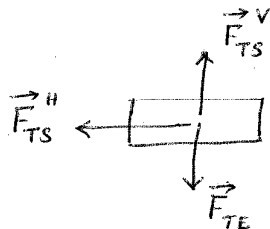


Solution to Group Exercise 1, Physics 2414

(1) (a)



$$(b) \quad \vec{F}_{\text{net on truck}} = \vec{F}_{TE} + \vec{F}_{TS}^V + \vec{F}_{TS}^H$$

$$(c) \quad F_{\text{net along vertical}} = -50 \text{ kN} + 50 \text{ kN} + 0 \\ = 0$$

$$F_{\text{net along horizontal}} = 0 + 0 - 15 \text{ kN} \\ = -15 \text{ kN}$$

$$(d) \quad \vec{F}_{\text{net}} = m \vec{a}$$

In the horizontal direction we have

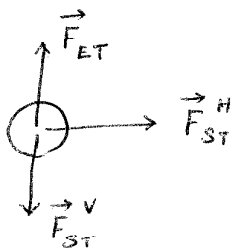
$$F_{\text{net along horizontal}} = m a_{\text{truck}}$$

$$-15 \text{ kN} = 10,000 \text{ kg } a_{\text{truck}}$$

$$- \frac{15 \text{ kN}}{10,000 \text{ kg}} = a_{\text{truck}}$$

$$- 1.5 \text{ m/s}^2 = \underline{\underline{a_{\text{truck}}}}$$

② (a)



$$(b) \quad \vec{F}_{\text{net on earth}} = \vec{F}_{ET} + \vec{F}_{ST}^V + \vec{F}_{ST}^H$$

$$F_{\text{net along vertical}} = +50 \text{ kN} - 50 \text{ kN} + \cancel{15 \text{ kN}} 0 \text{ kN} \\ = 0$$

$$F_{\text{net along horizontal}} = 0 + 0 + 15 \text{ kN} \\ = +15 \text{ kN}$$

$$(c) \quad F_{\text{net along horizontal}} = m a_{\text{earth}}$$

$$+15 \text{ kN} = 6 \times 10^{24} \text{ kg } a_{\text{earth}}$$

$$\frac{15 \times 10^3 \text{ N}}{6 \times 10^{24} \text{ kg}} = a_{\text{earth}}$$

$$2.5 \times 10^{-21} \text{ m/s}^2 = \underline{\underline{a_{\text{earth}}}}$$

$$③ (a) \quad \vec{F}_{ET}$$

$$(b) \quad \vec{F}_{ST}^V$$

$$(c) \quad \vec{F}_{ST}^H$$