Q. 11. Let g' = acceleration due to gravity on the moon. l', T' will be the length and periodic time of the pendulum on the moon.

$$T : T' = 2\pi\sqrt{\frac{l}{g}} : 2\pi\sqrt{\frac{l'}{g'}}$$

$$= 2\pi\sqrt{\frac{8}{l}} : 2\pi\sqrt{\frac{3}{\frac{1}{6}}}$$

$$= \sqrt{8} : \sqrt{18}$$

$$= \sqrt{4} : \sqrt{9}$$

$$= 2 : 3$$

Q. 12. (i) As in text.

(ii) $T = 2\pi\sqrt{\frac{k}{g}}$

$$\Rightarrow T^2 = 4\pi^2 \frac{k}{g}$$

$$\Rightarrow g = \frac{4\pi^2 k}{T^2}$$ **QED**

(iii) 39 cycles / min

$$= 1 \text{ cycle} / \frac{1}{39} \text{ min}$$

$$= 1 \text{ cycle} / \frac{60}{39} \text{ s}$$

$$\text{So, } g = \frac{4\pi^2(0.6)}{\left(\frac{60}{39}\right)^2}$$

$$\Rightarrow g = 10.0 \text{ m/s}^2$$

(iv) $$\% \text{ Error} = \frac{(10.0 - 9.8)\,(100)}{9.8} = 2.04\%$$

$$= 2\% \text{ (to nearest percent)}$$