

Instructor(s): *J. Ipser*

## PHYSICS DEPARTMENT

PHY 2004

Exam 2

March 14, 2005

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.**

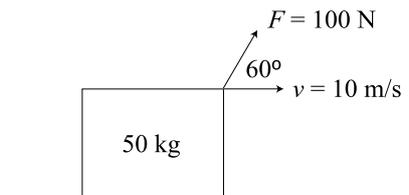
- (1) **Code your test number on your answer sheet (use 76–80 for the 5-digit number).** Code your name on your answer sheet. **DARKEN CIRCLES COMPLETELY.** Code your UFID number on your answer sheet.
- (2) Print your name on this sheet and sign it also.
- (3) Do all scratch work anywhere on this exam 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 with scratch work most questions demand.
- (4) **Blacken the circle of your intended answer completely, using a #2 pencil or blue or black 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.
- (6) **Hand in the answer sheet separately.**

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

1. A lady whose mass is 50 kg stands on a scale in an elevator. The elevator is moving down at a constant speed of 5 m/s. What is the reading on the scale for the lady's weight?

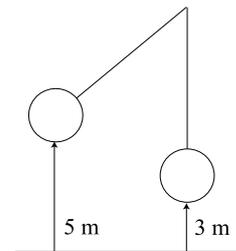
(1) 490 N                      (2) 620 N                      (3) 0                      (4) 745 N                      (5) 980 N

2. A block of mass 50 kg is moving at a constant velocity of 10 m/s in the positive  $x$  direction. A force  $F = 100 \text{ N}$  acts on the block at an angle of  $60^\circ$  relative to the  $x$ -axis as shown. How much work is done by the force  $F$  in 2 s?



(1) 1000 J                      (2) 450 J                      (3) -320 J                      (4) -250 J                      (5) 250 J

3. A pendulum ball is at a height of 5 m above the ground and is moving at a speed of 5 m/s. When the ball reaches 3 m, what is its speed in m/s?

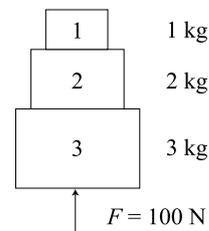


(1) 8                      (2) 5                      (3) 2                      (4) 13                      (5) 19

4. A 5 kg rifle shoots a 0.05 kg bullet at a speed of  $10^3 \text{ m/s}$ . The recoil of the rifle is stopped by a force  $F$  that acts for 0.01 s. What is the value of  $F$  in N?

(1)  $5 \times 10^3$                       (2)  $2 \times 10^2$                       (3)  $6 \times 10^4$                       (4)  $2 \times 10^4$                       (5)  $1.5 \times 10^3$

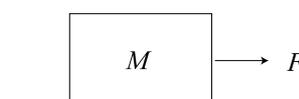
5. Three masses  $M_1 = 1\text{kg}$ ,  $M_2 = 2\text{kg}$ ,  $M_3 = 3\text{kg}$  are glued together and move above the ground as shown. A force  $F = 100\text{N}$  is applied in the upward direction to the bottom of mass  $M_3$ . What is the magnitude of the force that  $M_1$  exerts on  $M_2$ ?



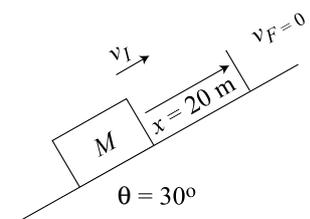
- (1) 16.7 N                      (2) 13.1 N                      (3) 11.2 N                      (4) 9.4 N                      (5) 7.1 N
6. An elevator of mass  $10^3\text{kg}$  starts from rest at the ground floor and is raised and lowered by its motor. After 10 s, the elevator is 10 m above the ground floor, and its speed is 10 m/s. How much work has been done by the motor during this process?

- (1)  $1.5 \times 10^5\text{J}$               (2) not enough information              (3)  $-3 \times 10^5\text{J}$               (4)  $-4 \times 10^4\text{J}$               (5)  $6.5 \times 10^4\text{J}$

7. A trunk of mass  $M = 50\text{ kg}$  is pulled across a horizontal floor by a horizontal force  $F$  of magnitude 300 N. The trunk moves at constant velocity. What is the value of the coefficient of kinetic friction?



- (1) 0.6                      (2) 0.5                      (3) 0.4                      (4) 0.7                      (5) 1.1
8. A block of mass  $M = 50\text{ kg}$  is moving up an incline that makes an angle of  $30^\circ$  relative to the horizontal. The block comes to rest after having moved a distance  $x = 20\text{ m}$  up along the incline. The only forces acting are gravity and friction. The coefficient of kinetic friction is  $\mu_k = 0.6$ . What is the initial speed of the block in m/s?



- (1) 20                      (2) 11                      (3) 31                      (4) 50                      (5) 5