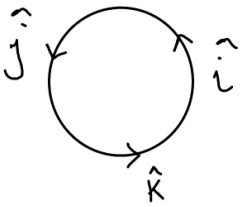
θ is small.

Q6

The value of $\hat{i} \bullet (\hat{j} \times \hat{k})$

(a) 0
(b) 3
(c) +1
(d) -1

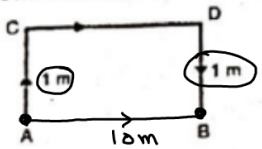
$\hat{i} \cdot (\hat{i}) = 1$



$\hat{j} \times \hat{k} = \hat{i}$

Q7

A man walks from A to C , C to D and D to B (as shown in figure). The magnitude of displacement of man is 10 m. The total distance travelled by the man is :



$\overline{CD} = 10\,m$

↑ +ve
↓ -ve
→ +ve

$+1 + 10\,m - 1$

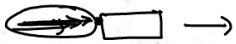
$d = 10\,m.$

(a) 10m
(b) 12m
(c) 7m
(d) 2m

Q8

For a body to be in equilibrium under the combined action of several forces:

(a) all the forces must be applied at the same point ✗



(b) all of the forces form pairs of equal and opposite forces ✗
(c) any two of these forces must be balanced by a third force ✗
(d) the sum of the components of all the forces in any direction must equal zero ✓

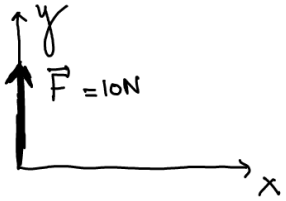
$\Sigma F_x = 0 = \Sigma F_y$

Q9

Torque acting on a body determines

(a) acceleration ✗
(b) linear acceleration ✗
(c) angular acceleration
(d) direction of motion of the body

Q10

A force of 10N is acting along y-axis. Its component along x-axis is

(a) zero ✓
(b) 10N
(c) 100N
(d) 5N