

Q- A 225 kilogram piano is pushed across the floor with a 155 Newton Force if the piano accelerates at 0.37 m/s^2 . What is the coefficient of friction between the piano and the floor?

Net force on the piano is given by Newton's second law of motion as

$$F = ma = 225 \times 0.37 = 83.25 \text{ N}$$

Thus the friction force on the piano will be

$$F = F_{\text{applied}} - F_{\text{friction}}$$

Or $F_{\text{friction}} = F_{\text{applied}} - F = 155 - 83.25 = 71.75 \text{ N}$

The normal reaction of the floor is

$$N = mg = 225 \times 9.8 = 2205 \text{ N}$$

Hence the coefficient of friction is given by

$$\mu = \frac{F_{\text{friction}}}{N} = \frac{71.75}{2205} = 0.0325$$

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