

- 8.11** If the mass of sun were ten times smaller and gravitational constant G were ten times larger in magnitudes-
- (a) walking on ground would become more difficult.
 - (b) the acceleration due to gravity on earth will not change.
 - (c) raindrops will fall much faster.
 - (d) airplanes will have to travel much faster.

11) Accr. to problem,

Ans \Rightarrow (a, c, d)

$$G' = 10G$$

So, Gravitational Field due to Earth

$$g' = \frac{G' M_e}{R^2} = 10g$$

$$\begin{aligned} \text{Force on the man due to Sun} &\Rightarrow \frac{G(M'_s)m}{r^2} \\ &= \frac{G(M_s)m}{10r^2} \quad \left(\because M'_s = \frac{M_s}{10} \right) \end{aligned}$$

As $r \gg R \Rightarrow$ Force due to Sun will be very small. (So it will be neglected)

As $g' = 10g$, walking on ground will be much more difficult. Also raindrops will fall much faster. To overcome increased gravitational force, the airplanes will have to travel much faster.