



$$F = 30 \text{ N} ; \phi = 30^\circ ; \theta = 37^\circ ; m = 3 \text{ kg} ; \mu_k = 0.2 ;$$

(1) Above

$$(2) \sum F_x = F \cos \phi - mg \sin \theta - f_k = ma \quad (a)$$

$$f_k = \mu_k N \quad (b)$$

$$\sum F_y = N + F \sin \phi - mg \cos \theta = 0 \quad (c)$$

$$\text{from (c)} \Rightarrow N = mg \cos \theta - F \sin \phi = 8.48 \text{ N}$$

$$(3) \quad \text{from (b)} \Rightarrow f_k = \mu_k N = 1.7 \text{ N}$$

(4) from (a), (b) and (c)

$$F \cos \phi - mg \sin \theta - \mu_k (mg \cos \theta - F \sin \phi) = ma$$

$$\therefore a = \frac{1}{m} (F \cos \phi - mg \sin \theta - \mu_k (mg \cos \theta - F \sin \phi)) = 2.2 \text{ m/s}^2$$