CBSE

MOTION WS 1

Class 09 - Science

Section A

1. A signal from a space ship reaches the ground in 5 minutes. What was the distance of the space ship from the ground station? The speed of the signal is 3×10^8 m/s. **[1]**

   a) 9×10^7 m
   b) 9×10^{10} m
   c) 9×10^6m
   d) 3×10^6 m

2. A body starting at a point, say A, reaches, say B, ahead in a straight line and returns back to A. Then there is: **[1]**

   a) negative displacement
   b) cannot be said
   c) zero displacement
   d) positive displacement

3. Which of the following is the characteristic of distance travelled by an object? **[1]**

   a) It has only magnitude and no specific direction
   b) It has a magnitude as well as specific direction
   c) It can be zero
   d) The distance travelled by an object is less than the magnitude of the displacement of the object.

4. The maximum speed of a train is 90 km/h. It takes 10 hours to cover a distance of 500 km. The ratio of its average speed to maximum speed is: **[1]**

   a) 9:5
   b) 5:9
   c) 1: 5
   d) 5:1

5. The displacement of a body is proportional to the cube of the time lapsed. The magnitude of the acceleration is: **[1]**

   a) decreasing with time
   b) increasing with time
   c) constant
   d) zero

6. The numerical ratio of displacement to distance for a moving object is **[1]**

   a) always less than 1
   b) equal or less than 1
   c) always more than 1
   d) always equal to 1

7. Which of the following is the characteristic of displacement of an object? **[1]**

   a) Displacement has only magnitude and no specific direction
   b) The magnitude of the displacement is greater than the distance travelled by a moving object
   c) Displacement has magnitude as well as specific direction
   d) Displacement cannot be zero

8. A boy runs for 10 minutes at a uniform speed of 9 kmh^{-1}. At what speed should he run for the next 20 minutes so that the average speed becomes 12 kmh^{-1}? **[1]**

a) 7.72 km h^{-1} b) 10.2 km h^{-1}

c) 13.5 km h^{-1} d) 8.2 km h^{-1}

9. Match the column I with column II and mark the correct option from the following given codes. **[1]**

Column I	Column II
(a) 36 km h^{-1}	(i) 20000 mm
(b) 1 m s^{-2}	(ii) 980 cm s^{-2}
(c) 9.8 m s^{-2}	(iii) 12960 km h^{-2}
(d) 0.02 km	(iv) 10 m s^{-1}

a) (a)- (iii), (b) - (ii), (c) - (i), (d) - (iv) b) (a) - (i), (b) - (ii), (c) - (iii), (d) - (iv)

c) (a) - (ii), (b) -(i), (c) - (iv), (d) - (iii) d) (a) - (iv), (b) - (iii), (c) - (ii), (d) - (i)

10. Which of the following is a correct statement? **[1]**

i. Distance is the magnitude of displacement in all cases.

ii. When a body moves with uniform speed, then the average speed is same as instantaneous speed.

iii. Average speed is greater than the average velocity if a body is moving in a straight line without reversing its direction.

iv. When a body moves with constant velocity, the average velocity is zero.

a) Statement (i) is correct. b) Statement (iv) is correct.

c) Statement (iii) is correct. d) Statement (ii) is correct.

11. Suppose a boy is enjoying a ride on a merry-go-round which is moving with a constant speed of 10ms^{-1}. It implies that the boy is **[1]**

a) moving with no acceleration b) at rest

c) in accelerated motion d) moving with uniform velocity

12. A body moves on three-quarters of a circle of radius r. The displacement and distance travelled by it **[1]**

a) displacement = 0, distance = $\frac{3\pi r}{2}$ b) displacement = r, distance = 3r

c) distance = 2r, displacement = $\frac{3\pi r}{2}$ d) displacement = $\sqrt{2}r$ Distance = $\frac{3\pi r}{2}$

13. Two identical balls are at rest side by side at the bottom of a hill. Sometime after ball A is kicked up the hill, ball B is given a kick up the hill. Ball A is headed downhill when it passes ball B headed up the hill. At the instant when ball A passes ball B, it has the same **[1]**

a) Position and acceleration as ball B b) Position and velocity as ball B

c) Displacement and velocity as ball B. d) Velocity and acceleration as ball B

14. A car travels 10 m in 5 seconds, 20 m in the next 10 seconds, and 30 m in the last 10 seconds. The average speed of the motion is: **[1]**

a) $30\ ms^{-1}$

b) $2.2\ ms^{-1}$

c) $2.4\ ms^{-1}$

d) $2.0\ ms^{-1}$

15. The displacement of the body can be- **[1]**

a) Zero

b) All of these

c) Positive

d) negative

16. Which of the following gives both direction and magnitude? **[1]**

a) Unit Scalar

b) Scalar

c) Unit Vector

d) Vector

17. **Assertion (A):** An object can have constant speed but variable velocity. **[1]**

