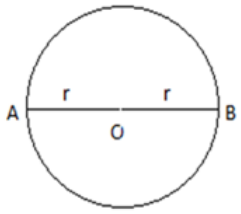
INDIAN SCHOOL AL WADI AL KABIR		
Class: IX	**DEPARTMENT OF SCIENCE -2022-23** **SUBJECT: PHYSICS**	DATE OF COMPLETION: 23.05.2022
WORKSHEET NO:1 WITH ANSWERS	**TOPIC: MOTION-PART 1**	**A4 FILE FORMAT (PORTFOLIO)**
CLASS & SEC:	**NAME OF THE STUDENT:**	**ROLL NO.**

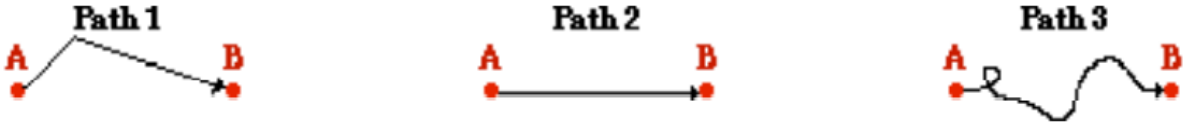
OBJECTIVE TYPE QUESTIONS

1. A particle is moving in a circular path of radius r. The displacement after half a circle would be:



(a) Zero (b) πr
(c) 2r (d) 2πr

2. When a car driver travelling at a speed of 10 m/s applies brakes and brings the car to rest in 20 s, then the retardation will be:
(a) + 2 m/s^2 (b) − 2 m/s^2
(c) − 0.5 m/s^2 (d) + 0.5 m/s^2
3. The numerical ratio of displacement to distance for a moving object is
(a) always less than 1 (b) always equal to 1
(c) always more than 1 (d) equal or less than 1
4. Suppose that you run along three different paths from location A to location B. Along which path(s) would your distance traveled be different than your displacement?



(a) Path 1 and Path 2
(b) Path 3 only
(c) Path 2 only
(d) Path 1 and Path 3
5. The SI unit of velocity is _____ and it is _____ quantity.

(a) m/s, vector
(b) ms, vector
(c) m/s, scalar
(d) m, scalar

6. A car travels from stop A to stop B with a speed of 36 km/h and then returns back to A with a speed of 54 km/h. Find the displacement of the car.

(a) 75m
(b) 0m
(c) 18m
(d) 90m

ASSERTION AND REASONING

DIRECTION: In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.
(e) Both Assertion and Reason are false.

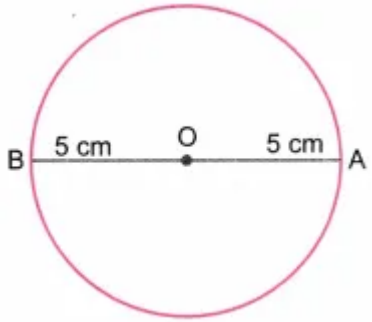
7. Assertion : An object can have constant speed but variable velocity.
   Reason : Speed is a scalar but velocity is a vector quantity.
8. Assertion : A body having non-zero acceleration can have a constant velocity.
   Reason : Acceleration is the rate of change of velocity.
9. Assertion : Displacement of a body may be zero when distance travelled by it is not zero.
   Reason : The displacement is the longest distance between initial and final position.
10. Assertion: A bus moving due north takes a turn and starts moving towards east with same speed. There will be no change in the velocity of bus.
    Reason: Velocity is a vector quantity

ONE MARK TYPE QUESTIONS

11. Suppose a ball is thrown vertically upwards from a position P above the ground. It rises to the highest point Q and returns to the same point P. What is the net displacement and distance travelled by the ball?
12. Can the displacement be greater than the distance travelled by an object?
13. When do the distance and displacement of a moving object have the same magnitude?
14. A body is moving with a velocity of 10 m/s. If the motion is uniform, what will be the velocity after 10 s?

TWO MARKS TYPE QUESTIONS

15. What is the difference between uniform velocity and non-uniform velocity?
16. What is negative acceleration? Explain with example
17. A particle moves in a circle with O as centre and AO = OB = 5 cm, as radius, as shown in the figure. It starts from A. Calculate:
    (a) the distance covered, and
    (b) the displacement, when it reaches B.

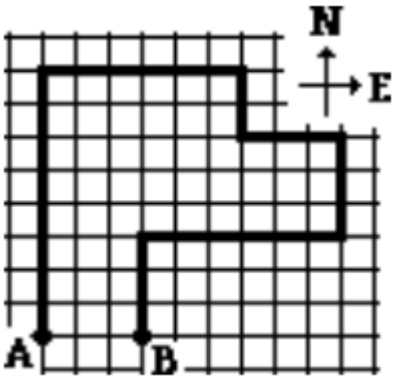


THREE MARKS TYPE QUESTIONS

18. Distance travelled by a train and time taken by it is shown in the following table. What is the average speed of the train?

Time	Distance (in km)
10:00 AM	0
10:30 AM	25
10:40 AM	28
11:00 AM	40
11:15 AM	42
11:30 AM	50

19. Observe the diagram below. A person starts at A, walks along the bold path and finishes at B. Each square is 1 km along its edge. Use the diagram in answering the next two questions.



