

(a) A 2000-kg car experiences a braking force of 10000 N and skids to a stop in 6 seconds. Calculate the speed of the car just before the brakes were applied. (10 marks)

Hint: Newton's 2nd law

(b) Two automobiles, each of mass 1000 kg, are moving at the same speed, 20 m/s, when they have an inelastic collision. In what direction and at what speed does the wreckage move

(i) If one car was driving north and one south? (4 marks)

(ii) If one car was driving north and one east? (3+3 marks)

Hint: Momentum conservation

(c) Calculate the initial amount of kinetic energy possessed by the car in question 2(a). (7 marks)

(d) What possible forms of energy will the kinetic energy be converted? (6 marks)

(e) The decrease of potential energy for a freely falling object equals its gain in kinetic energy, in accord with the conservation of energy. By simple algebra, find an equation for an object's speed v after falling a vertical distance h . (7 marks)