CLASS IX : ASSIGNMENT : CHAPTER-7 : MOTION : SCIENCE (PHYSICS)

1. On a cloudy day, lightning is seen before thunder is heard. Explain Why?
2. (a) Are rest and motion absolute or relative terms?
   (b) Can an object be at rest as well as in motion at the same time?
   (c) You are walking towards India Gate. Is India Gate at rest with respect to you or it is moving with respect to you?
3. Define the term velocity. What is its unit? Is it ascalar or a vector quantity?
4. What is the relationship between the distance travelled and the time elapsed for the motion with uniform velocity?
5. Define acceleration. Is it a scalar or a vector quantity?
6. What is the Si unit of acceleration?
7. What is the acceleration of a body moving at uniformvelocity?
8. Differentiate acceleration from velocity.
9. "The direction in which an object moves is given by the direction of velocity of the object and not the direction of acceleration." Give an example to justifythis statement.
10. When is the acceleration of a body positive?
11. When is the acceleration of a body negative?
12. Name the different types of graphs.
13. Which type of graph is used to describe motion?
14. Name the two types of physical quantities.
15. What is magnitude?
16. Define a scalar quantity.
17. Give two examples of a scalar quantity.
18. Define vector quantity.
19. Give the simplest type of motion.
20. Give two examples of a vector quantity.
21. How can we represent the change in the position of an object with time?
22. Why is the motion in a circle at a constant speed called accelerated motion?
23. A satellite revolves around the Earth with uniform speed. Is this motion accelerated? If so, in which direction does the acceleration act?
24. What is the difference between uniform linear motionand uniform circular motion?
25. Define uniform acceleration. Give one example.
26. Define non-uniform acceleration. Give one example.
27. What is the meant by retardation? Give its S.I. unit.
    or
    Give an example of negative acceleration.
28. How does the velocity change with time in the uniformrectilinear motion of an object?
29. How does the velocity change with time in the non-uniform rectilinear motion of an object?
30. What do graphs provide?
31. Give an example of the use of a bar graph and a straight graph.
32. When do we say that the position of the body has changed?
33. Classify the following as scalar and vector quantities: Mass, weight, time, temperature, volumes, velocity, speed, forces, and acceleration.

34. Give an example of a body that may appear to be moving for one person and stationary for the other.

(ii) What can we tell about motion from the aboveexample?

35. How many different kinds of motion are there? Namethem. Is there any motion that is a combination of two or more types of motion?

36. What is motion? Give some examples of directlyperceivable motion in daily life.

37. Give an example:

i. Of directly perceivable motion.
ii. Of indirectly perceivable motion.
iii. Of a Uniform Motion in a straight line in which velocity is changing at a uniform rate.
iv. Of a Non-Uniform Motion in which acceleration is not constant.
v. Of a motion in which acceleration is in the direction of motion.
vi. Of a motion in which acceleration is against the direction of motion.
vii. Of a body moving with constant acceleration but with zero velocity.
viii. Of a body moving horizontally with an acceleration in the vertical direction.
ix. Of a body moving with constant speed in an accelerated motion.

38. Give an example of motion in the human body thatcannot be perceived directly.

(ii) Give an example of motion in nature that cannotbe perceived directly.

(iii) Give an example of the motion of the Earth thatcannot be perceived directly.

39. Define the following:

a. Translatory motion
b. Complex motion

40. (i) Give some examples of erratic and uncontrolled motion.

(ii) Give an example of controlled motion which canbe a service to human beings.

(iii) Is there a need to study about the erratic which ofsome objects and learn to control them?

Numerical Problems

41. A person moves along the boundary of a square field of side 10 m in 20 s. What will be the magnitude of displacement of that person at the end of 2 minutes 20 seconds?

42. In a long-distance race, the athletes were expected to take four rounds of the track such that the line of finish was the same as the track was 200 m.

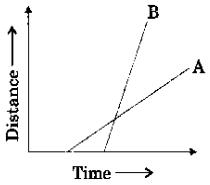
a. What is the total distance to be covered by theathletes?
b. What is the displacement of the athletes whenthey touch the finish line?
c. Is the motion of the athletes' uniform or non-uniform?
d. Is the distance moved by and displacement ofathletes at the end of the race equal?

43. Neha swims in a 90 m-long pool. She covers 180 m in one minute by swimming from one end to the other and back along the same straight path. Find the average speed and average velocity of Neha.

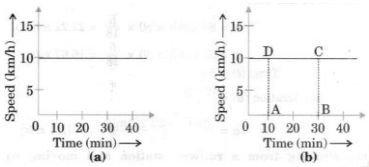
44. A car decreases its speed from 80 km/h to 60 km/h in5 seconds. Find the acceleration of the car.

45. A train starting from a railway station and moving with uniform acceleration, attains a speed of 40 km/h in10 minutes. Find its acceleration.

