Question Paper

Topic 1: Mechanics

Q1. A car moving at a constant speed of 40 m/s takes 10 seconds to come to a stop. What is the acceleration of the car?
Answer: -4 m/s^2
Explanation: Acceleration can be calculated using the formula: acceleration = (final velocity - initial velocity) / time. Here, the final velocity is 0 m/s (as the car comes to a stop), the initial velocity is 40 m/s, and the time taken is 10 seconds. Substituting the values, we get acceleration = (0 - 40) / 10 = -4 m/s^2.

Q2. A ball is thrown vertically upwards with an initial velocity of 20 m/s. How high does the ball go before coming back down? Take the acceleration due to gravity as 10 m/s^2.
Answer: 20 meters
Explanation: To find the maximum height reached by the ball, we can use the kinematic equation: final velocity^2 = initial velocity^2 + 2 * acceleration * displacement. Since the ball reaches its highest point, the final velocity is 0 m/s. Substituting the values, we get: 0 = (20)^2 + 2 * (-10) * displacement. Solving for displacement, we find displacement = 20 meters.