

QUIZ 3

Name..... Roll no. Date

Semester Class Section

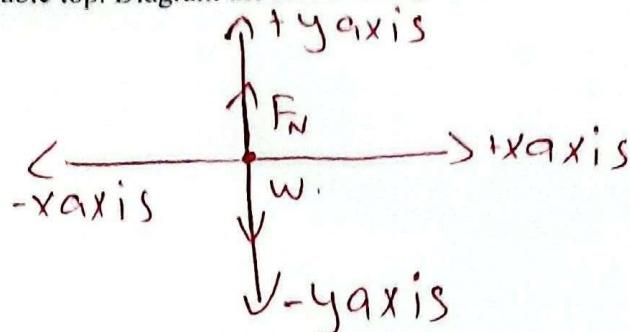
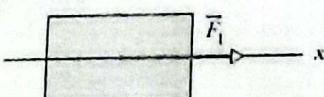
Instructions:

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

Q1. A book is at rest on a table top. Diagram the forces acting on the book.

(2 Marks)

Sol:

Q2. There are two horizontal forces on the 2.0 kg box in the overhead view of Fig. but only one (of magnitude $F_1 = 20 \text{ N}$) is shown. The box moves along the x axis. For each of the following values for the acceleration a_x of the box, find the second force in unit-vector notation: (a) -10 m/s^2 , (b) -20 m/s^2 , (c) 0. (8 Marks)

Sol:

$$m = 2.0 \text{ kg} \quad (b): \sum F = 20 + F_2 x$$

$$F_{1x} = 20 \text{ N}$$

$$F_{1y} = 0$$

$$\sum F_y = F_{1y} + F_{2y}$$

$$0 = 0 + F_{2y}$$

$$0 = F_{2y}$$

$$ma = 20 + F_2 x$$

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

$$-40 - 20 = F_2 x$$

$$-60 = F_2 x$$

$$(c) \text{ Sol: } \sum F = 20 + F_2 x$$

$$ma = 20 + F_2 x$$

$$m(0) = 20 + F_2 x$$

$$-20 \hat{i} \text{ N} = F_2 x$$

(a)

$$\text{Sol: } \sum F = \sum F_x$$

$$\sum F = F_{1x} + F_{2x}$$

$$ma = 20 + F_{2x} \Rightarrow 2(-10) = 20 + F_{2x} \Rightarrow -40 \hat{i} \text{ N}$$