	INDIAN SCHOOL AL WADI AL KABIR	
Class: XI **All Sections**	**Department: SCIENCE 2023 – 24** **SUBJECT: PHYSICS**	**Date of submission: 25-4-2023**
Worksheet No: 1 **WITH ANSWERS**	**CHAPTER 1: MOTION IN A STRAIGHT LINE**	**Note:** **A4 FILE FORMAT**
NAME OF THE STUDENT	**CLASS & SEC:**	**ROLL NO.**

OBJECTIVE TYPE QUESTIONS

1. The numerical ratio of displacement to distance is:

   (a) Always less than 1 **(b)** Always equal to 1

   (c) Always more than 1 (**d)** Equal to or less than 1

   (Ans. (d))

2. If the displacement of a body is proportional to square of time then:

   (a) The body moves with uniform velocity.

   (b) The body moves with uniform acceleration.

   (c) The body moves with increasing acceleration.

   (d) The body moves with decreasing acceleration.

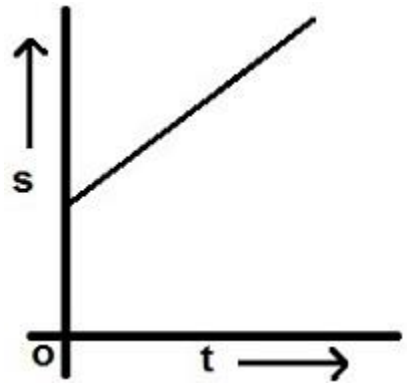
   (Ans. (b))

3.) A body moves with uniform velocity, its acceleration is:

   (a) Zero (b) Finite (c) Infinite (d) Negative

   (Ans. (a))

4. The displacement-time curve of a body is shown in following figure, then:



(a) The body is moving with uniform velocity with zero initial velocity.

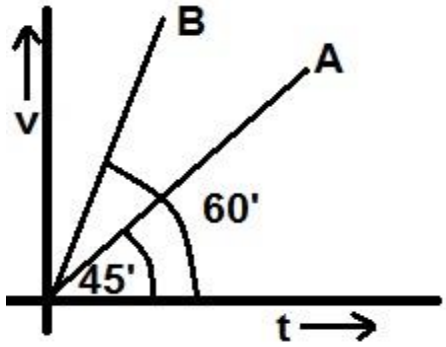
(b) The body is moving with uniform velocity, with finite initial velocity.

(c) The body is moving with constant acceleration with zero initial velocity.

(d) The body is moving with constant acceleration with finite initial velocity.

(Ans. (a))

5. The velocity-time graph of two bodies A and B are shown in figure, the ratio of their acceleration is:



(a) $1:\sqrt{3}$ (b) $1:3$ (c) $\sqrt{3}:1$ (d) $\sqrt{3}:\sqrt{2}$

(Ans. (a) acceleration = slope = $\tan\theta$)

7. The graph of displacement verses time of a body is a straight line making positive angle with the x-axis. Then the instantaneous velocity of the body at any point is

(a) Equal to the average velocity of the body.

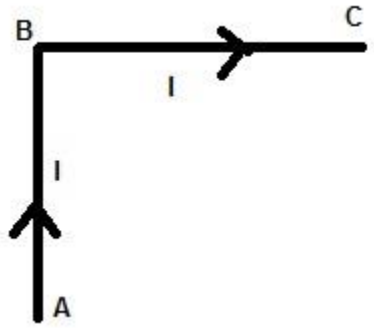
(b) Lesser than or equal to the average velocity of the body.

(c) Greater than or equal to the average velocity of the body.

(d) Always greater than the average velocity of the body.

