SECTION – A

Questions 1 to 10 carry 1 mark each.

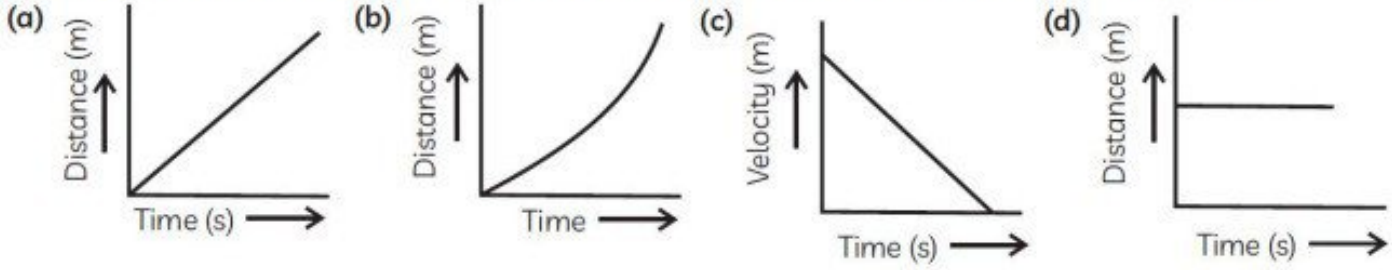
1. For a moving object, the numerical ratio of displacement to distance is:
(a) always less than 1 (b) always equal to 1
(c) always greater than 1 (d) equal or less than 1

2. Rita was enjoying a ride on a Ferris wheel which is revolving at a constant speed of 5 m/s. This shows that Rita is:
(a) at rest (b) moving with no acceleration
(c) in accelerated motion (d) moving with uniform velocity

3. The slope of the Distance-Time graph and Velocity-Time graph represents:
(a) both represent acceleration (b) speed and acceleration respectively
(c) acceleration and speed respectively (d) both represent speed

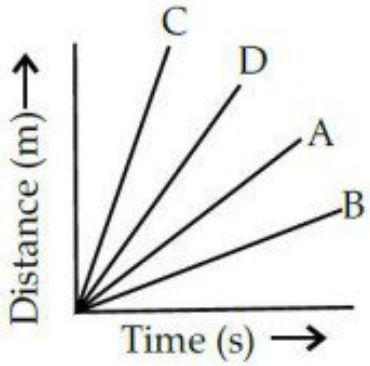
4. The horizontal straight line on distance-time graph indicates:
(a) increasing velocity (b) decreasing velocity
(c) zero velocity (d) constant velocity

5. Which of the following figures represents the uniform motion of a moving object correctly?



6. Name the instrument which is used to measure the instantaneous speed of a vehicle.
(a) Multimeter (b) Ammeter (c) Speedometer (d) Accelerator

7. Four cars A, B, C and D are moving on a levelled road. Their distance versus time graphs is shown in figure. Choose the correct statement.



(a) Car A is faster than car D
(b) Car B is the slowest
(c) Car D is faster than car C
(d) Car C is the slowest.

8. Suppose a boy is enjoying a ride on a merry-goround which is moving with a constant speed of 10 m/s. It implies that the boy is :
(a) At rest
(b) Moving with no acceleration
(c) In accelerated motion
(d) Moving with uniform velocity.

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.
(a) Both the Assertion and the Reason are correct and the Reason is the correct explanation of the Assertion.
(b) The Assertion and the Reason are correct but the Reason is not the correct explanation of the Assertion.
(c) Assertion is true but the Reason is false.
(d) Assertion is false but the Reason is true.

9. Assertion (A): The displacement-time graph of a body moving uniformly is a straight line.
Reason (R): A body travelling with uniform velocity covers equal distances in equal intervals of time with changing direction.

10. Assertion (A): If the velocity of a body in uniform motion changes, its acceleration cannot remain constant.
Reason (R): If a body is thrown vertically upward, the relationship between initial velocity (u) and acceleration (a) at any moment is $v^2 - u^2 = 2as$.

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. A train starting from a railway station and moving with uniform acceleration attains a speed 40 km h^{-1} in 10 minutes. Find its acceleration.

12. A bus decreases its speed from 80 km h^{-1} to 60 km h^{-1} in 5 s. Find the acceleration of the bus.

13. A body is thrown vertically upwards with a velocity and caught back.
(a) What is its displacement and distance travelled?
(b) How do the displacement and distance change if its velocity of projection is halved?

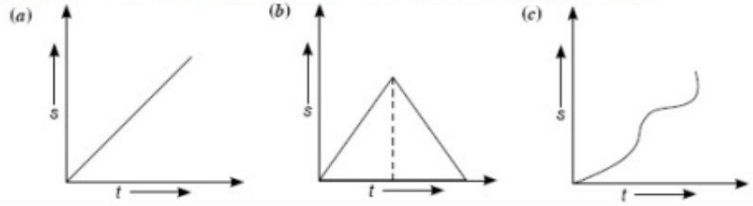
14. Distinguish between uniform and non uniform acceleration.

