Equations of motion – Practice

1. The driver of a car, travelling at 30 m/s, sees a hazard in the distance and applies the brakes for 1.5 s producing a deceleration of 8.0m/s^2.
   Calculate the distance that car travels during the deceleration. *(36m)*

2. A ball is thrown vertically into the air with an initial speed of 12 m/s.
   Calculate:
   (a) the time it takes to reach its highest point, *(1.22 s)*
   (b) the maximum height above the point of release that it reaches. *(7.3 m)*

3. A cyclist is travelling at 4.0 m/s and accelerates to 10.0 m/s in a time of 5.0 s.
   Calculate:
   (a) the average acceleration, *(1.2 m/s^2)*
   (b) the distance travelled while accelerating. *(35 m)*

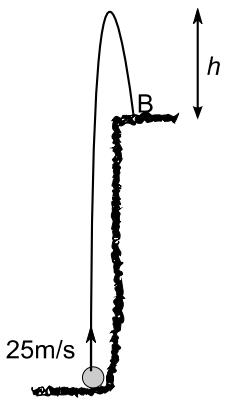
4. A car is measured by a radar speed detector to be travelling at 15 m/s at one point and 40 m/s at a point 350 m down the road.
   Calculate:
   (a) the average acceleration, *(2.0 m/s^2)*
   (b) the time taken to travel the 350m. *(12.7 s)*

5. A fountain projects water vertically to a height of 5.0 m. Calculate the minimum velocity with which the water must leave the fountain nozzle. *(9.9 m/s)*

6. An object is thrown vertically upwards with a velocity of 20 m/s from a height *h* above the ground. It hits the ground 5.0s later. Calculate *h*. *(22.5 m)*

7. A ball is thrown vertically upwards with an initial velocity of 25 m/s from the base of a 15 m cliff.
   Neglect air resistance and the small horizontal motion.

   Calculate:
   (a) the height, *h*, by which the ball clears the top of the cliff, *(17m)*
   (b) the time after release at which the ball lands at B, *(4.4 s)*
   (c) the impact velocity at B. *(18 m/s)*



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