10 The Moon orbits the Earth.

(a) State a difference between the orbit of a moon and the orbit of a planet.

(2)

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(b) The radius of the Moon's orbit is 385 000 km.

It takes 27 days for the Moon to complete one orbit.
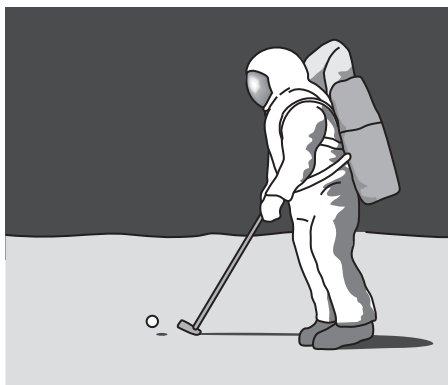
Calculate the orbital speed of the Moon.

Give a suitable unit.

(3)

orbital speed = ... unit ....

(c) In 1971, astronaut Alan Shepard hit a golf ball on the surface of the Moon.

The golf ball had a mass of 50 g and he transferred 56 J of energy to it.

(i) State the equation linking kinetic energy, mass and velocity.

(1)

(ii) Calculate the initial velocity of the ball.

(3)

initial velocity = ... m/s

(d) At its highest point the ball had gained 12 J of gravitational potential energy.

(i) State the kinetic energy of the ball at its highest point.

(1)

kinetic energy = ...J

(ii) State the equation linking gravitational potential energy, mass, g and height.

(1)

(iii) Calculate the maximum height that the ball reached.
(gravitational field strength on the Moon, g = 1.6 N/kg)

(2)

maximum height = ...m

(e) Suggest why the ball travelled further on the Moon than it would have done on Earth.

(2)

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(Total for Question 10 = 15 marks)