(Ans. (a)

8. A particle follows the path ABC where AB=BC=*l* , The distance travelled by particle and displacement are:



(a) l and $2l$ (b) 2 l and $\sqrt{2}l$ (c) 2 $l$and $\frac{l^2}{\sqrt{2}}$ (d) l^2 and 2 l

(Ans. b)

9. The acceleration of a moving body can be found from

(a) Area under distance – time graph

(b) Area under velocity – time graph

(c) Slope of the velocity – time graph

(d) Slope of the distance – time graph

(Ans. (c)

10. The distance of a body depends on time according to the equation

$S = 20 + 0.1\ t^2$. The body is undergoing

(a) Uniform retardation

(b) Non uniform acceleration

(c) Zero acceleration

(d) Uniform acceleration

(Ans. d)

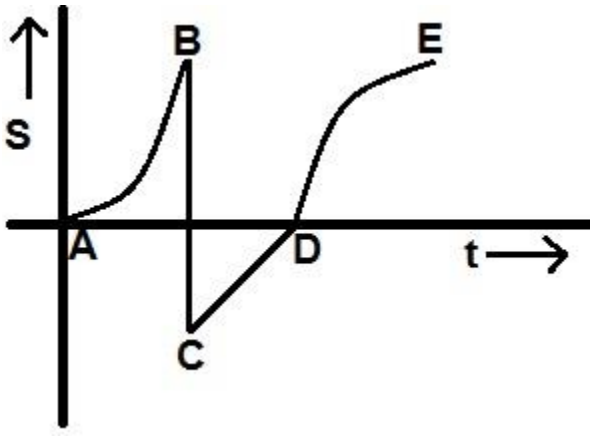
VERY SHORT ANSWER QUESTIONS (1MARK)

11.When is average velocity equal to average speed? (When a body moves along a straight line)

12. Give an example of a body having zero velocity but non-zero acceleration.

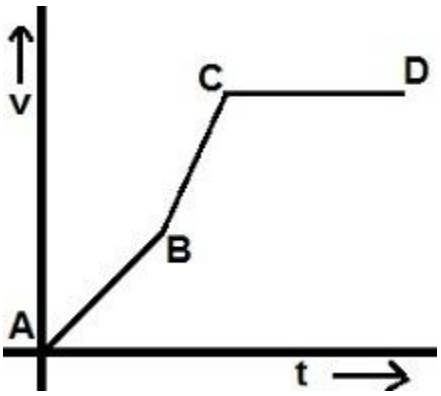
(A body which is thrown up and at the maximum height it has zero velocity but non-zero acceleration.

13. The displacement-time (s-t) graph of a body is shown in following figure. The path showing accelerated motion is



Ans. AB as the slope is increasing with time.

14. The velocity-time graph of a moving particle is shown in figure; the acceleration is maximum for part:



Ans. BC

15.) A body is thrown with speed 20m/s vertically upward, it will return to thrower's hand after a time of:(assume g=10m/s^2)

(Ans. V =0, u =20m/s, a = -10m/s^2

v=u + at,

Time to go up = 2 s

Time of ascent = time of descent

Total time = 2 + 2 = 4 s)

SHORT ANSWER QUESTIONS (2 MARKS)

16. If the displacement of a body is zero, is the distance covered by it necessary zero? comment with illustration.

17.Can a body have a constant speed but a varying velocity? Explain your answer with an example. (yes, for a body executing uniform circular motion)

18. Can a body have a constant velocity but a varying speed? Explain your answer. (No, speed gives the magnitude of velocity. So, if speed changes velocity also will change.)

19. What do you mean by instantaneous velocity. How can we find it graphically?

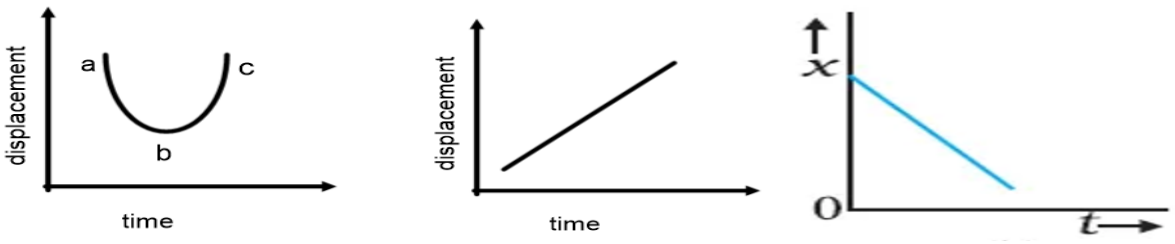
SHORT ANSWER QUESTIONS (3 MARKS)

20. A car moves a distance of 200 km. It covers the first half of the distance at a speed of 40km/h and the second half of the distance at speed v. If the average speed is 48km/h, then find the value of v.

