Old-Exam-Questions-Ch.-4

T072:

Q9. A projectile is fired over a flat horizontal land. It takes 10 s to reach its range of 100 m. What is the speed of the projectile at the highest point of its trajectory?(Ans: 10 m/s.)

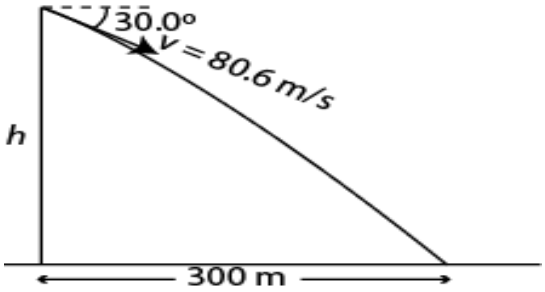
Q10. A particle is moving counterclockwise in *x-y* plane in a uniform circular motion. The circle is centered at the origin and has a radius of 2.0 m. When the velocity of the particle is $\left(4.0\,\hat{i}\right)$ m/s, then its acceleration is (Ans: $\left(+8.0\,\hat{j}\right) m/s^2$)

Q11. A river is flowing 0.20 m/s east. A boat in this river has a speed of 0.40 m/s directed 60° south of east relative to the earth. Find the velocity of the boat relative to the river.(Ans: 0.35 m/s, south)

Q12. A particle has its position vector defined by $\vec{r} = \left[\left(2.0t - t^2\right)i + \left(3.0t - 1.5t^2\right)j\right]$ m. At what time is its speed equal to zero? (Ans: 1.0 s)

T071:

Q10. A certain airplane has a speed of 80.6 m/s and is diving at an angle of 30.0° below the horizontal when it releases an object. The horizontal distance from the point of release was 300. m as shown in Fig.4. How high was the point of release of the object? (Ans: 264 m)



Q12. Ship *A* travels 40 km/h in a direction of 30° West of North and ship *B* travels 60° East of North at 30 km/h. What is the magnitude of the velocity of ship *A* relative to ship *B*?(Ans: 50 km/h)

T062:

Q10. The position of a particle is given as $r = (4.00t - t^2)i + t^3 j$ where *r* is in meters and *t* is in seconds. The particle's acceleration at $t = 0$ *s* is: (Ans: $-2.0i$ *m/s*)

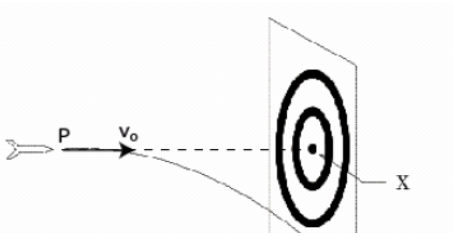
Q11.: A projectile is fired horizontally at a speed of 15 *m/s* from the top of a tower. It lands on the ground at a horizontal distance of 45 *m*. The height of the tower is: (A: 44 *m)*

Q13.: Two boats *A* and *B* leave seaport at the same time. Boat *A* travels at a speed of 10.0 *m/s* in the +*x* direction and boat *B* heads at an angle of 60.0º with the *x*-axis at a speed of 10.0 *m/s*. The velocity of *A* relative to *B* is (Ans: (5.00***i***-8.66 ***j***)m/s)

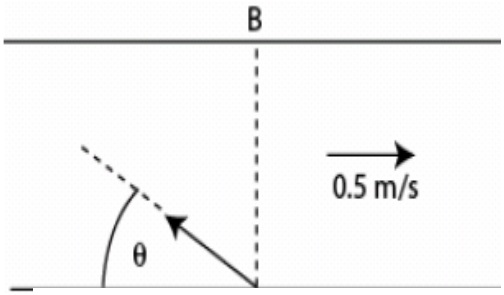
T061

Q9. A train traveling north at 20 m/s turns and then travels south at 20 m/s. The change in its velocity is: (Ans: 40 m/s south)

