

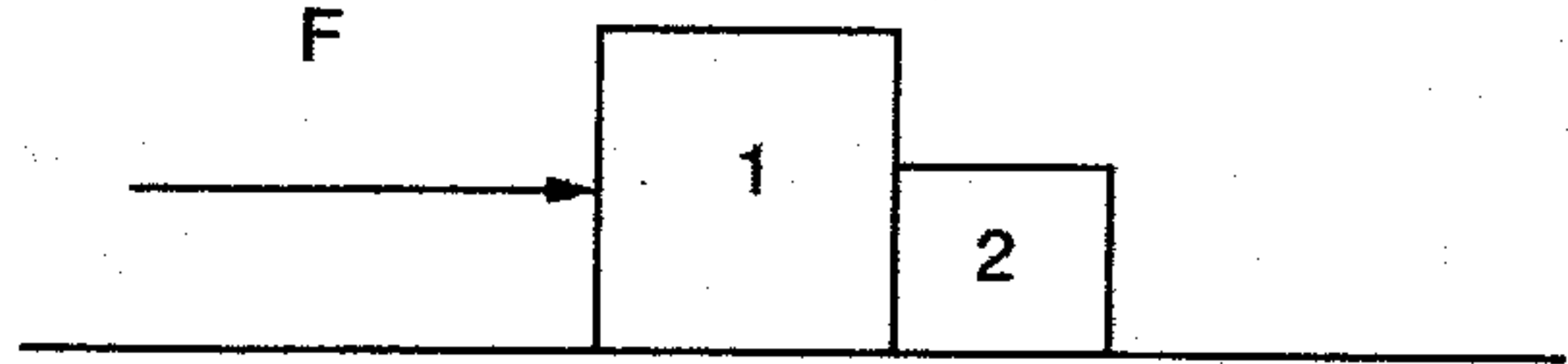
Solutions

PHYS 1408-001 Exam #2 - Fall, 2009

$g=9.80 \text{ m/s}^2$

Bubble in your answers on your scantron. BUBBLE IN YOUR ARRRRRRR NUMBER CORRECTLY!!
Please return this exam sheet as well, with your name written legibly on it.

72%
d 1. In the diagram on the right, a horizontal force F pushes on the two blocks, which lie on a frictionless surface. Block 1 has a greater mass than block 2. Which of the following statements is the true one?



- a) block 1 exerts no force on block 2
- b) block 1 exerts more force on block 2 than block 2 exerts on block 1
- c) block 1 exerts less force on block 2 than block 2 exerts on block 1
- d) block 1 exerts the same magnitude of force on block 2 as block 2 exerts on block 1
- e) block 2 exerts no force on block 1

Newton's 3rd law

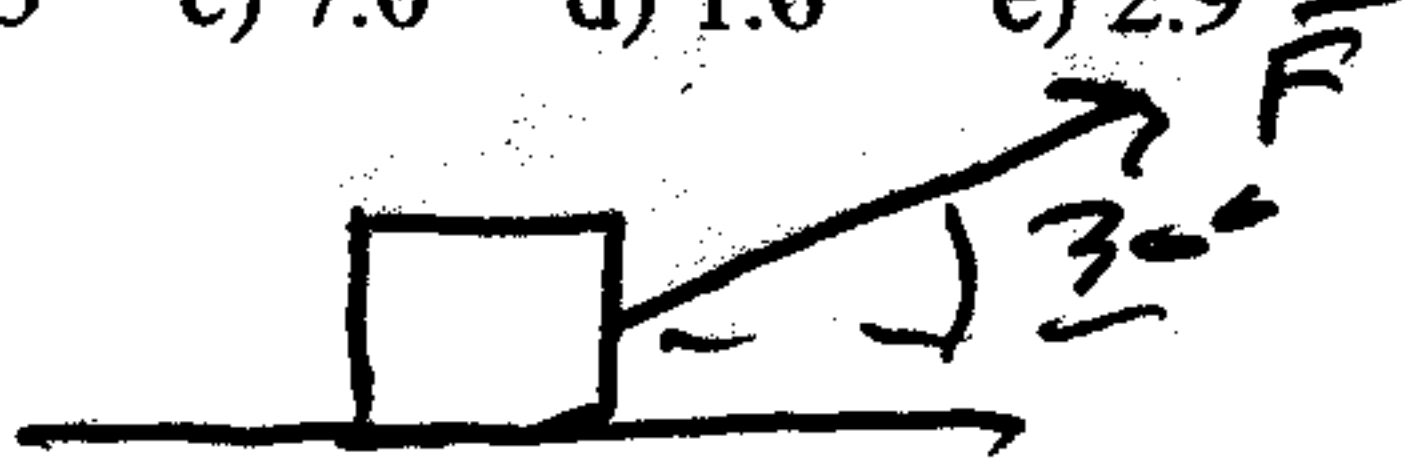
73% b 2. A body is observed to move at a constant velocity. Does this indicate that there are no forces acting on the body?

