Chapter 2: Understanding Kinetic Forces

1. Briefly explain the meaning of dynamics, kinetics and the meaning of uniform motion.

2. Draw a uniform and non-uniform distance versus time curve.

3. Convert 150 m/s into km/hr.

4. Figure 2.4 shows how John travels. Briefly, describe Figure 2.4. What can you deduced from it?

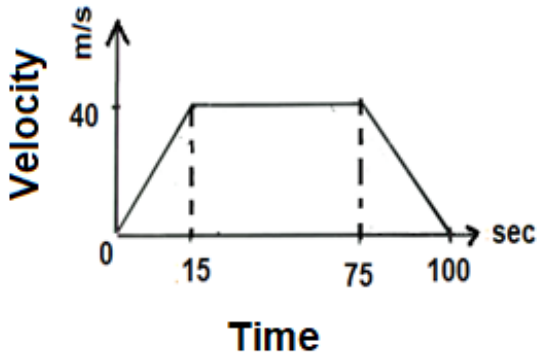

Figure 2.4

5. A car travelled 10 m in 5 seconds in the x-direction. The driver made a U-turn and travelled 20 m to B in 11 seconds. (See Figure 2.5). Find the average speed and velocity.

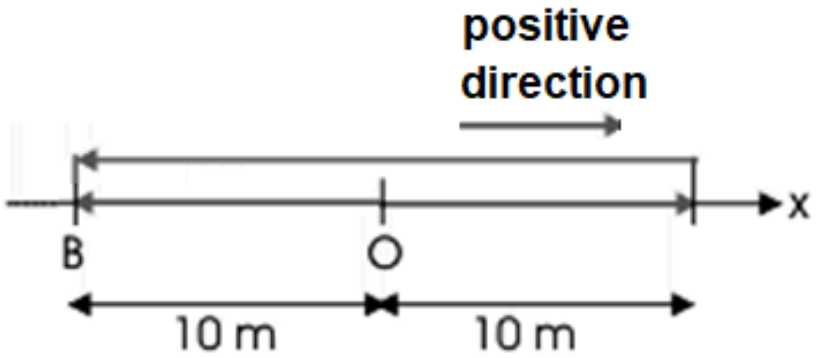

Figure 2.5

6. Figure 2.6 shows a bike ridden by Mary.

   a) How long was Mary stationary?
   b) What was the total distance travelled by Mary?
   c) What was her average speed in kilometres per hour between 17:15 and 17:45?

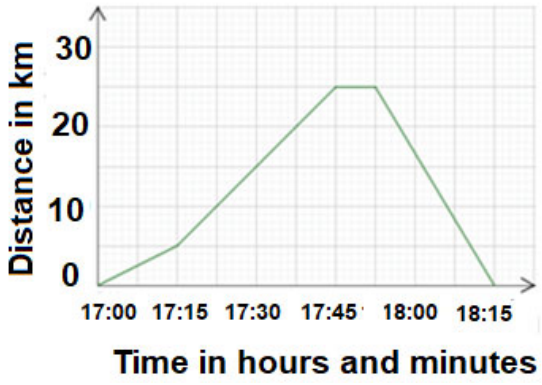

Figure 2.6

7. Figure 2.7 shows a distance-time graph describing a 1500m race ran by Adam. Work out the speeds for the three distance travelled. What is the maximum and the lowest speeds reached in this run. Give your answer to three significant figure.

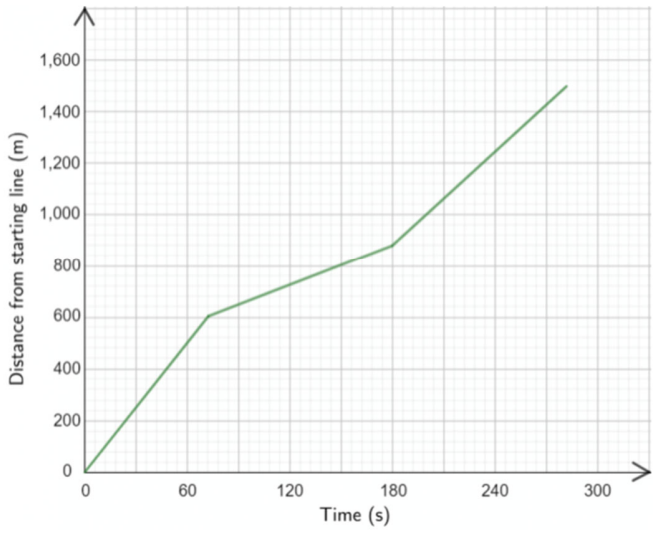

Figure 2.7

8. A car accelerates from rest to 40 m/s in 20 seconds. Determine the car's acceleration. The car then decelerates for 15 seconds and stopped. What is the rate of deceleration?

9. A car starts at rest and accelerates constantly at 5 m/s^2 in 1 second. Determine (a) the car speed and (b) the distance travelled after 10 seconds.

10. A car travels at a constant speed of 60 m/s, and then decelerates at 5 m/s^2 until rest. Determine time elapsed and car's distance before rest.

11. A car speeding at 110 km/hr past a police car on a roadside. One minute later, the police car chases at $1m/s^2$. How far did the police car go before reaching the car? Calculate the time taken by the police car to catch up the speeding car?

12. A 2kg ball attached to a 1.0m string moves in a horizontal uniform circular motion at speed of 5 m/s. What is the acceleration of the ball and the centripetal force acting on the ball?

13. John attached a 2kg ball to a 2m long string. He swings the ball in a uniform circular motion and the taut string is experiencing a 90 N force. Calculate the maximum speed the ball can travel without breaking the string.

14. A car can navigate around a uniform circular path of radius 150m at a maximum velocity of 25 m/s. What is the coefficient of friction between the car and the road?

15. A 10 kg object is circulating in a uniform circulator motion with a speed of 10 m/s. The diameter of the circulator motion is 20m. How long does it takes for the object to make one revolution? What is the centripetal force experienced by this object? What is the object's angular velocity?