

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.**

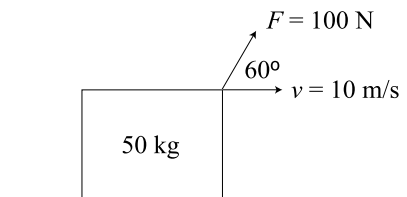
- (1) **Code your test number on your answer sheet (use 76–80 for the 5-digit number).** Code your name on your answer sheet. **DARKEN CIRCLES COMPLETELY.** Code your UFID number on your answer sheet.
- (2) Print your name on this sheet and sign it also.
- (3) Do all scratch work anywhere on this exam 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?

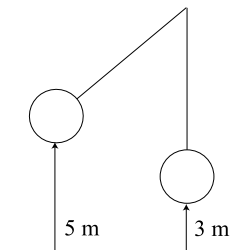
- (1) 490 N (2) 620 N (3) 0 (4) 745 N (5) 980 N

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° 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?

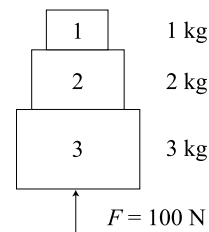


- (1) 8 (2) 5 (3) 2 (4) 13 (5) 19

4. A 5 kg rifle shoots a 0.05 kg bullet at a speed of 10^3 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) 5×10^3 (2) 2×10^2 (3) 6×10^4 (4) 2×10^4 (5) 1.5×10^3

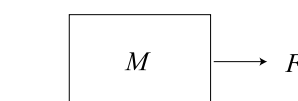
5. Three masses $M_1 = 1\text{kg}$, $M_2 = 2\text{kg}$, $M_3 = 3\text{kg}$ are glued together and move above the ground as shown. A force $F = 100\text{N}$ is applied in the upward direction to the bottom of mass M_3 . What is the magnitude of the force that M_1 exerts on M_2 ?



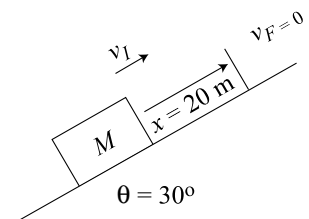
- (1) 16.7 N (2) 13.1 N (3) 11.2 N (4) 9.4 N (5) 7.1 N
6. An elevator of mass 10^3kg starts from rest at the ground floor and is raised and lowered by its motor. After 10 s, the elevator is 10 m above the ground floor, and its speed is 10 m/s. How much work has been done by the motor during this process?

- (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° 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