2021-Ph-H1-Q4

Section: Our Dynamic Universe
Topic: Forces, Energy and Power

Summary:
A 60 kg block is pulled up a 40° incline by a 500 N force. We are asked to determine the **maximum acceleration** of the block.

Solution:

1. Component of weight down the slope:
$W_{\parallel} = mg\sin 40^\circ = 60 \times 9.8 \times \sin 40^\circ \approx 378 \text{ N}.$

2. Net force on the block:
$F_{\text{net}} = 500 - 378 = 122 \text{ N}.$

3. Acceleration:
$a = \frac{F_{\text{net}}}{m} = \frac{122}{60} \approx 2.0 \text{ m/s}^2.$

Answer: A. 2.0 m/s²

Guidance for Students:

- Always resolve the weight component parallel to the slope: $W_{\parallel} = mg\sin\theta$.
- The net force is the applied force minus the component of weight down the slope.

Revision Tips:

- Know how to resolve forces on inclines using trigonometry.
- $F = ma$ always refers to **net** force, not just applied force.
- Use $g = 9.8 \text{ m/s}^2$ unless told otherwise.