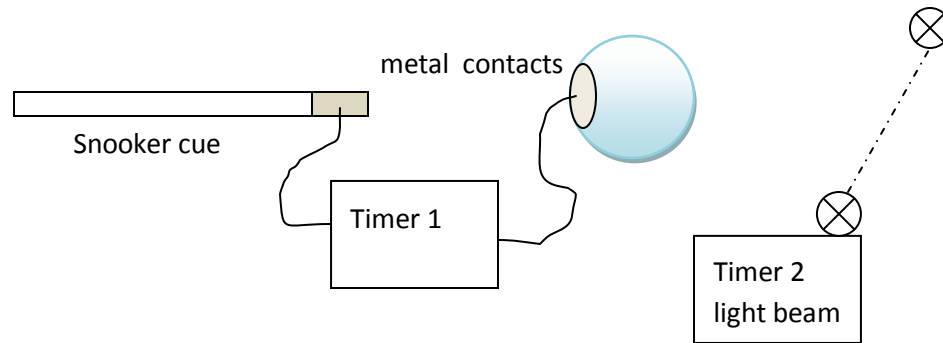


Higher Physics Assessment 005

- 1) A physics student carries out an experiment to calculate the average force exerted by a snooker cue on a snooker ball.

The student sets up the following apparatus:



- a. Explain how this experimental setup would enable the student to calculate the average force exerted by the snooker cue on the snooker ball.
 - b. In one experiment timer 1 registers 0.005 seconds and timer 2 registers 0.2 seconds. The diameter of the snooker ball is 0.10 m and has a mass of 1.0 kg. Use this data to find the average force exerted by the snooker cue on the ball.
- 2) A car of mass 2000 kg travelling at 8 ms^{-1} skids on ice and collides with a stationary car of mass 1000 kg at traffic lights. The two cars move off together.
- a. Find the velocity of the two cars as they move off together.
 - b. By finding the total kinetic energy before and after the collision show that it is an inelastic collision.
- 3) A rocket of mass 18,000 kg is launched from Florida. The thrust from the rocket's engines amounts to 360,000 N.
- a. Sketch a diagram of the forces acting on the rocket.
 - b. Calculate the acceleration of the rocket.
 - c. If the rocket maintains this thrust explain why the rocket's acceleration increases as the flight progresses.