Class IX Physics Numerical Chapter Motion Linear and Circular with answer

1. A body starts sliding over a horizontal surface with an initial velocity of 0.5 m/s. Due to friction, its velocity decreases at the rate of 0.05 m/s^2. How much time will it take to stop? [**Ans.** 10 s]
2. A train accelerates uniformly from 36 km/h to 72 km/h in 20 s. Find the distance travelled by it. [**Ans.** 300 m]
3. An aeroplane taking off from a field has a run of 500 m. What is the acceleration and take off velocity if it leaves the ground 10 seconds after the start? [**Ans.** (i) a = 10 m/s^2 (ii) v = 100 m/s]
4. An object undergoes an acceleration of 10 m/s^2 starting from rest. Find the distance travelled by it in 5 seconds. [**Ans.** 125 m]
5. A car travelling at 60 km/h uniformly retards for 10 s and reaches a velocity of 45 km/h. Find the retardation. [**Ans.** 0.42 m/s^2]
6. When brakes were applied to a car, it retarded uniformly at 5 m/s^2 and stopped after 15 s. Find the initial velocity of the car. [**Ans.** 75 m/s]
7. A body moving with a velocity of 6 m/s uniformly accelerates at 1.5 m/s^2. What will be its velocity after 5 seconds and how far will it move during this time? [**Ans.** v = 13.5 m/s, S = 48.75 m]
8. A bullet is fired onto a wall with a velocity of 50 m/s. If the bullet stops at the depth of 10 cm inside the wall, find the retardation provided by the wall. [**Ans.** 12.5 km/s^2]
9. A car travelling at 18 km/h speeds up to 54 km/h in 5 seconds. What is its acceleration? [**Ans.** 2 m/s^2]
10. A moving train is brought to rest within 20 seconds by applying brakes. Find the initial velocity if the retardation due to brakes is 2 m/s^2. [**Ans.** 40 m/s]
11. The brakes applied to a car produce a negative acceleration of 6 m/s^2. If the car takes 2 seconds to stop after applying the brakes, calculate the distance it travels during this time. [**Ans.** S = 12 m]
12. Starting from rest, Abhay paddles his bicycle to attain the velocity of 6 m/s in 30 seconds. Then he applies brakes so that the velocity of the bicycle comes down to 4 m/s in the next 5 seconds. Calculate the acceleration of the bicycle in both the cases.[**Ans.** acceleration = 0.2 m/s^2, retardation = 0.4 m/s^2]
13. A racing car has uniform acceleration of 4 m/s^2. How much distance will it cover in 10 seconds after the start? [**Ans.** 200 m]

1. A cyclist covers a distance of 1.5 km in 2.5 minutes. Calculate his speed in (a) SI units (b) kilometre per hour. [**Ans.** (a) 10 m/s (b) 36 km/h]
2. A train starts from rest and covers a distance of 450 m in 2 minutes. Calculate the speed of the train in (a) SI units (b) km/h. [**Ans.** (a) 3.75 m/s (b) 13.5 km/h]
3. A train travels a distance of 20 km with a uniform speed of 60 km/h. It travels another distance of 40 km with a uniform speed of 80 km/h. Calculate the average speed of the train. [**Ans.** 72 km/h]
4. An aeroplane flies 200 km with a uniform speed of 300 km/h and then another 200 km with a uniform speed of 240 km/h. Calculate the average speed of the aeroplane. [**Ans.** 266.67 km/h]
5. The distance between two stations A and B is 160 km. A train covers first 40 km at a speed of 20 km/h. How fast should the train travel while covering the remaining distance, so that its average speed for the entire journey is 40 km/h? [**Ans.** 60 km/h]
6. A scooterist has to cover a distance of 10 km. He covers the first 4 km at a speed of 40 km/h. How fast should he run his scooter for the remaining journey, such that his average speed for the entire journey is 60 km/h? [**Ans.** 90 km/h]
7. A car is travelling at 36 km/h. If its velocity increases to 72 km/h in 5 s, then find the acceleration of the car in SI units. [**Ans.** 2 m/s^2]
8. A car travelling at a uniform velocity of 60 km/h retards in 10 seconds and reaches a velocity of 45 km/h. Find its retardation. [**Ans.** 0.42 m/s^2]

1. A car travels 30 km at a uniform speed of 40 km h^{-1} and the next 30 km at a uniform speed of 20 km h^{-1}. Find its average speed. [**Ans.** 26.7 km h^{-1}]
2. On a 120 km track, a train travels the first 40 km at a uniform speed of 40 km h^{-1}. How fast must the train travel the next 80 km so as to average 60 km h^{-1} for the entire trip? [**Ans.** 80 km h^{-1}]
3. A scooter acquires a velocity of 36 km h^{-1} in 10 seconds just after the start. It takes 20 seconds to stop. Calculate the acceleration in both the cases. [**Ans.** (a) 1 m s^{-2} (b) –0.5 m s^{-2}]
4. A train travels some distance with the speed of 30 km h^{-1} and returns with the speed of 45 km h^{-1}. Calculate the average speed of the train. [**Ans.** 36 km h^{-1}]
5. A car travelling at 36 km h^{-1} speeds upto 72 km h^{-1} in 5 seconds. What is its acceleration? If the same car stops in 20 seconds, what is the retardation? [**Ans.** (a) 2 m s^{-2} (b) –1 m s^{-2}]
6. A cheetah is the fastest animal and can achieve a peak velocity of 100 km h^{-1} upto a distance less than 500 m. If a cheetah spots its prey at a distance of 100 m, what is the minimum time it will take to get its prey? [**Ans.** 4 s]
7. If a body has a velocity 50 m s^{-1} and the uniform acceleration is 5 m s^{-2}, find the time it takes to travel a distance of 240 m. [**Ans.** 4 s]
8. A racing car has a uniform acceleration of 4 m s^{-2}. What distance will it cover in 10 seconds after the start? [**Ans.** 200 m]
9. A train is travelling at a speed of 90 km h^{-1}, the brakes are applied so as to produce a uniform acceleration of –0.5 m s^{-2}. Find how far the train goes before it stops. [**Ans.** 625 m]
10. On turning a corner, a motorist with a speed of 90 km h^{-1} finds a child on the road 50 m ahead. He applied brakes and stops the car just in front of the child. Calculate the retardation.[**Ans.** –6.25 m s^{-2}]
11. When brakes are applied to a bus, the retardation produced is 25 m s^{-2} and the bus takes 20 s to stop. Calculate (a) the initial velocity of bus (b) the distance travelled by bus during this time. [**Ans.** (a) 5 m s^{-1} (b) 50 m]
12. A radar spots an enemy plane. A radio pulse emitted by radar and reflected by the plane reaches back in 0.5 × 10^{-3} s. What is the distance of the plane from the radar station? [Take speed of radar pulse = speed of light = 3 × 10^8 m s^{-1}] [**Ans.** 75 km]
13. A train starting from rest attains a velocity of 72 km h^{-1} in 5 minutes. Assuming that the acceleration is uniform, find (a) the acceleration and (b) the distance travelled by the train for attaining this velocity. [**Ans.** (a) 1/15 m s^{-2} (b) 3 km]
14. A car is travelling at 72 km h^{-1} and when the brakes are applied it experiences a uniform retardation of 2 m s^{-2}. How long does it take the car to stop and how far does it travel from the instant, the brakes are applied? [**Ans.** (a) 10 s (b) 100 m]