A Level Maths

Topic: Velocity-Time and Displacement-Time Graphs

Instructions

Answer all questions. Show complete working. Use the appropriate methods to interpret and analyze the graphs.

Practice Questions

1. A car moves with constant velocity of 10 m/s for 20 seconds. Draw the velocity-time graph for the car's motion and calculate the displacement.
2. A car accelerates from rest at a rate of $2\,\text{m/s}^2$ for 5 seconds. Plot the velocity-time graph and calculate the total displacement.
3. A car travels with an initial velocity of 15 m/s and decelerates at $3\,\text{m/s}^2$ for 10 seconds. Draw the velocity-time graph and calculate the displacement.
4. A particle moves with constant acceleration and its velocity-time graph is given. Find the gradient of the graph and explain its significance.
5. Sketch a velocity-time graph for an object that starts from rest, accelerates uniformly, reaches its maximum velocity, and then decelerates uniformly to a stop.
6. For the displacement-time graph of an object, describe the motion at the following points:
   (a) When the slope is constant.
   (b) When the graph is horizontal.
   (c) When the slope is increasing.
7. A body moves with varying velocity. The velocity-time graph is given. Find the total displacement for the time interval from $t = 0$ to $t = 5$ seconds.

8. Draw the displacement-time graph for an object moving with constant velocity of $8\,\mathrm{m/s}$ for 10 seconds.

9. Given a velocity-time graph for a car, calculate the total distance traveled during the time interval $0 \leq t \leq 6$ seconds.

10. A body is moving with a velocity-time graph that shows constant acceleration for the first 3 seconds and then a constant deceleration for the next 2 seconds. Calculate the displacement during the deceleration phase.

Multiple-Choice Questions

1. The area under the velocity-time graphrepresents:

   A. Speed
   B. Distance
   C. Velocity
   D. Displacement

2. If the velocity-time graph of an object is a straight line with a positive slope, the object is:

   A. At rest
   B. Moving with constant velocity
   C. Accelerating
   D. Decelerating

3. The gradient of a displacement-time graph represents:

   A. Velocity
   B. Acceleration
   C. Distance
   D. Displacement

4. The velocity-time graph of an object shows a constant negative slope. What does this imply about the object's motion?

   A. The object is moving at a constant velocity.
   B. The object is decelerating.
   C. The object is accelerating.
   D. The object is at rest.