**Date: 29-1-22**

Class: 11th

Subject: Physics

Numerical Problems

1. An athlete completes one round of a circular track of diameter 200 m in 40 s. What will be the distance covered and the displacement at the end of 2 minutes 20 s?
2. Amit jogs from one end A to the other end B of a straight 300 m road in 2 minutes 30 seconds and then turns around and jogs 100 m back to point C in another 1 minute. What are Amit's average speeds and velocities in jogging (1) from A to B and (2) from A to C?
3. Rahim, while driving to school, computes the average speed for his trip to be 20 km h^{-1}. On his return trip along the same route, there is less traffic and the average speed is 30 km h^{-1}. What is the average speed for Rahim's trip?
4. A motorboat starting from rest on a lake accelerates in a straight line at a constant rate of 3.0 m s^{-1} for 8.0 s. How far does the boat travel during this time?
5. A 100 m long train crosses a bridge of length 200 m in 50 seconds with constant velocity. Find the velocity.
6. A ball is gently dropped from a height of 20 m. If its velocity increases uniformly at the rate of 10m s^{-2}, with what velocity will it strike the ground? After what time will it strike the ground?
7. An artificial satellite is moving in a circular orbit of radius 42250 km. Calculate its speed if it takes 24 hours to revolve around the earth.
8. The odometer of a car reds 2000 km at the start of a trip and 2400 km at the end of the trip. If the trip took 8h, calculate the average speed of the car in km h^{-1} and ms^{-1}.
9. A car accelerates uniformly from 18 km/h to 36 km/h in 5s. Calculate (i) the acceleration and (ii) the distance covered by the car in that time.
10. The brakes applied to a car produce an acceleration of 6 ms^{-2} in the opposite direction to the motion. If the car takes 2s to stop after the application of brakes, calculate the distance it travels during this time.
11. A boy walks around a circular track of radius 14m, such that after 2 minutes he is diametrically opposite to the starting point. Find distance and displacement of boy.
12. The average speed of a body in the above diagram is

55m	255m
•——————•———————	
A	B
10.30am	1032am
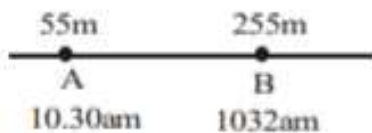
13. The table below shows the speed of moving vehicle with respect to time.

Speed (m/s)	2	4	6	8	10
Time (s)	0	2	3	4	5

    Find the acceleration of the vehicle.
14. Calculate the distance covered in above question in 5 seconds.
15. Find the ratio of average speed of a scooter moving at 30m/min and a car moving at 27 km/h.

16. Rahul while driving to school, computes the average speed of his trip to be 20km/h. On his return trip along the same route, there is less traffic and average speed is 40 km/h. calculate the average speed of Rahul's round trip.

17. A circular cycle track has a circumference of 314 m with AB as one of its diameters. A cyclist travels from A to B along the circular path with a velocity of constant magnitude 15.7 m/s. Find:
    (1) The distance moved by the cyclist.
    (2) The displacement of the cyclist if AB represents north-south direction.
    (3) The average velocity of the cyclist.

18. On a 100 km road, a car travels the first 50 km at a uniform. Speed of 30 km h^{-1}. How fast must the car travel for the next 50 km so as to have an average speed of 45 km h^{-1} for the entire journey?

19. A man walks at 1 m/s for 60 minutes. He takes rest for 20 minutes and then walks at a speed of 1 m/s for 60 minutes. Find its average speed.

20. A train 120 m long moving on a straight and level track with uniform speed passes a pole in 6 seconds. Find:
    (1) The speed of the train.
    (2) The time it will take to cross a 50 m long bridge.

21. A body covers half of its journey with a speed of 60 ms^{-1} and the other half with a speed of 40 ms^{-1}. Then find the average speed during the whole journey.

22. A car travelling at 20 km/h speeds up to 60 kmh^{-1} in 6 secs. What is its acceleration?

23. In 1985, Said Aouita set the world record for the 1500 m race in a time of 3 minute 29.46 second? What was his average speed?

24. A car travelling at a constant speed of 27 ms^{-1}. The driver looks away from the road for 2.0 second to tune in a radio station on the radio. How far does the car go during this time?

25. If a sports car can go from rest to 27 ms^{-1} in 9.0 second, what is the magnitude of its average acceleration?

26. A cheetah, the fastest of all land animals over a short distance, accelerates from rest to 26 ms^{-1}. Assuming that the acceleration is constant, find the average speed of the cheetah.

27. A skier, starting from rest, accelerates down a slope at 1.6 ms^{-2}. How far has he gone at the end of 5.0 second?