- a) yes, there can be no forces acting on it
- b) no, there could be some number of forces acting on it

Net force = 0

56% a 3. A 2.5 kg object on a horizontal, frictionless surface is pulled by an applied force which is angled 30 degrees above the horizontal. If the object's acceleration is 1.4 m/s^2 , what is the magnitude of the applied force, in N?

- a) 4.0
- b) 3.5
- c) 7.0
- d) 1.6
- e) 2.9



$$F \cos \theta = ma$$

$$F = \frac{ma}{\cos \theta} = 4.0 \text{ N}$$

54% e 4. The 4.0 kg object in the diagram on the right is hanging on a rope which makes a 20 degree angle to the vertical as shown.

The tension of the horizontal string is, in N.

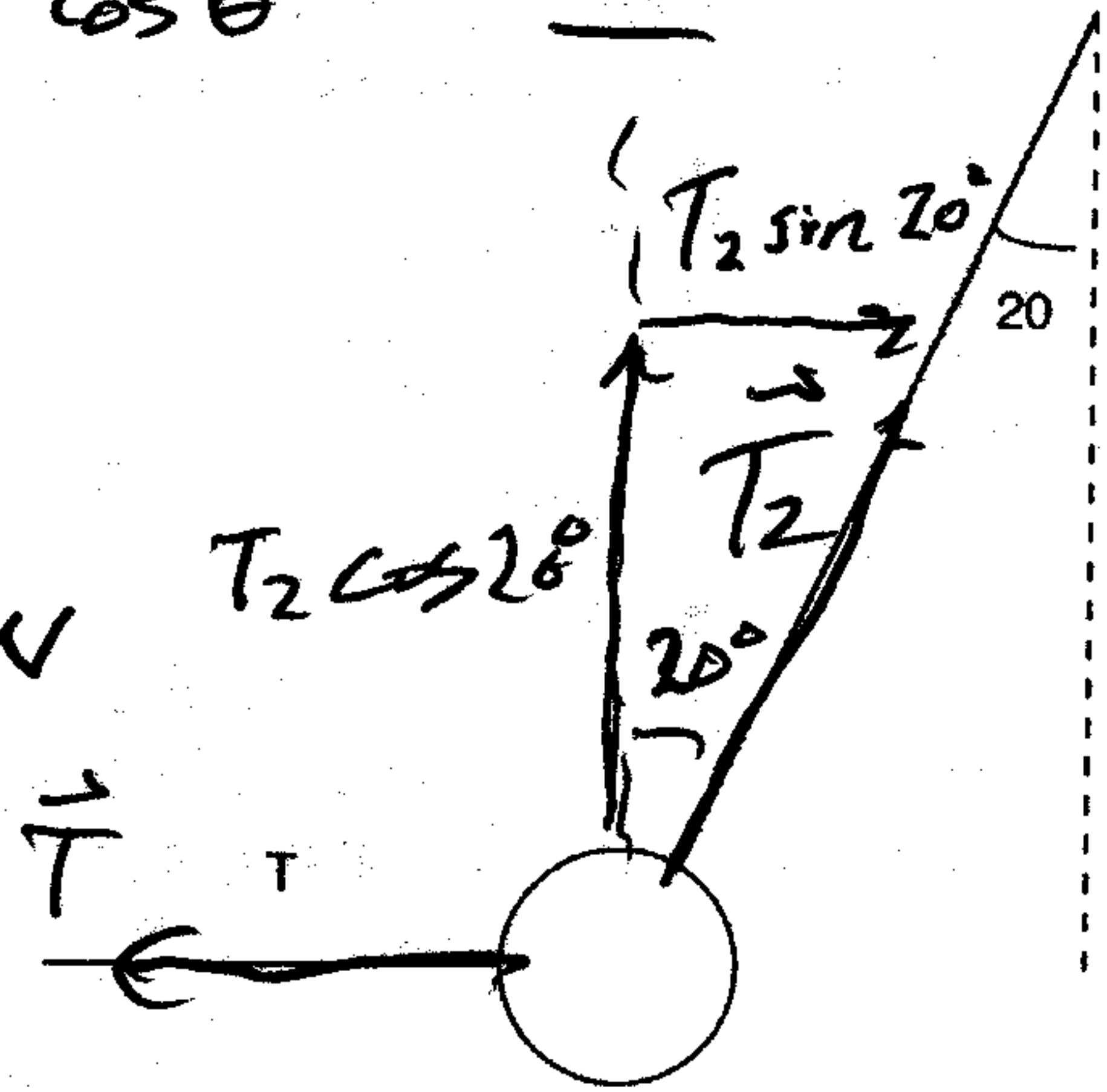
- a) 39
- b) 110
- c) 42
- d) 18
- e) 14