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. A bus starting from rest moves with a uniform acceleration of 0.1 m s^{-2} for 2 minutes. Find (a) the speed acquired, (b) the distance travelled.

16. What type of motion is represented by following displacement-time graph:



17. A stone is thrown in a vertically upward direction with a velocity of 5 m s^{-1}. If the acceleration of the stone during its motion is 10 m s^{-2} in the downward direction, what will be the height attained by the stone and how much time will it take to reach there?

SECTION – D

Questions 18 carry 5 marks each.

18. (a) Draw a velocity-time graph for an object in uniform motion. Show that the slope of velocity time-graph gives acceleration of the body.

(b) An aeroplane starts from rest with an acceleration of 3 ms–2 and takes a run for 35 s before taking off. What is the minimum length of runway and with what velocity the plane took off?

OR

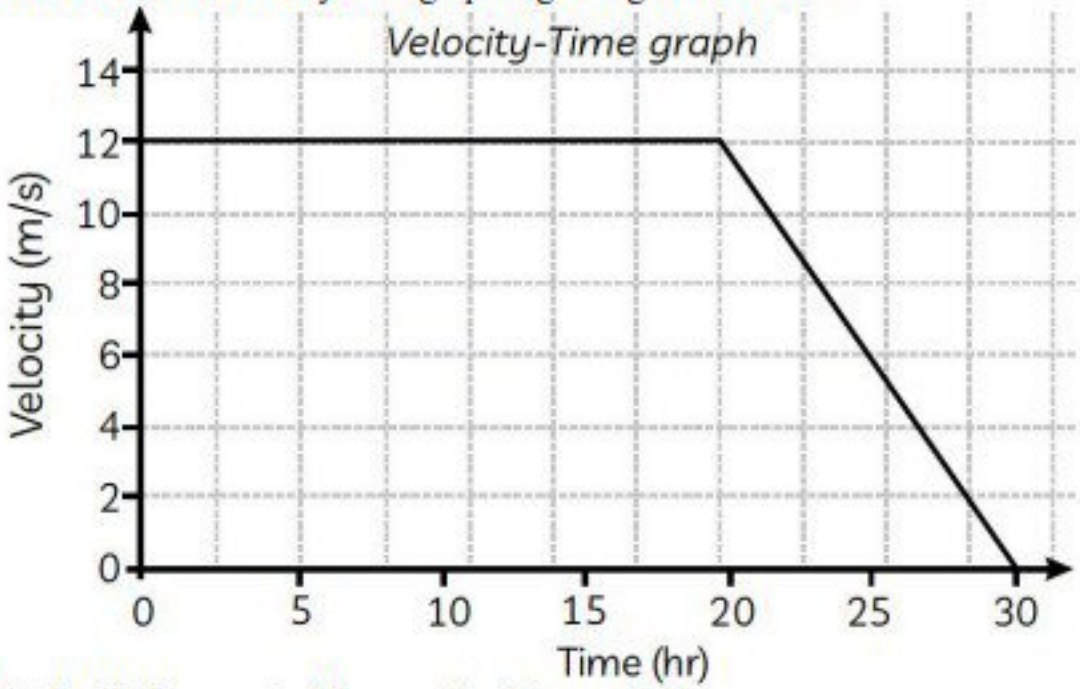
Draw velocity time graph for a body that has initial velocity 'u' and is moving with uniform acceleration '*a*'. Use it to derive $v = u + at$; $s = ut + \frac{1}{2} at^2$, and $v^2 = u^2 + 2as$

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Read the following information and answer the questions based on information and related studied concepts.

Ritesh was driving car to his office. When suddenly a boy came in between the road, he applied brakes suddenly to save the child and the car came to the rest. The whole scenario was observed by Sita and she draws the velocity-time graph regarding the situation.



(a) Calculate the displacement of the car after 20 seconds?

(b) After deceleration, how far does the car go?

(c) Describe the motion of the car from 0 s to 30 s.

20. Read the given passage and answer the questions that follow based on the passage and related studied concepts.

A bus is moving with a velocity of 50 km/h. The driver sees a child running across the road and he pressed the brakes. The time taken by him to stop the bus in this emergency was 1/10 th of a second. In a second case, another bus was coming on the same road at the same 50 km/h and the driver saw another child crossing the road. He applied the brakes and time taken by him to the emergency was 0.5 sec. Both the buses started moving to their destination after 10 minutes. Bus A moved at 45 km/h while bus B moved at 60 km/h.

(a) What is the distance between buses A and B?
(b) How much distance did the bus move in the 1st case before the driver could press the brakes? How much is the distance between bus A and bus B after 1.5 hours?
(c) How much distance did the bus move in the 2nd case before the driver could press the brakes?