

## RACE # 07

PHYSICS

- 1. A man moves in an open field such that after moving 10 m in a straight line, he makes a sharp turn of 60° to his left. The total displacement of the man just after 7 such turns is (A) 10 m (B) 20 m (C) 70 m (D) 30 m
- A particle passes a point at the instant t = 0 s, moving with uniform velocity  $2\sqrt{3}$  m/s in the north 2. direction. It turns towards east at the instant t = 8 s and moves with uniform velocity 6 m/s. Direction of change in its velocity vector is (A)  $30^{\circ}$  east of north (B)  $60^{\circ}$  south of east (C)  $60^{\circ}$  east of north (D)  $30^{\circ}$  south of east
- 3. Which of the following sets of forces can not give zero resultant force : (A) 1 N, 1 N, 1 N (B) 2 N, 3 N, 4 N (C) 2 N, 3 N, 5 N (D) 2 N, 3 N, 6 N
- 4. For shown situation, what will be the magnitude of minimum force in newton that can be applied in any direction so that the resultant force is along east direction?



(D) none of these

Mark the **INCORRECT** option(s) : 5.

(A) 15

(A) If  $\vec{d} - \vec{e} = \vec{f}$  and  $\vec{f} = d + e$  then  $\vec{d}$  and  $\vec{e}$  are opposite in direction.

(B) 6

(B) If  $\vec{d} + \vec{e} = \vec{f}$  and  $f = \sqrt{2} d$ ; d = e then  $\vec{d}$  and  $\vec{e}$  are perpendicular.

(C) If  $\vec{d} - \vec{e} = \vec{f}$  and  $\vec{f} = d + e$  then  $\vec{d}$  and  $\vec{e}$  are in the same direction.

(D) If  $\vec{d} + \vec{e} = \vec{f}$  and  $f = \sqrt{2} d$ ; d = e then  $\vec{d}$  and  $\vec{e}$  are in opposite direction.

- Four pairs of force vectors are given, which pairs of force vectors cannot be added to give a resultant 6. vector of magnitude 10 N? (D) 100N, 105 N
  - (A) 2N, 13 N (C) 7N. 8N (B) 5N, 16 N
- 7. The resultant vector of the two vectors (having angle  $\theta$  between them) of equal magnitude is at an angle  $\alpha$  from either vector. Then :

(A) 
$$\alpha = \tan^{-1}\left(\frac{\theta}{2}\right)$$
 (B)  $\alpha = \frac{\theta}{2}$   
(C)  $\alpha = \tan^{-1}\left(\tan\frac{\theta}{2}\right)$  (D)  $\alpha$  is any possible value between 0° to  $\theta$ 

- 8. A vector **a** of magnitude 8 units has two components. One is perpendicular to **a** and is of magnitude 6 units. What is the magnitude of the other component? [Hint: They are 'components' not 'rectangular component']
- A force  $\vec{F}$  of magnitude 12 N has non-rectangular components  $\vec{P}$  and  $\vec{O}$ . The sum of the magnitudes 9.

of  $\vec{P}$  and  $\vec{Q}$  is 18 N. The direction of  $\vec{Q}$  is at right angles to  $\vec{F}$ . Find the magnitude of  $\vec{Q}$ .

N_Race # 07			ANSWER KEY
1. Ans. (A)	2. Ans. (D)	3. Ans. (D)	4. Ans. (B)
5. Ans. (C,D)	6. Ans. (A,B)	<b>7. Ans. (B,C)</b>	<b>8. Ans.</b> 10 units
9. Ans. 5 N			