CHAPTER 2 PRACTICE PASSAGE

An airplane is susceptible to substantial deflection off course due to wind. A pilot calls the engines' contribution the *airspeed*. This motion relative to the air, combined with the wind velocity, results in the *ground speed*, or velocity relative to fixed terrestrial objects.

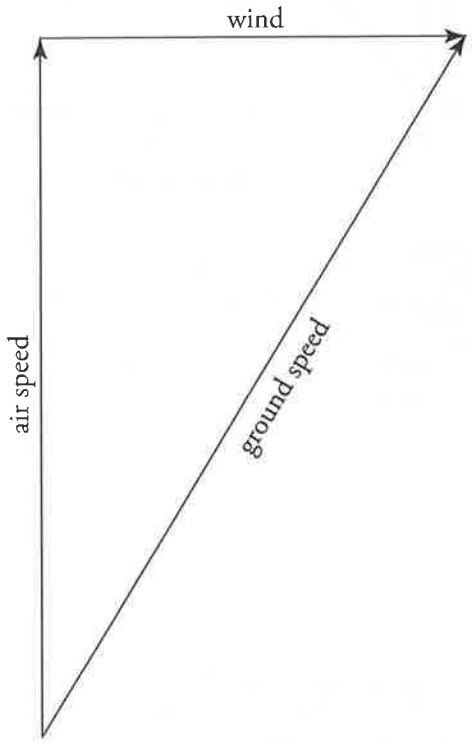


Figure 1

When a parachutist typically leaves an airplane, it is not so much a jump as a drop. He steps out of a door or lets go of a strut under the wing, not giving him any significant velocity relative to the airplane. He becomes subject to gravity without the lift of the wings. Air resistance allows the plane to get ahead of him. If we neglect this drag effect, then the parachutist's constant horizontal velocity and constant vertical acceleration gives him a trajectory resembling half of an inverted parabola. This is a reasonable assumption for the freefall before the parachute is engaged.

1. A pilot wanting to travel northeast in a wind blowing from the West at a speed similar to her airspeed should direct her airplane in which direction?

A) North
B) South
C) East
D) West

2. If an airplane has airspeed of 100 km/hr southwest but is travelling 140 km/hr south relative to the ground, what is the wind velocity?

A) 40 km/hr to the East
B) 100 km/hr to the Southeast
C) 100 km/hr to the East
D) 170 km/hr to the Southeast

3. An airplane capable of 100 km/hr airspeed is 60 km off the coast above the sea. If the wind is blowing from the coast out to sea at 40 km/hr, what is the least time it will take for the plane to get to shore?

A) 26 minutes
B) 36 minutes
C) 60 minutes
D) 100 minutes

4. Neglecting air resistance, if a parachutist drops from an airplane when it is flying horizontally at 100 m/s to the West at an altitude of 1 km, and the parachute never engages, what will be his final horizontal velocity?

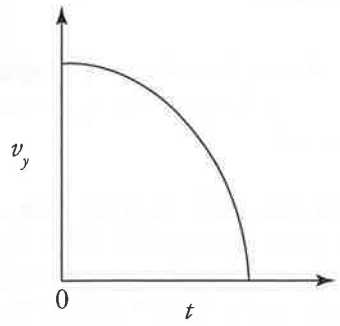
A) 0 m/s
B) 100 m/s to the West
C) 40 m/s to the West
D) 170 m/s to the West

5. Neglecting air resistance, what is the total velocity of a parachutist just before engaging his parachute, 8 s after dropping from an airplane flying horizontally at 60 m/s?

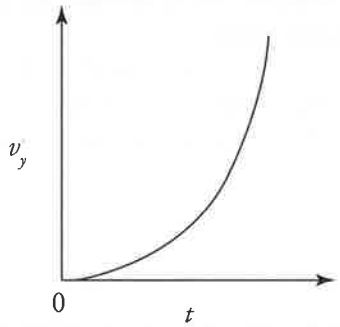
A) 60 m/s
B) 80 m/s
C) 100 m/s
D) 140 m/s

6. Which graph correctly represents the vertical speed of a falling object with respect to time?

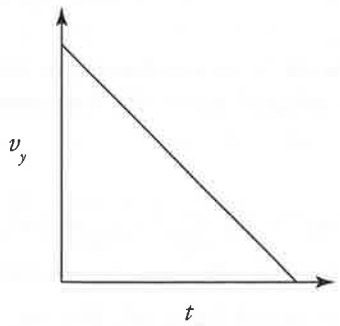
A)



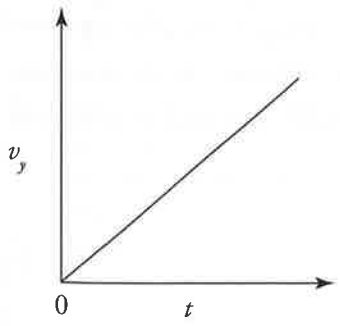
B)



C)



D)



7. Relative to the typical dropping parachutist, one who thrusts himself downward on exiting the airplane will have:

A) lower acceleration but the same velocity just before engaging his parachute.
B) the same acceleration and the same velocity just before engaging his parachute.
C) the same acceleration but greater velocity just before engaging his parachute.
D) greater acceleration and greater velocity just before engaging his parachute.