Reason (R): Speed is a scalar but velocity is a vector quantity.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

18. **Assertion (A):** The displacement of an object can be either positive, negative or zero. **[1]**

Reason (R): Displacement has both the magnitude and direction.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

19. **Assertion (A):** An object may acquire acceleration even if it is moving at a constant speed. **[1]**

Reason (R): With change in the direction of motion, an object can acquire acceleration.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

20. **Assertion (A): T**he speedometer of a car measures the instantaneous speed of the car. **[1]**

Reason (R): Average speed is equal to the total distance covered by an object divided by the total time taken.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

21. **Assertion (A):** The speed of a body can be negative. **[1]**

Reason (R): If the body is moving in the opposite direction of positive motion, then its speed is negative.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

22. **Assertion (A):** The bus travels 250 km from Delhi to Jaipur towards the West and then comes back to the starting point. Total displacement is zero. **[1]**

Reason (R): The average velocity of the bus for the whole journey (both ways) is 0 kilometers per hour.

a) Both A and R are true and R is the correct

b) Both A and R are true but R is not the

explanation of A.

correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

23. **Assertion (A):** A boy goes from A to B with a velocity of 20 m/min and comes back from B to A with a velocity of 30 m/min. The average velocity of the boy during the whole journey is zero. **[1]**

Reason (R): The ratio of speed to the magnitude of velocity when the body is moving in one direction is equal to one.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

24. **Assertion (A):** Displacement of a body may be zero when the distance travelled by it is not zero. **[1]**

Reason (R): The displacement is the longest distance between the initial and final position.

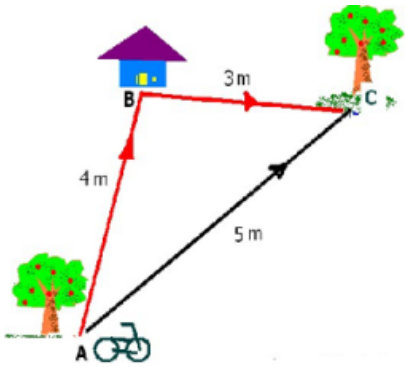
a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

25. The path covered from A to C is called: **[1]**



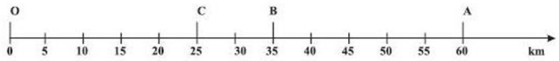
a) Velocity

b) Speed

c) Distance

d) Displacement

26. If the object moves through C and B and reaches A. Then it moves back along the same path and reaches C through B. What is the total path covered? **[1]**



a) 105 Km

b) 95 Km

c) 65 Km

d) 35 Km

27. Distance can never be _____ for a moving body. **[1]**

a) Positive

b) Negative or zero

c) Zero

d) Negative

28. Distance is a _____ quantity. **[1]**

a) Vector

b) Unit vector

c) Dimensionless

d) Scalar

29. Which of the following statements is correct? **[1]**

A. speed distance are scalar, velocity and displacement are vectors

B. speed distance are vector, velocity and displacement are vectors

C. speed and velocity are scalar, distance and velocity are vectors

D. speed and velocity are vectors, distance and displacement are scalar

a) (D) b) (B)

c) (C) d) (A)

30. Starting from rest at the top of an inclined plane a body reaches the bottom of the inclined plane in 4 seconds. At what time does the body cover one fourth the distance starting from rest at the top? **[1]**

a) 3 second b) 2 second

c) 1 second d) 4 second

31. Which of the following is true for displacement? **[1]**

a. It cannot be zero.

b. Its magnitude is greater than the distance traveled by the object.

32. What does the odometer of an automobile measure? **[1]**

33. Under what condition will the displacement and distance have the same magnitude? **[1]**

34. An object travels 16 m in 4 s and then another 16 m in 2 s. What is the average speed of the object? **[1]**

35. Can the speed of a body be negative? **[1]**

36. When is an object in motion considered to be a point object? **[1]**

37. What is essential to describe the position of an object? **[1]**

38. What is a reference point? **[1]**

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

Section B

40. Differentiate between distance and displacement? **[2]**

41. Distinguish between speed and velocity. **[2]**

42. Usha 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 Usha. **[2]**

43. The odometer of a car reads 2000 km at the start of a trip and 2400 km at the end of the trip. If the trip took 8 h, calculate the average speed of the car in kmh^{-1} and ms^{-1} **[2]**

44. Under what conditions is the magnitude of average velocity of an object equal to its average speed? **[2]**

45. A train starting from rest attains a velocity of 72 km h^{-1} in 5 minutes. Assuming that the acceleration is uniform, find **[2]**

i. the acceleration and

ii. the distance travelled by train for attaining this velocity.

