OCR
Oxford Cambridge and RSA

A level Physics B

H557/01 Fundamentals of physics

Question Set 10

1. (a) The Moon is in circular orbit around Earth at constant speed.

Explain why we describe the Moon as accelerating towards the Earth.

[2]

(b) (i) Starting from the equation for circular motion show that the acceleration of the Moon towards the Earth is given by

$$a = \frac{4\pi^2 R}{T^2}$$

where the Moon's orbital radius is R and the Moon's orbital time is T.

[1]

(ii)

Show that the Moon's acceleration is less than 3 mm s^{-2}.

$R = 3.84 \times 10^8$ m $\quad T = 2.35 \times 10^6$ s

[1]

(iii) The Moon's orbital radius $R = 60\ R_{Earth}$.
The gravitational acceleration at the Earth's surface $g = 9.8$ m s^{-2}.

Calculate the acceleration due to the Earth's gravity at the Moon's orbit.

Compare this value to the value calculated in **(ii)**.

acceleration =.....m s^{-2}

[3]

Total Marks for Question Set: 7