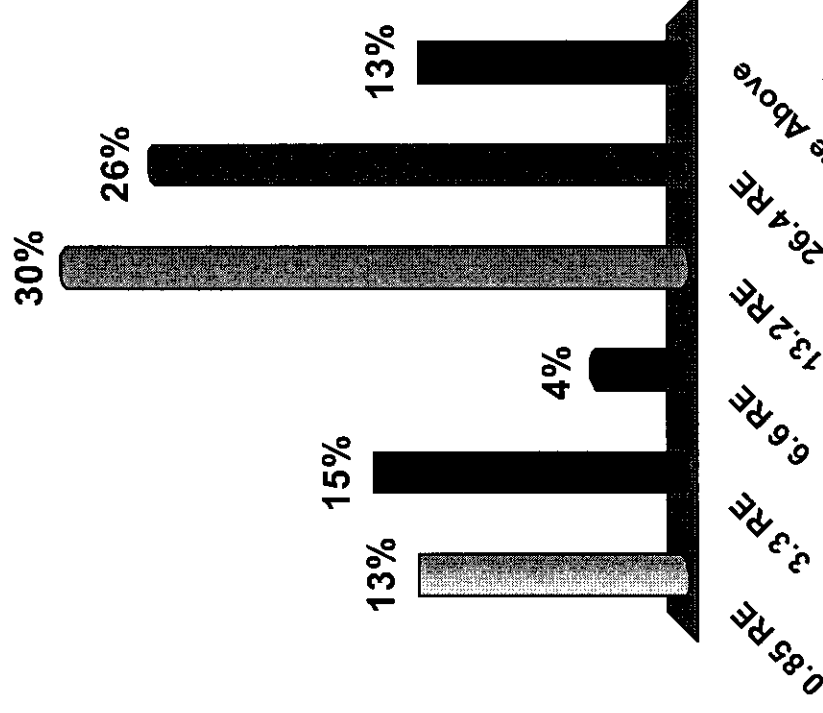


Given that a geosynchronous satellite must be 6.6 earth Radii from the center of the earth, how far must a satellite be whose period is 8 days?

- a)  $0.85 R_E$
- b)  $3.3 R_E$
- c)  $6.6 R_E$
- d)  $13.2 R_E$
- e)  $26.4 R_E$
- f) None of the Above



The correct answer is (f),

$$D = 26.4 R_E$$

- By Kepler's III Law,  $T^2 = c \cdot R^3$ .
- Therefore, for any two earth orbits, ratio is
- $(T_2/T_1)^2 = c \cdot R_2^3 / c \cdot R_1^3$ , (&  $c/c=1$ ), so that for  $T_1 = 24$  hr,  $T_2 = 8 \cdot 24$  hr, &  $R_1 = 6.6 \cdot R_E$ ,
- we obtain  $8^2 = R_2^3 / R_1^3$ . Taking cube roots yields:  $(8^2)^{1/3} = (R_2^3 / R_1^3)^{1/3}$ ,
- so that  $4 = R_2 / R_1$ , or
- $R_2 = 4 \cdot R_1 = 4 \cdot (6.6) \cdot R_E = 26.4 R_E$