Instructor(s): *N. Sullivan*

PHYSICS DEPARTMENT
PHY 2004   Exam 2   October 20, 2010

Name (print, last first): _____   Signature: _____

*On my honor, I have neither given nor received unauthorized aid on this examination.*

YOUR TEST NUMBER IS THE 5-DIGIT NUMBER AT THE TOP OF EACH PAGE.
(1) **Code your test number on your answer sheet (use lines 76–80 on the answer sheet for the 5-digit number).** Code your name on your answer sheet. **DARKEN CIRCLES COMPLETELY**. Code your UFID number on your answer sheet.
(2) Print your name on this sheet and sign it also.
(3) Do all scratch work anywhere on this exam that you like. **Circle your answers on the test form.** At the end of the test, this exam printout is to be turned in. No credit will be given without both answer sheet and printout.
(4) **Blacken the circle of your intended answer completely, using a #2 pencil or <u>blue</u> or <u>black</u> ink.** Do not make any stray marks or some answers may be counted as incorrect.
(5) **The answers are rounded off. Choose the closest to exact. There is no penalty for guessing. If you believe that no listed answer is correct, leave the form blank.**
(6) Hand in the answer sheet separately.

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

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1. (4 points) A force P holds an object weighing 30 N a distance 3 m from the wall as shown as in the figure. The tie rope T is tied 4 m above the horizontal line of action P. Calculate P.

   (1) 22.5 N
   (2) 45 N
   (3) 11.2 N
   (4) 4.5 N
   (5) 33.7 N
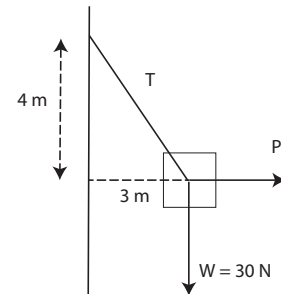
2. (3 points) A ramp inclined at 30 degrees to the horizontal is used to haul a load of 100 N up a height of 1 m. What is the ideal mechanical advantage of this elementary machine?

   (1) 2.0   (2) 1.0   (3) 0.87   (4) 0.5   (5) 0.25

3. (3 points) The pulley system shown in the figure is used to lift an object that weighs 30 N. The rope is continuous around each pulley What is the tension T in the pulley rope?

   (1) 10 N
   (2) 30 N
   (3) 15 N
   (4) 60 N
   (5) 3 N
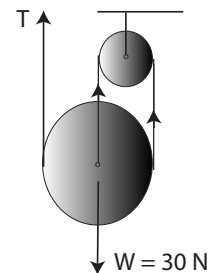
4. (4 points) The boom shown in the figure has a length of 4 m. and weighs 300 N. It is used to lift a weight of 400 N. If the boom is inclined at 53 degrees to the horizontal, calculate the tension T in the tie which is linked to the boom at a distance of 3 m from the ground.

   (1) 550 N
   (2) 700 N
   (3) 350 N
   (4) 100 N
   (5) 50 N
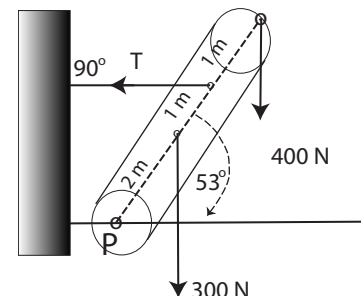
5. (4 points) Joe is standing in a canoe that has a mass of 40 kg. The canoe is at rest on the surface of a smooth lake. Joe jumps off the canoe with a speed of 5 m/s. If Joe has a mass of 80 kg, what is the velocity of recoil of the canoe after he jumps?
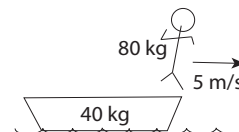
(1) 10 m/s (2) 20 m/s (3) 0 (4) 5 m/s (5) 7 m/s

6. (4 points) A ping-pong ball of mass 2 gm and traveling with a velocity of 2 m/s collides with stationary tennis ball of mass 10 gm. Calculate the velocity of the ping-pong ball after the collision, assuming the collision is elastic.

(1) 1.3 m/s (2) 0.33 m/s (3) 2 m/s (4) 0.67 m/s (5) 3.9 m/s

7. (4 points) The wheel of a car is rotating at a speed of 3.0 rev/s. If the wheel has a diameter of 30 cm, how fast is the car going along its straight line path?

(1) 2.8 m/s (2) 5.6 m/s (3) 1.4 m/s (4) 3.5 m/s (5) 0.33 m/s

8. (4 points) A phonograph record rotates at 45 rpm (revolutions per minute). A fire ant sits on the record a distance of 5 cm from the center. How fast is the ant moving?

(1) 0.24 m/s (2) 0.50 m/s (3) 4.5 m/s (4) 1.5 m/s (5) 0.12 m/s