Average speed $= \frac{s_1 + s_2}{(s_1 / v_1 + s_2 / v_2)} = \frac{200}{\frac{100}{40} + \frac{100}{v}} = 48$

On solving v = 60km/h)

21. Draw the nature of a position –time graph for a motion of a particle moving with[i] positive acceleration [ii] zero acceleration [iii] negative uniform velocity.



22. A train takes 1 hr. to go from one station to another. It travels at a speed of 30km/h for first half hour and at a speed of 50km/h for the next half hour. Find the average speed of the train?

average speed $= \frac{total\ distance}{total\ time} = \frac{d1+d2}{t1+t2} = \frac{s1\ x\ t1\ \ +s2\ x\ t2}{t1+t2}$

23. If a body travels 1/3 distance with a velocity 2m/s next 1/3 distance with a velocity of 4m/s and the remaining 1/3 distance with a velocity of 6m/s. Find the average velocity of the body?

Average velocity $= \frac{total\ displacement}{total\ time} = \frac{3d}{t1+t2+t3} = \frac{3d}{\frac{d1}{v1}+\frac{d2}{v2}+\frac{d3}{v3}} = \frac{3d}{\frac{d}{2}+\frac{d}{4}+\frac{d}{6}} = \frac{36}{11}$m/s

LONG ANSWER QUESTIONS (5 MARKS)

24. a) Derive all the 3 equations of uniformly accelerated motion graphically.

b) A particle moving with a uniform acceleration travels 24 metres and 64 metres in the first two consecutive intervals of 4 sec each. What is its initial velocity?

(Ans. Assume that in first interval of 4s the distance covered is 24m and in next 4s it covers distance of 64 m. Let a be uniform acceleration and u be initial velocity.

From equation of motion s= $ut + \frac{1}{2}at^2$, we have for first interval,

24=4u+8a or

6=u+2a.....(1)

For next interval, initial velocity is u+4a. Therefore,

64=(u+4a)4+8a or

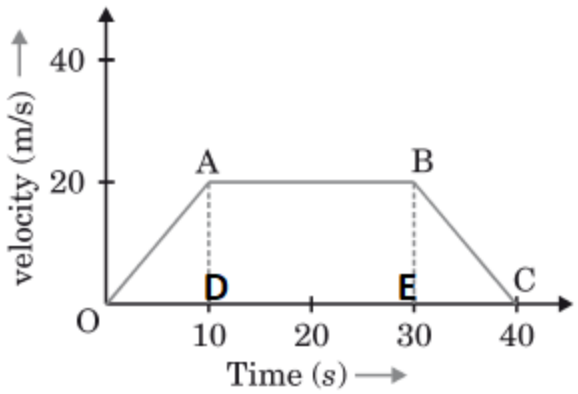
64=4u+24a or

16=u+6a.....(2)

Solving equations (1) and (2),

u=1m/s.)

30. The velocity time graph of a body is shown in the following figure. Answer the following questions:



(a) State the kind of motion represented by OA, AB and BC

(b) What is the velocity of the body after 10 s and after 40 s?

(c) Find the value of acceleration between 0 to 10 s and 30 s to 40 s.

(d) Find the distance travelled by the body during the time interval between 10s and 30s.

(Ans.

(a) OA - Uniform acceleration, AB - Zero acceleration / constant velocity and BC - uniform deceleration.

(b) After 10s velocity= 20m/s and after 40s velocity is zero / body comes to rest

(c) Acceleration = 20-0/10 -0 = $2m/s^2$

Retardation = (0 - 20) / (40 - 30) = $-2\ ms^2$

(d) Distance between 10th and 30th second

= area of the rectangle ABED = length X breadth = (30 - 10) s × 20 m/s = 400 m

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