For Examiner's Use

3 **(a)** **(i)** State, in terms of the forces acting on an object, one condition necessary for the object to move in a circular path at constant speed.

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.....[1]

(ii) An object moves in a circular path at constant speed. Explain why the object has acceleration.

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.....[1]

(b) A satellite travels in a circular orbit around the Earth at a constant speed of $2500\,m\,s^{-1}$.

The mass of the Earth is 6.0×10^{24} kg and may be assumed to be a point mass at the centre of the Earth.

(i) Calculate the radius of the orbit. Explain your working.

radius = ... km [3]

(ii) The radius of the orbit of the satellite is reduced.

State and explain the effect on

1. the potential energy of the satellite,

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.....[1]

2. the kinetic energy of the satellite.

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.....[1]