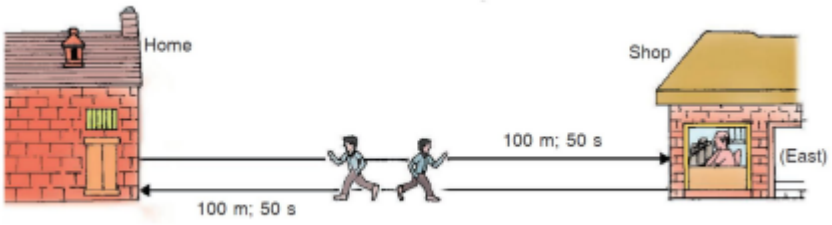
I. This person walks a distance of _____ km.
II. This person has a displacement of _____.
a. 0 km b. 3 km c. 3 km, E d. 3 km, W

PREVIOUS YEAR BOARD QUESTIONS

20. What is the numerical ratio of average velocity to average speed of an object when it is moving along a straight path. CBSE 2014
21. What do you mean by positive acceleration? CBSE 2013

CASE STUDY QUESTIONS

22. Suppose the boy first runs a distance of 100 metres in 50 seconds in going from his home to the shop in the East direction, and then runs a distance of 100 metres again in 50 seconds in the reverse direction from the shop to reach back home from where he started



(i) Find the speed of the boy. (a) 1 m/s (b) 2 m/s (c) 3 m/s (d) none of these

(ii) Find the Velocity of the boy. (a) 1 m/s (b) 2 m/s (c) 3 m/s (d) 0 m/s

(iii) In which of the following cases of motion, the distance moved and the magnitude of displacement are equal?
(a) if the car is moving on straight road
(b) if the car is moving on circular road
(c) if the pendulum is moving to and fro
(d) if a planet is moving around the sun

(iv) A boy is sitting on a merry-go-round which is moving with a constant speed of 10m/s. This means that the boy is:
(a) at rest
(b) moving with no acceleration
(c) in accelerated motion
(d) moving with uniform velocity

EXEMPLAR QUESTIONS

23. 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.

ANSWERS

1.	Ans:- (c) 2r
2.	**Ans:- (d) - 0.5 m/s^2**
3.	Ans:-(d) equal or less than 1
4.	Ans:-(d) Path 1 and Path 3
5.	**Ans:- (a) m/s, vector**
6.	**Ans:- (b) 0m**

7.	Ans : (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
8.	Ans : (d) Assertion (A) is false but reason (R) is true
9.	Ans : (c) Assertion (A) is true but reason (R) is false.
10.	Ans : (d) Assertion (A) is false but reason (R) is true
11.	Ans:- Displacement is zero. Distance is twice the distance between position P and Q.
12.	Ans : No, it is always either equal to or less than the distance travelled by the object.
13.	Ans : The magnitude of distance and displacement of a moving object are same when the object moves along the same straight line in the same fixed direction.
14.	Ans:- As the motion is uniform, the velocity remains 10 m/s after 10 s.
15.	Ans:- Uniform velocity: An object with uniform velocity covers equal distances in equal intervals of time in a specified direction, e.g., an object moving with speed of 40 kmh^{-1} towards west has uniform velocity. Non-uniform velocity: When an object covers unequal distances in equal intervals of time in a specified direction, or if the direction of motion changes, it is said to be moving with a non-uniform or variable velocity, e.g., revolving fan at a constant speed has variable velocity.
16.	Ans:- If the velocity of a body decreases with time, then its final velocity is less than the initial velocity and thus its acceleration is negative. Negative acceleration is called retardation or deceleration. For example, when brakes are applied to a moving truck, its velocity gradually decreases.
17.	Ans:-(a) Distance covered = $\pi \times OA = \pi \times 5 = 5\pi$ cm (b) Displacement = $2 \times OB$ $= 2 \times 5 = 10$ cm along AB
18.	$\text{Average speed} = \frac{\text{Total distance travelled}}{\text{Total time taken}}$ In this problem, total distance travelled = 50 km. Total time taken 10:00 AM to 11: 30 AM $= 1 \text{ hour } 30 \text{ minutes} = 1\frac{1}{2}\text{ h} = \frac{3}{2}\text{h}$ $\therefore \quad \text{Now average speed} = \frac{50 \text{ km}}{\frac{3}{2}\text{ h}} = \frac{100}{3} \text{ km / h} = \mathbf{33.33\ kmh^{-1}}$
19.	i. 31km ii.3km E
	Ans:-Ratio is 1(both are equal)

20.	
21.	Ans:- When the change in velocity of a body takes place in the direction of motion of the body , then the acceleration is positive.
22.	i. Total distance travelled is 100 m + 100 m = 200 m and the total time taken is 50 s + 50 s = 100 s. $\text{Speed of boy} = \frac{\text{Distance travelled}}{\text{Time taken}} = \frac{200\text{ m}}{100\text{ s}} = 2\text{ m/s}$ ii. The boy runs 100 m towards East and then 100 m towards West and reaches at the starting point, his home. So, the displacement will be 100 m – 100 m = 0 m. The total time taken is 50 s + 50 s = 100 s. $\text{Velocity of boy} = \frac{\text{Displacement}}{\text{Time taken}} = \frac{0\text{ m}}{100\text{ s}} = 0\text{ m/s}$ iii. Ans: (a) if the car is moving on straight road iv. (c) in accelerated motion
23.	Total distance covered by Usha in 1 min is 180 m. Displacement of Usha in 1 min = 0 m $\text{Average speed} = \frac{\text{Total distance covered}}{\text{Total time taken}}$ $= \frac{180\text{ m}}{1\text{ min}} = \frac{180\text{ m}}{1\text{ min}} \times \frac{1\text{ min}}{60\text{ s}}$ $= 3\text{ m s}^{-1}$ $\text{Average velocity} = \frac{\text{Displacement}}{\text{Total time taken}}$ $= \frac{0\text{ m}}{60\text{ s}}$ $= 0\text{ m s}^{-1}$ The average speed of Usha is 3 m s^{-1} and her average velocity is 0 m s^{-1}.

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