$$T_2 \cos 20^\circ = mg$$

$$\text{or } T_2 = \frac{mg}{\cos 20^\circ} = 41.7 \text{ N}$$

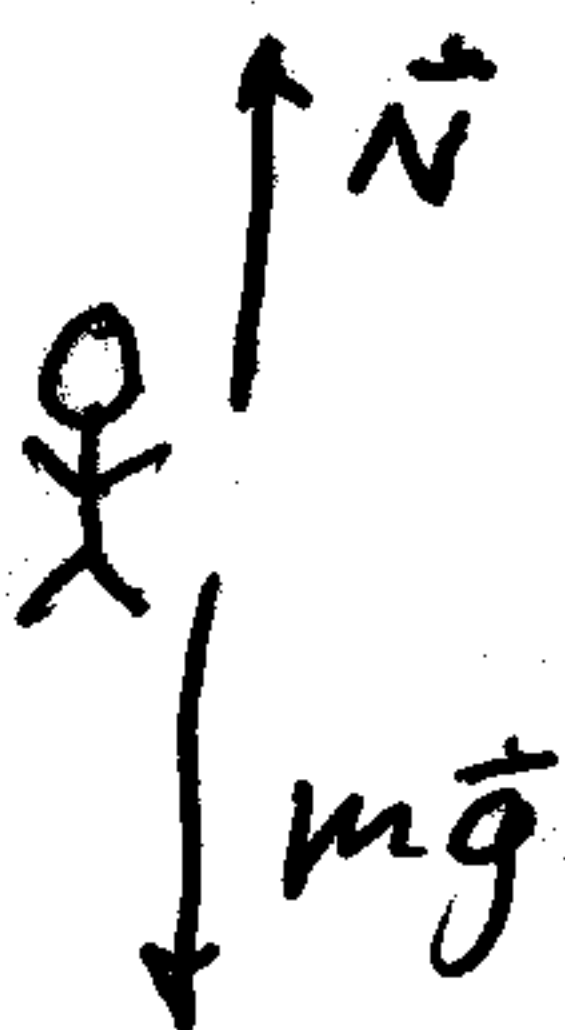
$$T_2 \sin 20^\circ = T$$

$$T = (41.7 \text{ N}) \sin 20^\circ = 14 \text{ N}$$



60% b 5. A 85 kg person is in an elevator. When the elevator begins to descend from its initial height to a lower height, it and the person undergo an acceleration of 1.2 m/s^2 downwards. What is the person's apparent weight, in N, while the elevator is accelerating?

- a) 830
- b) 730
- c) 100
- d) 940
- e) 450



take a > 0 downwards

$$ma = mg - N$$

$$N = mg - ma = 730 \text{ N}$$