Class 09 - Science
motion

Maximum Marks: 25   **Time Allowed: 1 hour and 30 minutes**

Section A

1. Define average velocity.   **1**

2. State SI unit of acceleration.   **1**

3. A plane has a take off speed of 88.3 m/s and requires 1365 m to reach that   **1**
   speed. Determine the acceleration of the plane and the time required to reach
   this speed.

4. Which of the following is true for displacement?   **1**
   (a) It cannot be zero.
   (b) Its magnitude is greater than the distance travelled by the object.

5. When is an object in motion considered to be a point object?   **1**

6. Can the speed of a body be negative?   **1**

7. Express average velocity when the velocity of a body changes at non-uniform   **2**
   rate and at uniform rate.

8. An artificial satellite is moving in a circular orbit of radius 42250 km.   **2**
   Calculate its speed if it takes 24 hours to revolve around the earth.

9. The distance between two stations is 200 km. A train travels for the first 100   **2**
   km at a speed of 10 kmh^{-1}. How fast should the train travel the next 100 km so
   as to average 70 kmh^{-1} for the whole journey?

10. A cheetah is the fastest land animal and can achieve a peak velocity of 100   **2**
    kmh^{-1} up to distances less than 500 m . If a cheetah spots his prey at a distance
    of 100 m, what is the minimum time it will take to get its prey, if the average
    velocity attained by it is 90 kmh^{-1}?

11. The velocity of a car is 18 ms^{-1}. Express this velocity in kmh^{-1}.   **2**

12. A body travels along a circular path of radius 70 m. After travelling half a   **2**
    revolution in 20 s, find the
    (i) average velocity,
    (ii) average speed.

13. A farmer moves along the boundary of a square field of side 10 m. in 40 s. **2** What will be the magnitude of displacement of the farmer at the end of 2 minutes 20 seconds?

14. A driver of a car travelling at 52 km h^{-1} applies the brakes and accelerates **5** uniformly in the opposite direction. The car stops in 5s. Another driver going at 3 km h^{-1} in another car applies his brakes slowly and stops in 10s. On the same graph paper, plot the speed versus time graphs for the two cars. Which of the two cars travelled further after the brakes were applied?