

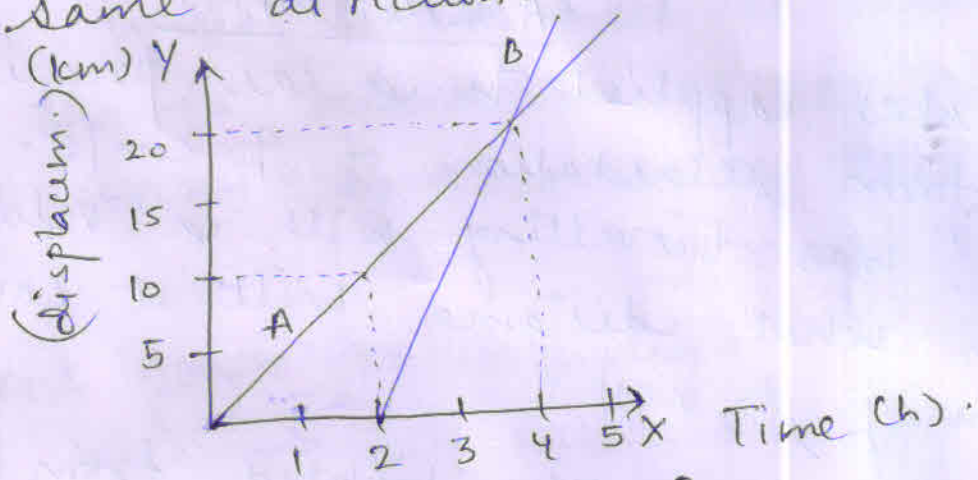
# CLASS IX

## PHYSICS - MOTION IN ONE DIMENSION

### ASSIGNMENT

- Q1. Brakes applied to a car produces a uniform retardation of  $90 \text{ cm/s}^2$ . If the car was travelling with a velocity  $27 \text{ m/s}$ . Then what distance will it cover before coming to rest? [405 m]
- Q2. A ball is gently dropped from a height of  $20 \text{ m}$ . If its velocity increases uniformly at the rate of  $10 \text{ m/s}^2$ , with what velocity will it strike the ground. After what time will it strike the ground? [20 m/s]
- Q3. A car starts with uniform velocity of  $25 \text{ m/s}$  for  $5 \text{ sec}$ . The brake are applied and car comes to rest with a uniform retardation in further  $10 \text{ sec}$ . Draw a  $v-t$  graph and use it to find -  
(a) the retardation  
(b) distance which the car travels after the brakes are applied. [250 m,  $2.5 \text{ m/s}^2$ ]
- Q4. A ball is thrown vertically up with an initial velocity of  $30 \text{ m/s}$ . Draw a  $v-t$  graph for the motion of a ball.  
(a) calculate the time taken for the ball to reach the highest point and returns back.  
(b) calculate the maximum height it reached  
(c) calculate total distance and displacement travelled.

Q5. The figure given alongside shows the displacement-time graph for the motion of two boys A and B along a straight road in the same direction.



- When did B start after A?
  - How far away was A from B when B started?
  - Which of the two has greater velocity?
  - When and where did B overtake A?
- [2hr, 10km,  $v_B > v_A$ , 20km, 4hr]

Q6. While driving, Jayant travels 30 km with a uniform speed of 40 km/h and next 30 km with a uniform speed of 20 km/h. Find the average speed.

[0.75h, 1.5h, 26.7 km/h]

Q7. A bus starting from rest moves with uniform acceleration of  $0.1 \text{ m/s}^2$  for 2 minutes. Find the (a) speed acquired (b) distance travelled.

[720 m, 12 m/s]

Q8. A train is travelling at a speed of 90 km/h. Brakes are applied so as to produce a uniform acceleration of  $-0.5 \text{ m/s}^2$ . Find how far the train will go before it is brought to rest.

[625 m]

Q9. An express train starts from rest and accelerates uniformly at a rate of  $1 \text{ m/s}^2$  for 20 sec. It then maintains a constant speed for 120 sec. Then the driver applies brakes and the train comes to rest in 10 sec.

- Calculate
- maximum velocity of train
  - retardation on applying brakes.
  - total distance travelled by train
- [ $20 \text{ m/s}$ ,  $-2 \text{ m/s}^2$ ,  $2700 \text{ m}$ ]

Q10. An aeroplane requires for take off a minimum speed of  $360 \text{ km/h}$ . If the engine of the aeroplane can produce a maximum acceleration of  $10 \text{ m/s}^2$  during its motion on runway, what should be the minimum length of runway for a successful take off by the aeroplane?

[ $500 \text{ m}$ ].

Q11. An  $e^-$  moving with a velocity of  $5 \times 10^4 \text{ m/s}$  enters into a uniform electric field and acquires a uniform acceleration of  $10^4 \text{ m/s}^2$  in the direction of its initial motion.

- calculate the time in which the  $e^-$  would acquire a velocity double of its initial velocity.
  - How much distance the  $e^-$  would cover in this time?
- [ $5 \text{ sec}$ ,  $37.5 \text{ m}$ ]

Q12. An electric train is running at  $90 \text{ km h}^{-1}$

On stopping electric supply to the train's engine, the train, moving with a constant retardation, comes to a halt in 20 sec.

Calculate the (a) retardation of the train.  
(b) distance covered by train during this time.  
[ $-1.25 \text{ m/s}^2$ ,  $250 \text{ m}$ ].

Q13. Draw v-t graph for following -

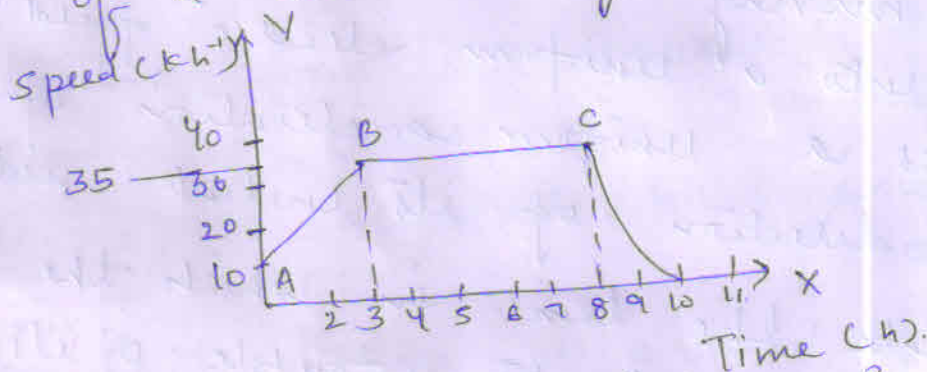
(a) object moving with uniform velocity

(b) object moving with uniform acceleration.

How do you calculate the distance covered by the moving object in a given time  $t$ ?

Q14. Give an example of each type of following motions -  
(a) uniform retardation  
(b) Variable acceleration.

Q15. The graph given below shows how the speed of a car changes with time



(a) What is the initial speed of car?

(b) What is the maximum speed attained by car?

(c) Which part of graph shows zero acceleration?

(d) Which part of graph shows varying retardation?

[ $10 \text{ km/h}$ ,  $35 \text{ km/h}$ , BC, CD].