

First Name: \_\_\_\_\_

Last Name: \_\_\_\_\_

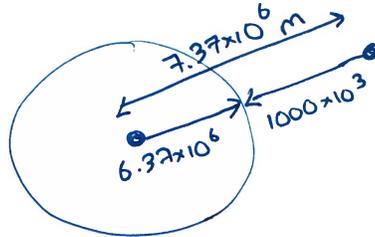
103 - EQ - Gravitational fields

Q1: What is the gravitational field strength of the Earth at a point 1000 km above the surface? (3 marks)

$$M_{\text{Earth}} = 5.97 \times 10^{24} \text{ kg}$$

$$r_{\text{Earth}} = 6.37 \times 10^6 \text{ m}$$

$$G = 6.67 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$$



$$g = \frac{Gm_{\text{source}}}{r^2} = \frac{(6.67 \times 10^{-11})(5.97 \times 10^{24})}{(7.37 \times 10^6)^2} = \frac{3.98199 \times 10^{14}}{5.43169 \times 10^{13}}$$

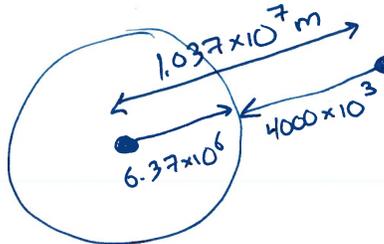
$g = 7.33 \text{ N/kg}$

Q2: How quickly will an object 4000 km above the surface of the Earth accelerate? (3 marks)

$$M_{\text{Earth}} = 5.97 \times 10^{24} \text{ kg}$$

$$r_{\text{Earth}} = 6.37 \times 10^6 \text{ m}$$

$$G = 6.67 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$$



$$g = \frac{Gm_{\text{source}}}{r^2} = \frac{(6.67 \times 10^{-11})(5.97 \times 10^{24})}{(1.037 \times 10^7)^2} = \frac{3.98199 \times 10^{14}}{1.075369 \times 10^{14}}$$

$g = 3.70 \text{ m/s}^2$

**MARKING:**

Beginning	0	-	2.5
Progressing	3	-	4.5
Competent	5	-	5.5
Exemplary	6		