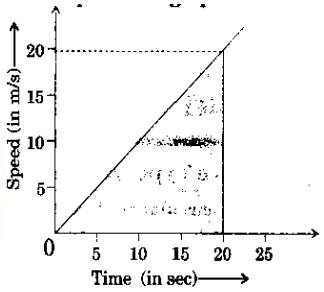
46. The average speed of a bicycle, an athlete, and a car are 18 km/h, 7 m/s, and 2 km/min respectively. Which of the three is the fastest and which is the slowest?
47. Figure shows a distance-time graph of two objects A and B, which object is moving with greater speed when both are moving?



48. Figure represents the speed time graph for a particle. Find the distance covered by the particle between t =10 min and t = 30 min.

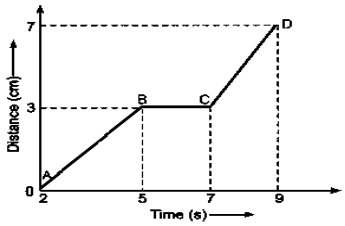


49. Find the distance covered by a particle during the time interval t = 0 to t = 20 s for which the speed- time graph is shown in figure.

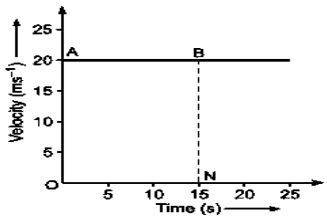


50. A bus moves 30 km in 30 min and the next 30 km. in 40 min. Calculate the average speed for the entire journey.
51. A girl runs for 10 min at a uniform speed of 9 km/h. What should be the speed that she runs for the next 20 min, so that the average speed comes to 12 km/h?
52. It is estimated that the radio signal takes 1.27 secondsto reach the Earth from the surface of the Moon. Calculate the distance of the Moon from the Earth. Speed of radio signal = 3×10^8 ms^{-1} (speed of lightin air).
53. Divya walked 2 km on a straight road and then walked back 1 km. Which of the two quantities involved in her walking is greater- the scalar or vector?
54. Two satellites A and B revolve around a planet C. The time taken by satellite B to go around the planet is twice the time taken by A. Which of the two satellites will have a greater magnitude of velocity?
55. A child moving on a circular track of radius 40 mcompletes one revolution in 5 minutes. What is his
    (i) average speed (ii) average velocity in one fullrevolution?
56. The graph given below shows the positions of a body at different times. Calculate the speed of the body as it moves from

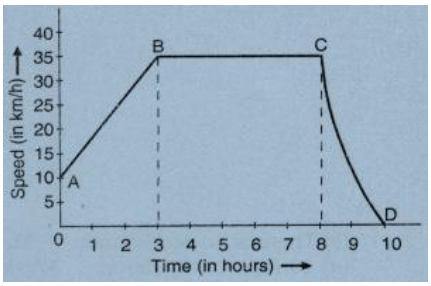
(i) A to B (ii) B to C and (iii) C to D.



57. The velocity-time graph shows the motion of a cyclist. Find
(i) its acceleration (ii) its velocity (iii)the distance covered by the cyclist in 15 seconds.



58. A train starts from rest and accelerates uniformly at 10 m/s^2 for 1 minute. Find the (i) Velocity and (ii) Distance travelled by train at the end of 1 minute.
59. A child drops a ball from a height of 10m. Assume that its velocity increases uniformly at the rate of 10m/s^2. Find (i) the Velocity with which the ball strikes the ground. (ii) The time taken by the ball to reach the ground.
60. An artificial satellite is moving in a circular orbit of radius 3600 Km. If it takes 24 hrs to complete one orbit around the Earth, find its linear velocity.
61. A train is travelling with a velocity of 72km/h. The brakes are applied to retard the motion of the train uniformly. If the train is stopped after 50m away from the place where the brakes were applied. Find the retardation of the train.
62. A bullet moving with a velocity of 10m/s is brought to rest after penetrating the wooden plank of 4cm thickness. Calculate the retardation of the bullet.
63. A stone is dropped down a deep well from rest. The well is 50m deep. How long will it take to reach the bottom of the well?
64. A car is moving with a uniform velocity of 10m/s. The driver of the car decided to overtake a bus moving ahead of the car. So, the driver of the car accelerates at 1m/s^2 for 10sec. Find the velocity of the car at the end of 10 seconds. Also, find the distance travelled by a car while accelerating.
65. A car starts from rest & accelerates uniformly at the rate of 1m/s^2 for 5 sec. If then maintains a constant velocity for 30 sec. Then breaks are applied and the car is uniformly retarded to rest for 10 sec. Find the maximum velocity attained by the car and the total distance travelled by it. Also, Plot the velocity-time graph for the motion of the car.
66. The graph given alongside shows how the speed of a car changes with time:
(i) What is the initial speed of the car? (ii) What is the maximum speed attained by the car?
(iii) Which part of the graph shows zero acceleration?
(iv) Which part of the graph shows varying retardation?
(v) Find the distance travelled in the first 8 hours.


Speed (in km/h)
40
35
30
25
20
15
10
5
0
A
B
C
D
1 2 3 4 5 6 7 8 9 10
Time (in hours)