Name of the Student:_____
Max. Marks : 7 Marks **Time : 7 Minutes**

Mark Schemes

Q1.

(a) (i) (Minimum) Speed (given at the Earth's surface) that will allow an object to leave / escape the (Earth's) gravitational field (with no further energy input)

Not gravity
Condone gravitational pull / attraction

B1
1

(ii) $\frac{1}{2} mv^2 = \frac{GMm}{r}$

B1

Evidence of correct manipulation
At least one other step before answer

B1
2

(iii) Substitutes data and obtains $M = 7.33 \times 10^{22}$(kg)
or
Volume = $(1.33 \times 3.14 \times (1.74 \times 10^6)^3$ or 2.2×10^{19}

or $\rho = \frac{3v^2}{8\pi Gr^2}$

C1

3300 (kg m^{-3})

A1
2

(b) (Not given all their KE at Earth's surface) energy continually added in flight / continuous thrust provided / can use fuel (continuously)

B1

Less energy needed to achieve orbit than to escape from Earth's gravitational field / it is not leaving the gravitational field

B1
2

[7]

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