MOTION   **Grade – IX**

NUMERICALS

1. a) An object travels 30m in 4 sec and then another 30m in 2sec. What is the average speed of the object ?
    b) Is the data given above sufficient to find average velocity of the object? (no)

2. During an experiment a signal from a spaceship reached the ground station in five minutes. What was the distance of spaceship from the ground station? The signal travels at the speed of light, that is 3×10^8 m/sec.

3. The Rajdhani express travels from Mumbai to delhi a distance of 1384 km. It starts from Mumbai at 4: 00 p.m and reaches Delhi at 9:00 a.m, the next day. What is its average speed?

4. Light travels with a speed of 3×10^8 m/sec. How long does the light take to reach earth from the sun which is 1.5×10^{11} m away?

5. A 100 m long train crosses a 300m long bridge at a speed of 90 km/hr. How much time will it take to cross the bridge completely?

6. A cheetah is the fastest land animal and can achieve a peak velocity of 100km/hr upto distance less than 500m.If a cheetah spots his prey at a distance of 100m, what is the minimum time it will take to get its prey, if the average velocity attained by it is 90km/hr.

7. A bus decreases its speed from 80km/hr to 60km/hr in 5 sec. Find the acceleration of the bus.

8. A train starting from a railway station and moving with uniform acceleration attains a speed of 40km/hr in 10minutes. Find the acceleration.

9. A moving train is bought to rest within 20sec by applying brakes. Find initial velocity if the retardation due to brakes is 1.5m/sec^2.

10. An object undergoes an acceleration of 10m/sec^2 starting from rest. Find the distance travelled in 5 seconds.

11. A wooden slab starting from rest, slides down an inclined plane of length 10m with an acceleration of 5 m/sec^2. What would be its speed at the bottom of the inclined plane?

12. On a 60 km straight road, a bus travels the first 30 km with a uniform speed of 30 kmh^{-1}. How fast must the bus travel the next 30 km so as to have average speed of 40 kmh^{-1} for the entire trip?

13. A driver takes 0.20 seconds to apply the brakes. If he is driving car at a speed of 54 kmh^{-1} and the brakes cause a deceleration of 6.0 ms^{-2}. Find the distance travelled by the car after he sees the need to put the breakers.

14. A bullet initially moving with a velocity of 20m/s strikes a target and comes to rest after penetrating a distance of 0.01m in the target. Calculate the retardation produced by the target.

15. A body moving in a straight line at 72kmph undergoes an acceleration of $4m/s^2$. Find its speed after 2 seconds.

16. A car a moving at rate of 72km/h and applies brakes which provide a retardation of $5ms^{-2}$

a) How much time does the car takes to stop.
b) How much distance does the car cover before coming to rest?
c) What would be the stopping distance needed if speed of the car is doubled?

17. A body starts from rest and moves with a uniform acceleration of 5m/s2 for 5s and then it moves with a constant velocity for 4s. Later it slows down and comes to rest in 5s. Draw the velocity – time graph for the motion of body and answer the following questions-:

a) What is the maximum velocity attained by the body?
b) What is the distance travelled during this period of acceleration?
c) What is distance travelled when the body was moving with constant velocity?
d) What is the retardation of the body while slowing down?
e) What is the distance travelled by retarding?
f) What is the total distance travelled?