Show that in a simple model the maximum height h of the tide is given by

$$h = \frac{mR^4}{MD^3},$$

where m and M are the masses of the Moon and Earth, respectively, R is the radius of the Earth, and D is the distance of the Moon from the Earth. What assumptions have been made in deriving this estimate?

Explain why the height of tides on the Atlantic seaboard is typically several metres rather than ~ 0.5 m as given by the simple estimate above. [The speed of a tidal wave in water of depth D is given by $(gD)^{1/2}$, where g is the acceleration due to gravity, and the Atlantic can be taken to have a width of 4000 km and a depth of 4000 m.]

Explain the difference between a tidal-stream and a tidal-barrage scheme. Why are tidal-stream projects attracting more attention than tidal-barrage ones?