BAL BHARATI PUBLIC SCHOOL, PITAMPURA, DELHI – 110034

SUBJECT:-PHYSICS

CHAPTER:-MOTION

TOPIC: Uses of graphs in describing motion of the objects

GUIDELINES:

Dear Students

- There is only one assignment, detailed as follows:
  - Assignment 9: Uses of graphs in describing motion of an object
- Solve the assignment in a separate notebook you have made for Physics
- Suitable Video link has been provided for better explanation.
- Do read NCERT too for better understanding of these concepts

NCERT LINK FOR THE CHAPTER:

http://ncert.nic.in/textbook/textbook.htm?iesc1=8-15
(page no104,105,106 and 107)

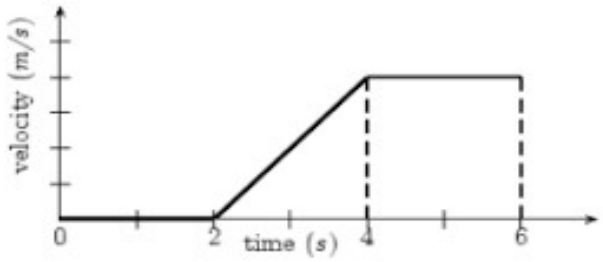
YOUTUBE LINK

https://www.youtube.com/watch?v=POdBG4nHalo&t=220s

SUBTOPICS: Uses of graphs in describing motion of an object.

LET US TRY TO UNDERSTAND HOW DISTANCE TIME AND SPEED TIME GRAPHS HELP IN DESCRIBING MOTION OF THE OBJECTS:

GRAPH 1



As per the information provided by this graph, we can say:

0-2 sec	2-4 sec	4-6 sec
• The object is at rest	• The motion is uniformly accelerated as the v-t graph is a straight line inclined to time axis	• The object is moving with uniform velocity from 4 to 6 sec, hence the motion is not accelerated.

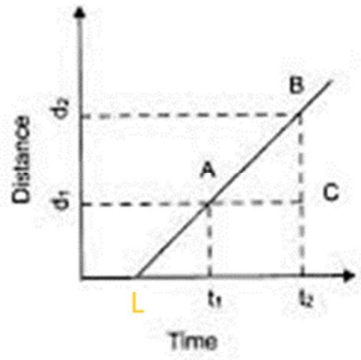
GRAPH 2

Let d_1 be the distance covered in time t_1
Let d_2 be the distance covered in time t_2
$\therefore$ $d_2 - d_1$ will be the distance covered in $t_2 - t_1$

$\therefore$ Speed of the object = $\frac{\text{distance covered}}{\text{time taken}}$

$$v = \frac{d_2 - d_1}{t_2 - t_1} = \frac{BC}{AC}$$

But here $\frac{BC}{AC}$ = slope of the graph



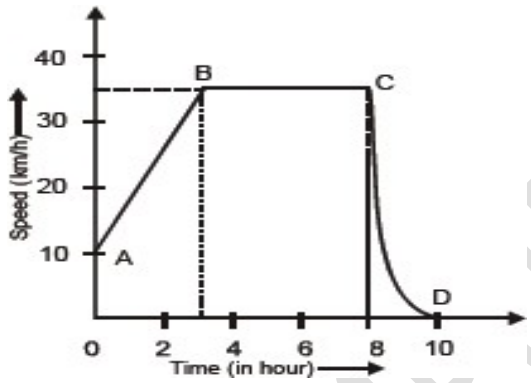
This graph indicates:

1. The object is at rest in the beginning till point L on X-axis.

2. After this the object moves with a constant velocity as the graph is a straight line inclined to the time axis i.e. the object exhibits uniform motion.

3. Slope of distance-time graph measures speed of the object.

GRAPH 3



Looking at this graph we can interpret the following (starting from point A to point D):

The initial speed of the object is 10km/h.

In 3 hrs its speed increases to 35 km/h.

Since part AB of the graph is a straight line so the motion is uniformly accelerated for first 3 hrs.

Slope of speed time graph gives acceleration

The acceleration for AB is : $a = (35-10)/3 = 25/3$ km/h^2

BC: For next 5 hrs i.e. (during the interval 3 hrs to 8 hrs), object is moving at a uniform speed of 35 km/h, as this part of graph is a straight line parallel to time axis.

As this part(BC) is depicting uniform motion, the acceleration for this time interval is zero.

From point C to D the speed of the object decreases, so the acceleration is negative

CD: Since the graph is a curved line , so the object is non uniformly accelerated in last 2 hrs (8-10 hrs)

At point D , finally the object comes to rest

Look how much we could interpret about the motion of the objects just by looking at these graphs!

Now solve the following questions based on distance time and velocity time graphs:

ASSIGNMENT 9

NCERT: Chapter 8

PAGE 107 (Block questions 1 to 4)

Page 112,113 (Questions 5,6,8)

STAY HOME STAY SAFE