

Question #1)

SOLUTION

FBD cabinet:

(a)

$$\uparrow \Sigma F_y = 0: N_A + N_B - W = 0$$

$$N_A + N_B = W$$

Impending slip:

$$F_A = \mu_s N_A$$

$$F_B = \mu_s N_B$$

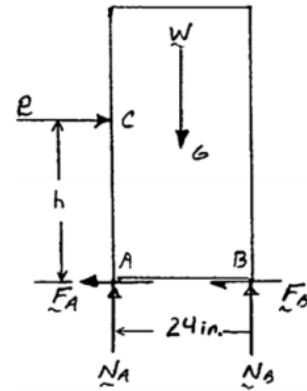
So

$$F_A + F_B = \mu_s W$$

$$\rightarrow \Sigma F_x = 0: P - F_A - F_B = 0$$

$$P = F_A + F_B = \mu_s W$$

$$P = 0.3(120 \text{ lb}) = 36.0 \text{ lb}$$



$$W = 120 \text{ lb}$$

$$\mu_s = 0.3$$

$$P = 36.0 \text{ lb} \rightarrow \blacktriangleleft$$

Question #2)

This is only an example of two FBDs that could have been used. The other wedge or block could have also been analysed. It is to note that using the normal (N) and friction (F) separately instead of R is the best way to illustrate the forces on the FBD.

Only forces were required without the angles.

NOTE: The point of application of a force needs to be clearly understood and used accordingly in order for the FBD to be representative of the analysed system. (ex: the weight is applied at the center of gravity not anywhere else, although mathematically it makes no difference!).

