	INDIAN SCHOOL AL WADI AL KABIR	
Class: XI All Sections	**Department: SCIENCE 2024 – 25** **SUBJECT: PHYSICS**	**Date: 28-04-2024**
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

2. A body is thrown upward and after some time the body reaches its maximum height, at maximum height:

(a)Its velocity and acceleration both are zero.

(b) Its velocity is zero and acceleration is maximum.

(c) Its velocity is maximum and acceleration is minimum.

(d) Its velocity is zero and acceleration is equal to acceleration due to gravity (g).

3. 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.

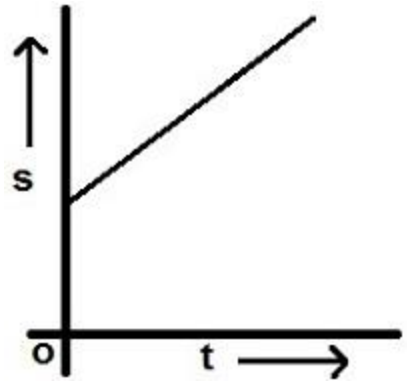
(c) The body moves with increasing acceleration.

(d) The body moves with decreasing acceleration.

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

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

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



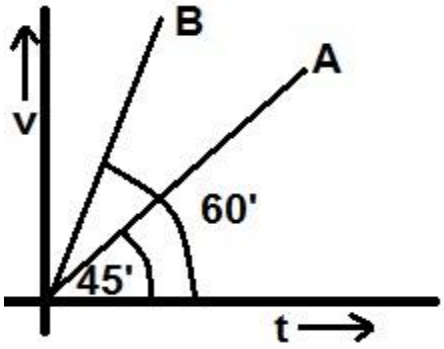
(a) The body is moving with uniform velocity with zero initial velocity.

(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.

6. 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) $\sqrt{3}:\sqrt{2}$

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

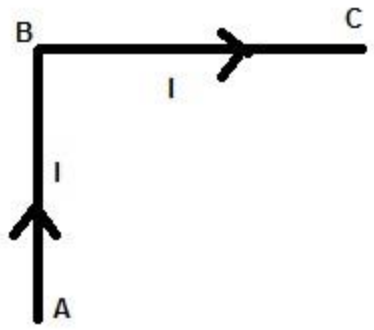
(a) Equal to the average velocity of the body.

(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.

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

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

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

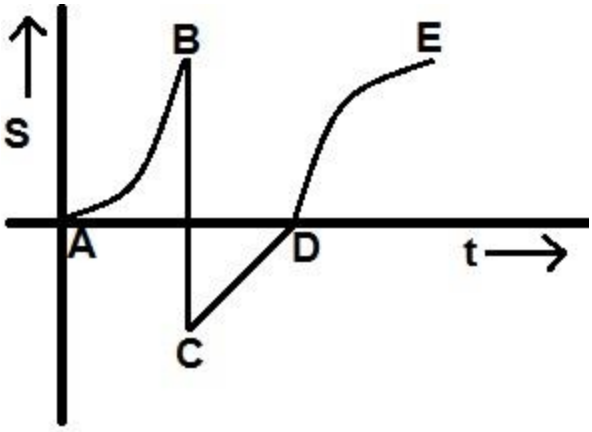
(d) Uniform acceleration

VERY SHORT ANSWER QUESTIONS (1MARK)

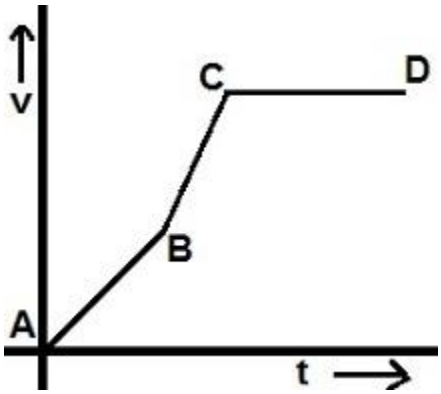
11.When is average velocity equal to average speed? (When a body moves along a straight line)

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

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



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



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

SHORT ANSWER QUESTIONS (2 MARKS)

16. A stone is thrown vertically upwards. Draw the[i] velocity-time graph[ii]speed-time for the complete journey of the body.
17. If the displacement of a body is zero, is the distance covered by it necessary zero? comment with illustration.
18. Can a body have a constant speed but a varying velocity? Explain your answer with an example.
19. Can a body have a constant velocity but a varying speed? Explain your answer.
20. What do you mean by instantaneous velocity. How can we find it graphically?

