ANSWER QUESTION 6 ONLY

Period $T = \dfrac{\text{circumference of orbit}}{\text{speed}}$

$= \dfrac{2\pi r}{v}$

$v^2 = \dfrac{GM}{r} = \left(\dfrac{2\pi r}{T}\right)^2$

$\Rightarrow M = \dfrac{(2\pi)^2 r^3}{GT^2}$

$= \dfrac{(2\pi)^2 (4.22 \times 10^8)^3}{6.68 \times 10^{-11} \times (42.5 \times 60 \times 60)^2}$

$= 1.9 \times 10^{27}\ kg$