**PROJECTILE MOTION QUESTIONS – Worksheet 2**

In all the following questions ignore the effects of air resistance. Take the acceleration due to gravity close to the surface of the Earth as 9.8 ms-2. Answers are provided in parentheses.

1    A football is kicked with a speed of 25 m/s at an angle of 30o to the horizontal. Neglecting air resistance determine:

(a)   The time of flight for the football. (2.55 s)

(b)   The maximum height reached by the football. (7.97 m)

(c)    The horizontal range of the football. (55.2 m)

2    A crate of supplies for a scientific expedition to Antarctica is being dropped by plane. When the supplies are dropped, the plane is travelling at 40 m/s horizontally at a height of 500 m. The parachute fails to open and the package falls to the ground under gravity. Ignoring air resistance, find the horizontal distance travelled by the package as it falls to the ground. (404 m)

3    A stone is thrown horizontally from the top of a vertical cliff. Given that the initial velocity of the stone is 20 m/s and that it hits the horizontal ground below the cliff 3 seconds later, calculate:

(a)   The horizontal distance travelled by the stone from the foot of the cliff. (60 m)

(b)   The height of the cliff. (44.1 m)

(c)    The velocity of the stone just before it hits the ground. (35.6 m/s at an angle of  
 55.8o below the horizontal)  
  
  
  
**EXTENSION QUESTION**

4    A stone is thrown vertically upwards with a velocity of 29.4 m/s from the edge of a cliff 78.4 m high. The stone falls so that it just misses the edge of the cliff and falls to the ground at the foot of the cliff. Determine the time taken by the stone to reach the ground. Assume air resistance is negligible and that the acceleration due to gravity is 9.8 ms-2.  
(8 s)