Quiz

Chapter # 05 (FORE & Motion - I)

Topics Included:

- Newtons Law of Motion
- Freebody Diagram
- Forces (1D/2D)
  - → Gravitational
  - → Friction
  - → Tension
  - → Weight

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QUIZ 3

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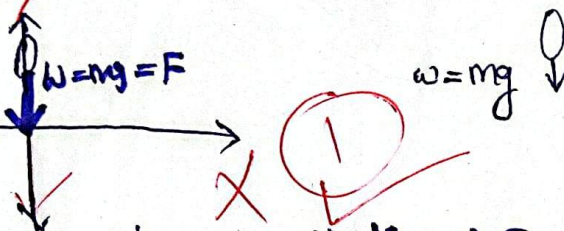Semester 01................. Class Applied Physics............ Section. BSCS-1B

Instructions:
- ❖ Attempt all questions.
- ❖ Show all steps clearly.
- ❖ Direct answers without steps will result in mark deductions.

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Q1. An egg is free-falling from a nest in a tree. Neglect air resistance. Diagram the forces acting on the egg as it is falling
**[2 Marks]**

Diagram:

$W = mg = F$ $w = mg$ $\downarrow W = wg = F_g$

① X

Explanation: only **gravitational force** i.e $F = mg$ (equal to weight) will act on the egg when egg is **free Falling.**

Q2. There are two horizontal forces on the 2.0 kg box in the overhead view of Fig. but only one (of magnitude $F_1 = 20$ N) is shown. The box moves along the x axis. For each of the following values for the acceleration ax of the box, find the second force in unit-vector notation: (a) 10 m/s², (b) 20 m/s²,(c) 0.
[8 Marks]

$\vec{F_1}$ x   8 F_2 F_1
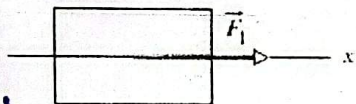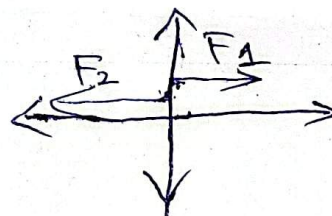
Given:

$M = 2$ kg
$F_1 = 20$ N

Solution

$F_{net} = ma$

$F_1 + F_2 = ma$

$F_2 = ma - F_1$

(a) $a = 10$ ms⁻²

$F_2 = (2)(10) - 20$

$\boxed{\vec{F_{2a}} = 0\hat{i} \; N}$

(b) $a = 20$ ms⁻²

$F_2 = (2)(20) - 20$

$F_{2b} = 40 - 20 = 20N$

$\boxed{\vec{F_{2b}} = 20\hat{i} \; N}$

(c) $a = 0$ ms⁻²

$F_2 = (2)(0) - 20$

$\boxed{\vec{F_{2c}} = -20\hat{i} \; N}$

As box moves only along the x-axis so their vertical components are zero and there are only x-component.