2017 Ph H1 Q2

Section: Our Dynamic Universe
Topic: Forces

Question Recap:

A block of mass $m = 20\,\text{kg}$ is on a **horizontal** surface.
A **force of 24 N** is applied at an angle of **60°** to the horizontal.
The block **accelerates at** $0.20\,\text{m/s}^2$.
We are asked to find the **force of friction** acting on the block.

Step 1: Horizontal Forces

The applied force is at an angle, so the **horizontal component** is:

$$F_{\text{applied, horizontal}} = 24\cos(60^\circ) = 24 \times 0.5 = 12\,\text{N}$$

Step 2: Net Force using Newton's 2nd Law

The net horizontal force is also:

$$F_{\text{net}} = ma = 20 \times 0.20 = 4.0\,\text{N}$$

Step 3: Use Newton's 2nd Law to find friction

If the **net force** is 4.0 N, and the applied **horizontal** component is 12 N, then:

$$f_{\text{friction}} = F_{\text{applied, horizontal}} - F_{\text{net}} = 12 - 4 = 8\,\text{N}$$

✅ Final Answer:

B

Revision Tips:

- Always resolve angled forces into horizontal/vertical components
- Apply Newton's 2nd Law only in the **horizontal direction** for this question
- Friction always **opposes motion** — subtract it from the applied force to get net force
- Watch for **angles** — even a simple-looking question may require trigonometry