Q10: An arrow is shot horizontally from a point *P* toward *X* as shown in Fig 2, T061. It hits at a point *Y*, 0.20 s later. If the speed of the arrow at *P* is v_o = 11 m/s, the distance *PX* is: (Ans: 2.2 m)

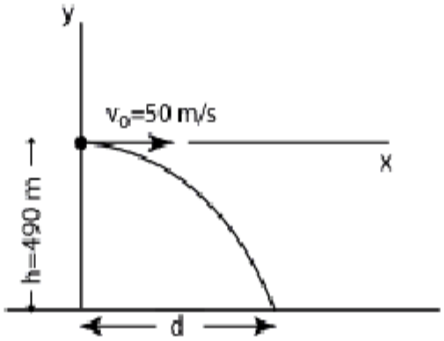


Q11. A boy wishes to swim across a river from *A* to *B*. He can swim at 1.0 m/s in still water and the river is flowing at 0.50 m/s (Fig 3, T061). At what angle θ should he be heading?
(Ans: 60°)



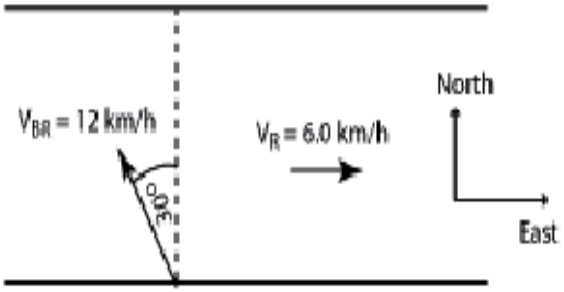
T052

Q9. The plane shown in Fig 2, is in a level flight at a height of 490 m and a speed of 50 m/s when a package was released. The horizontal distance between the release point and the point where the package strikes the ground is: (Ans: 500 m)



Q10. An object moves with a constant acceleration a= -8.0 *i*+ 7.0 *j* m/s$^{2.}$ At t=0 the velocity *vo* is 4*0i* m/s. The velocity at time t = 5.0 s is: (Ans: 35 / *j ms*

Q12. Fig 3 shows a boat is sailing at 12 km/h 30° W of N relative to a river that is flowing East (E) at 6.0 km/h relative to ground. As observed from the ground, the boat is sailing: (A: due N)



Q13. A 5.0-kg mass is suspended by a string from the ceiling of an elevator that is moving downward with constant acceleration of 2.8 m/s 2 . The tension in the string is: (Ans: 35 N)

T051

Q9. A ball is thrown with a velocity v_0= 3.0 i + 5.0 j m/s from the ground. Its velocity just before it strikes the ground is: (Ans: v = 3.0 i - 5.0 j m/s)

Q10. A ball is kicked from the ground with an initial speed of 20 m/s at an angle of 45°. A player 60 m away starts running to catch the ball at that instant (see Fig 2). What must be his average speed (v) if he has to catch the ball just before it hits the ground? (Ans: 6.6 m/s)

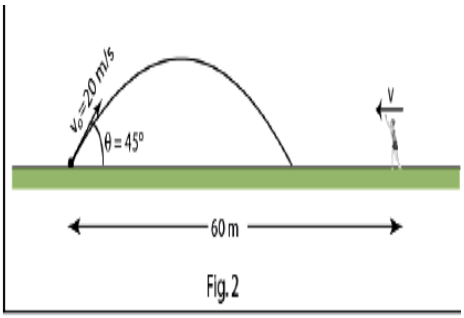


Fig.2

Q11. The position of a particle as a function of time is given by r= 3.0 ti + 2.0 t^2j . Find the angle between the velocity and acceleration of the particle at t =5.0 s. (Ans: 8.5°)

Q12. Car A is moving towards East with speed 15.0 m/s and car B is moving towards West with speed 25.0 m/s, both relative to the ground. Find the velocity of car B relative to car A.(Ans: 40.0 m/s towards West)