SHORT ANSWER QUESTIONS (3 MARKS)

21. 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.

22. 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.

23. 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?

24. 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?

25. A ball thrown vertically upwards with a speed of 20m/s from the top of a tower and returns to the ground level in 6 s. Find the height of the tower

[g= 10m/s^2] (Ans. 60m)

26. From the top of a tower 30m high, a stone is dropped. At the same instant another stone is projected vertically upwards from the ground with a speed of 30m/s. After how much time and at what height from the ground will the stones crosses each other [g= 10m/s^2]

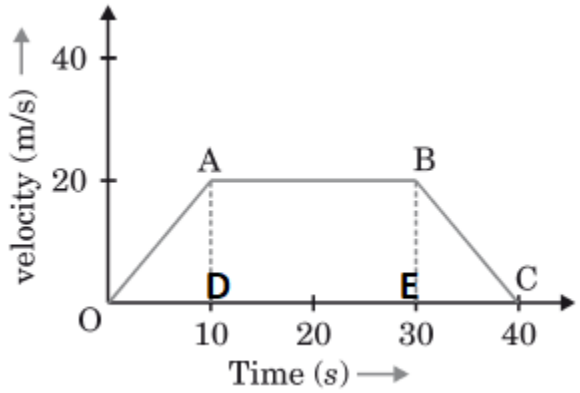
27. A stone is dropped from a balloon moving upwards with a velocity of 4.5m/s. The stone reaches the ground in 5s. Calculate the height of the balloon when the stone was dropped [g = 9.8m/s^2]

LONG ANSWER QUESTIONS (5 MARKS)

28.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?

29. 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.

ASSERTION REASONING QUESTIONS

Two statements are given –one labelled Assertion (A) and other labelled Reason (R). Select the correct answer to these questions from the options as given below.

a) If both Assertion and Reason are true and Reason is correct explanation of Assertion.

b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

c) If Assertion is true but Reason is false.

d) If both Assertion and Reason are false.

1) **Assertion:** A body may be accelerated even when it is moving uniformly.
   Reason: When direction of motion of the body is changing, the body must have acceleration.
2) **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.
3) **Assertion:** Velocity-time graph for an object in uniform motion along a straight path is a straight line parallel to the time axis.
   Reason: In uniform motion of an object velocity increases as the square of time elapsed.
4) **Assertion:** For one dimensional motion the angle between acceleration and velocity must be zero.
   Reason: One dimensional motion is not always on a straight line.

CASE BASED STUDY QUESTIONS

Q.1. In the absence of air resistance, all bodies fall with same acceleration near the surface of the earth. This motion of a body falling towards the earth from a small height is called free fall. The acceleration with which a body falls is called acceleration due to gravity and it is denoted by g.

(i) For a freely falling body, which of the following equation is incorrect.

(a) $h-ut=(1/2)\,gt^2$ (b) $v^2-u^2=2gh$

(c) $h=(1/2)\,ut+gt^2$ (d) $(v-u)/g=t$

(ii) The maximum height attained by a body thrown vertically upward with initial velocity u is

(a) $h=u^2/2g$ (b) $h=u/2g$

(c) $h=u^2/g$ (d) $h=2u^2/g$

(iii) The time of ascent of a body thrown vertically upward with initial velocity u is

(a) t= u/2g (b) t= u/g

(c) t= u^2/g (d) t= u/g^2

(iv) The total time of flight to come back to the point of projection of a body thrown vertically upward with initial velocity u is

