Answer **all** the questions in the spaces provided.

1   **(a)** **(i)** State what is meant by *gravitational field strength*.

....

....

....[1]

(ii) Explain why, at the surface of a planet, gravitational field strength is numerically equal to the acceleration of free fall.

....

....

....[1]

(b) An isolated uniform spherical planet has radius R.
The acceleration of free fall at the surface of the planet is g.

On Fig. 1.1, sketch a graph to show the variation of the acceleration of free fall with distance x from the centre of the planet for values of x in the range $x = R$ to $x = 4R$.
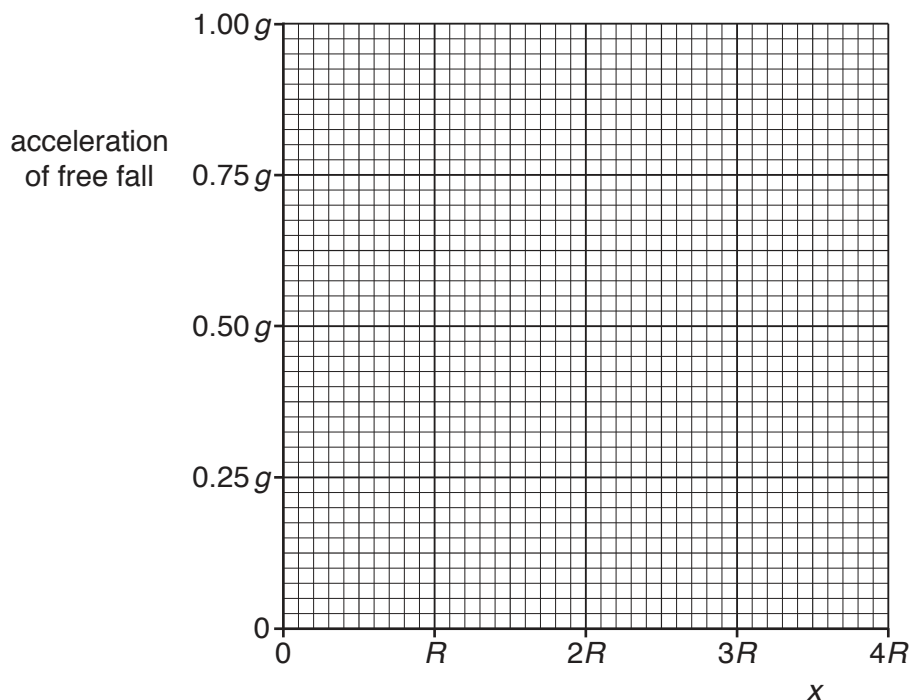

Fig. 1.1

[3]

(c) The planet in **(b)** has radius R equal to 3.4×10^3 km and mean density 4.0×10^3 kg m^{-3}.

Calculate the acceleration of free fall at a height R above its surface.

acceleration of free fall = ... m s^{-2} [3]

[Total: 8]