46. A motorcyclist drives from A to B with a uniform speed of 30 km h^{-1} and returns back with a speed of 20 km h^{-1}. Find its average speed. **[2]**

47. Obtain a relation for the distance travelled by an object moving with a uniform acceleration in the interval between 4^{th} and 5^{th} second. **[2]**

48. An object has moved through a distance. Can it have zero displacement? If yes, explain with an example. **[2]**

49. An electric engine has a velocity of 120 kmh^{-1}. How much distance will it travel in 30 s? **[2]**

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

51. 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]**

52. A bus starting from rest moves with a uniform acceleration of 0.1 ms^{-2} for 2 minutes. Find a) the speed acquiredb) the distance travelled. **[2]**

53. A car acquires a velocity of 72 kmh^{-1} in 10 second after starting from rest. Find (a) the acceleration (b) the average velocity and (c) the distance travelled in this time. **[2]**

54. A racing car has uniform acceleration of 4 ms^{-2}. What distance will it cover in 10 s after start? **[2]**

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

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

Section C

57. The position of a body at different times is recorded in the table given below:- **[3]**

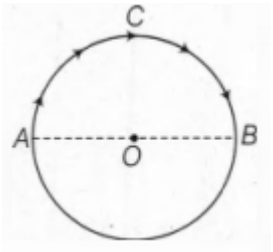
Time (s)	0	1	2	3	4	5	6	7	8
Displacement (m)	0	6	12	18	24	30	36	42	48

i. Draw the displacement time graph for the above data.
ii. What is the slope of graph?
iii. What is the velocity of the motion?

Section D

58. **Fill in the blanks:** **[5]**
(a) To locate the position of an object, we have to choose some suitable reference point called the _____. **[1]**
(b) Distance is a _____ quantity. **[1]**
(c) Both distance and displacement have the _____ units. **[1]**
(d) _____ is the speed of an object moving in a definite direction. **[1]**
(e) If the position of an object changes as time passes, then it is said to be in _____. **[1]**

59. **[5]**



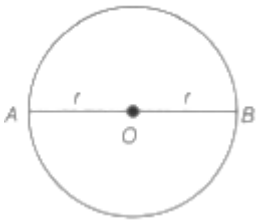
An insect moves along a circular path of radius 10 cm with a constant speed. It takes 1 min to move from a point on the path to the diametrically opposite point, find
i. the distance covered,
ii. the speed,
iii. the displacement and
iv. the average velocity.

60. i. What is the importance of a reference point? **[5]**

ii. Is it possible that the train in which you are sitting appears to move while it is at rest?

iii. Odometer measures the displacement of the vehicle. Correct this statement.

iv. A particle is moving in a circular path of radius r. What will be the displacement after half a circle?



v. In which condition, will the magnitude of the displacement be equal to the distance travelled by an object?

61. i. If the displacement of a body is zero, is it necessary that the distance covered by it is also zero? **[5]**

ii. A body starts to slide over a horizontal surface with an initial velocity of 0.7 m/s. due to friction, its velocity decreases at the rate 0.07 m/s^2. How much time will it take for the body to stop?

Section E

62. **State True or False:** **[10]**

(a) An object is said to be in uniform motion if it travels equal distances in equal intervals of time, howsoever small the intervals may be. **[1]**

(b) Displacement is a scalar quantity. **[1]**

(c) The distance travelled by an object is the length of the actual path traversed by the object during motion. **[1]**

(d) If the position of an object does not change as time passes, then it is said to be at rest. **[1]**

(e) The shortest distance measured from the initial to the final position of an object is known as the displacement. **[1]**

(f) The speed of a body is a vector quantity. **[1]**

(g) An object can be at rest with respect to one thing and in motion with respect to some other thing at the same time. **[1]**

(h) The distance traveled by an object in motion can never be zero or negative. **[1]**

(i) When an object travels equal distances in equal intervals of time, it moves with uniform speed. **[1]**

(j) The simplest type of motion is the motion along a straight line called linear motion. **[1]**