

## Phys11 Vectors : W.S.-30

- 1) Define : Vector -
- 2) Give three examples of physical quantities that are vectors.
- 3) Given :  $\mathbf{A} = [3.00, 5.00]$ ,  $\mathbf{B} = [6.00, -2.00]$ ,  $\mathbf{C} = [-10.00, -7.00]$ .
  - a)  $\mathbf{A} + \mathbf{B} = \underline{\hspace{2cm}}$
  - b)  $\mathbf{A} + \mathbf{B} - \mathbf{C} = \underline{\hspace{2cm}}$
  - c)  $-\mathbf{B} = \underline{\hspace{2cm}}$
  - d)  $\mathbf{B} - \mathbf{C} = \underline{\hspace{2cm}}$
  - e) The magnitude of  $\mathbf{C} = \underline{\hspace{2cm}}$
- 4) A plane flies [West] at 85 km/hr. A boy on the plane throws a ball with a velocity of 60. km/hr [East]. Find the velocity of the ball relative to the ground.
- 5) A plane heads North (Airspeed = 150. km/hr). A wind blows toward the West at 25.0 km/hr. Find the pilot's ground speed and his heading relative to the ground, (track).

(Important note : The **heading** is the compass direction. The **track** is the direction (heading) relative to the ground. An aircraft's speed relative to the surrounding air is called the **airspeed**. The aircraft's speed relative to the ground is called the **ground speed**).
- 6) In question 5, if the pilot wishes to really fly North, what should his heading be ?  $\underline{\hspace{2cm}}$  . Find the ground speed.  $\underline{\hspace{2cm}}$
- 7) Find the total displacement of; 4 blocks [ N ] + 8 blocks [ E ] + 3 blocks [ S ] .  $\underline{\hspace{2cm}}$
- 8) If  $\mathbf{A} = 15 [ 30.^{\circ} \text{ N of W } ]$  and  $\mathbf{B} = 20. [ 45^{\circ} \text{ E of N } ]$  , find  $\mathbf{C} = \mathbf{A} + \mathbf{B}$ .  
 $\mathbf{C} = \underline{\hspace{2cm}} [ \underline{\hspace{2cm}}^{\circ} \underline{\hspace{2cm}} \text{ of } \underline{\hspace{2cm}} ]$

Answers : 1) It is a magnitude and a direction. 2) displacement, velocity, acceleration, ... 3)a) [9.00, 3.00], b) [19.00, 10.00], c) [-6.00, 2.00], d) [16.00, 5.00], e) 12.2, 4) 25 km/hr [west], 5) ground speed = 152 km/hr, track =  $9.46^\circ$  W of N, 6)  $9.59^\circ$  E of N, 148 km/hr, 7) 8 blocks [East] + 1 block [North], or 8.1 blocks  $7.1^\circ$  N of E. 8)  $22^\circ$  [87° N of E].