Q1

$$\vec{F} = -\frac{G_N M_{sun} m}{r^2} \cdot \frac{\vec{r}}{r} \quad - (1)$$

$$r_s = \frac{2 G_N M_{sun}}{c^2}$$

$$\frac{r_s c^2}{2} = G_N M_{sun} \quad - (2)$$

sub (2) into (1)

$$\vec{F} = -\frac{r_s c^2}{2} \cdot \frac{m}{r^2} \cdot \frac{\vec{r}}{r}$$

$$= -\frac{c^2}{2}\left(\frac{r_s}{r^2}\right)\frac{\vec{r}}{r} \cdot m$$

$$\therefore \quad \ddot{\vec{r}} = -\frac{c^2}{2}\left(\frac{r_s}{r^2}\right)\frac{\vec{r}}{r}$$