(a) t= 2u/3g (b) t= u/2g

(c) t= 2u/g (d) t= $u^2/2g$

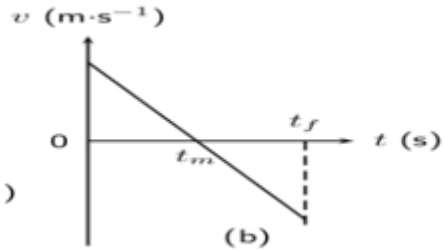
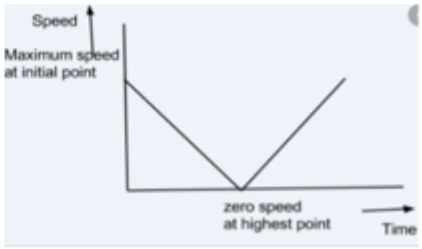
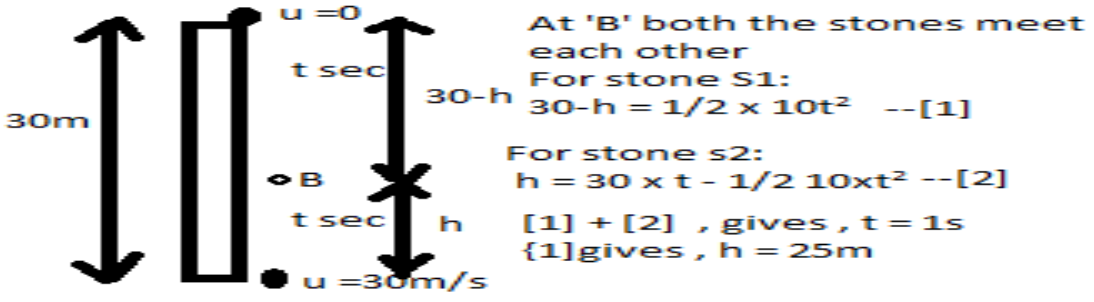
OR

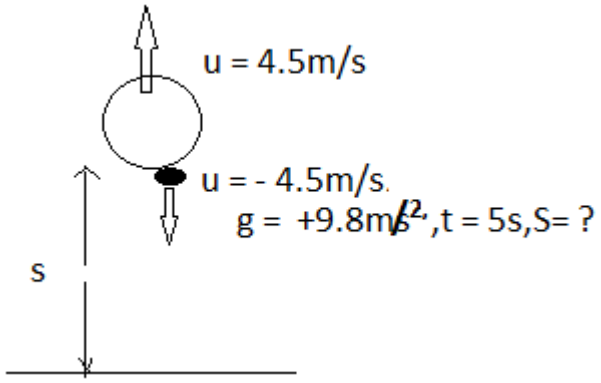
Velocity of fall at the point of projection of a body thrown vertically upward with initial velocity u is

(a) v = u (b) v = 2u

(c) v = 3u (d) v = 4u

Q. No.	ANSWERS
1.	(**d)** Equal to or less than 1
2.	(d) Its velocity is zero and acceleration is equal to acceleration due to gravity (g).
3.	(b) The body moves with uniform acceleration.
4.	(a) Zero
5.	(a) The body is moving with uniform velocity with zero initial velocity.
6.	(a) $1 : \sqrt{3}$ acceleration = slope = tanθ)
7.	(a) Equal to the average velocity of the body.
8.	(b) 2 l and $\sqrt{2}l$
9	(c) Slope of the velocity – time graph
10.	(d) Uniform acceleration
	SHORT ASWER QUESTIONS (2MARKS)
11.	When a body moves along a straight line
12	A body which is thrown up and at the maximum height it has zero velocity but non-zero acceleration.
13	AB as the slope is increasing with time.
14	BC
15	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
16	 
17	Explanation with example
18	yes, for a body executing uniform circular motion
19	No, speed gives the magnitude of velocity. So, if speed changes velocity also will change.
20	Definition. Slope of the displacement -time graph.
21	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
22	
23	average speed $=\frac{total\ distance}{total\ time}=\frac{d1+d2}{t1+t2}=\frac{s1\ x\ t1\ +s2\ x\ t2}{t1+t2}$
24	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
25.	Ans.60m
26.	

27.	 S = ut + ½ gt^2 = - 4.5 x 5 + ½ x 9.8 x [5]^2 = 100m
28.	Derive the equations of motion graphically. (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.)
29.	(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
	ASSERTION REASON TYPE QUESTIONS
1	Answer: a
2	Answer: c
3	Answer: c
4.	Answer: (d) One dimensional motion is always along straight line. But acceleration may be opposite of velocity and so angle between them will be 180°.
	CASE BASED QUESTION
1 (i)	(c) $h = (1/2)\ ut + gt^2$
(ii)	(a) $h=u^2/2g$
(iii)	(b) $t= u/g$
(iv)	(c) $t= 2u/g$ OR (a) $v = u$

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