കൈ സോപ്പ് ഉപയോഗിച്ച് കഴുകുക
സാനിറ്റൈസർ ഉപയോഗിക്കുക
മാസ്ക് ധരിക്കുക
സാമൂഹിക അകലം പാലിക്കുക

MALAPPURAM EDUCATIONAL DISTRICT

FIRST BELL SUPPORTING MATERIAL

PHYSICS

Std. IX

I velocity-time graph

1. Given is a table showing the motion of an object.

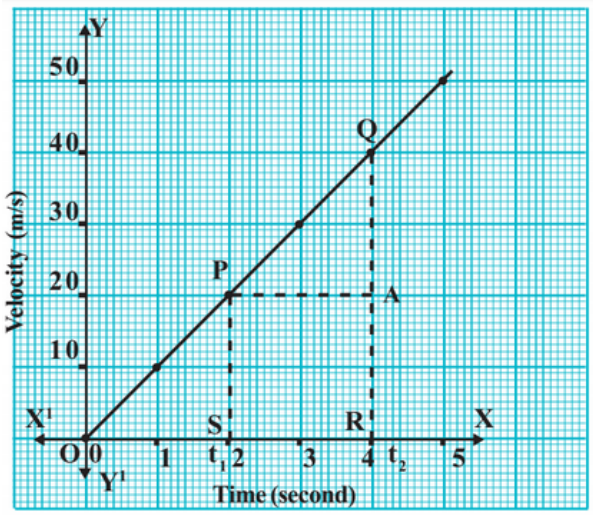
Time(s)	0	2	4	6	8	10
Velocity(m/s)	15	15	15	15	15	15

Draw a velocity-time graph based on the table.

2. What is the geometric shape of the area below the velocity-time graph?
3. What equation can be used to calculate the area of a quadrilateral?
4. Why is it said that the area of the portion at the bottom of the velocity-time graph is equal to the displacement of the object?
5. Calculate the displacement of the object in the first 8 seconds from this velocity-time graph. Shade the part that shows the displacement.

II First equation of motion

The following is the velocity-time graph of an object moving uniform acceleration. Observe the graph and find the following.



1. Which part indicates the displacement of the object at time interval from t_1 to t_2? What kind of quadrilateral is this?
2. Which part of this indicates the velocity of the object at t_1?
3. Which of the following indicates the velocity of which object at t_2?
4. Which part indicates the difference between these parts?
5. Which part indicates the time interval?
6. What is the information given by the part AQ regarding the velocity of the object?
7. Which equation is used to calculate acceleration? How do you calculate this from the picture?
8. From this we get the **first equation of motion**:

If a = (v-u) / t

v =.....

III Second equation of motion

The portion PQRS in the graph that represents the displacement of an object in a certain time interval, moving with uniform acceleration is a trapezium. Equation for finding the area of a trapezium is

A = $\frac{1}{2}$h (a + b).

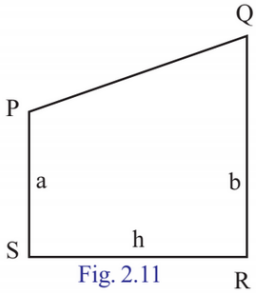


Fig. 2.11

where a and b are the length of parallel sides and h is the distance between these sides.

1. Name the segments from the picture and rewrite the equation.

displacement s = area of quadrilateral PQRS

= .....

2. Look what these segments are (u, v, t) in the graph and attribute them to the equation.

displacement s = ...

3. Expand this equation by adding the value of 'u + at' according to the first moving equation instead of 'v'.

4. Simplify the equation to $\mathbf{s = ut + \frac{1}{2}at^2}$.

This equation is known as the **second equation of motion**.

IV Third equation of motion

Acceleration = change in velocity / time

$a = (v-u) / t$

then $t = (v-u) / a$

Displacement from the graph = area of the trapezium

$s = \frac{1}{2}t(u + v)$

1. Replace the equation with '(v-u) /a' instead of 't'

s = ...

2. $(a + b)(a-b) = a^2-b^2$

Rewrite the equation accordingly.

s = ...

From this we get $v^2-u^2 = 2as$.

It can also be written as $\mathbf{v^2 = u^2 + 2as}$

This equation is known as the **third equation of motion.**

3. What types of motion are subject to which the laws of motion apply?

Now write the three equations of motion

$$v = u + at$$

$$s = ut + \frac{1}{2}at^2$$

$$v^2 = u^2 + 2as$$