JURONG PIONEER JUNIOR COLLEGE
9478 H2 PHYSICS

PROJECTILE MOTION ASSIGNMENT

Data: $g = 9.81\ \text{m s}^{-2}$ **Formulae**: $s = ut + \frac{1}{2}at^2$; $v^2 = u^2 + 2as$

1 A stone thrown horizontally from the top of a vertical cliff with velocity 10.0 m s^{-1} is observed to strike a soft ground at a distance of 50.0 m from the base of the cliff. Determine

(a) the height of the cliff, [2]

(b) the velocity at which the stone strikes the ground, stating its direction clearly. [3]

2 A footballer standing near the centre of the field kicks a ball with a velocity of 20.0 m s^{-1} at an angle of 37° above the horizontal.

(a) Assuming that the ball was propelled into the air when the footballer's foot was at a height of 0.200 m above the ground, calculate the horizontal distance the football travels if it hits a goal post bar at a height of 2.44 m. [4]

(b) Calculate the maximum height reached by the ball. [2]

(c) Calculate the velocity of the ball when it hits the bar. [3]

(d) Sketch on the same diagram the path taken by the ball if there is (i) no air resistance and (ii) a large air resistance. [2]

(e) Sketch on the same graph the accleration-time graph of the ball if there is (i) no air resistance and (ii) a large air resistance. [2]