

Instructor(s): *J. Ipser*PHYSICS DEPARTMENT
Exam 2

October 22, 2007

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.**

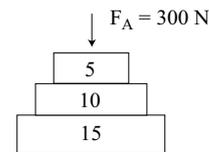
- (1) **Code your test number on your answer sheet (use lines 76–80 on the answer sheet for the 5-digit number).** Code your name on your answer sheet. **DARKEN CIRCLES COMPLETELY.** Code your UFID number on your answer sheet.
- (2) Print your name on this sheet and sign it also.
- (3) Do all scratch 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 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. If you believe that no listed answer is correct, **leave the form blank.**
- (6) **Hand in the answer sheet separately.**

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

1. An automobile of mass 2000 kg accelerates from 0 to 40 m/s in 10 s along a horizontal surface. What is the total force exerted by the road on the auto? (Remember to include both horizontal and normal forces.)

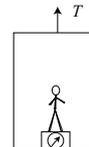
- (1) $2 \times 10^4 \text{ N}$ (2) $8 \times 10^3 \text{ N}$ (3) $6 \times 10^3 \text{ N}$ (4) $3 \times 10^3 \text{ N}$ (5) 10^3 N

2. Three blocks of masses 5, 10, and 15 kg, respectively, are glued together and move above the Earth. A downward force $F_A = 300 \text{ N}$ is applied to the 5 kg block as shown. What is the magnitude of the force that the 15 kg block exerts on the 10 kg block?



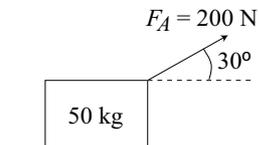
- (1) 150 N (2) 200 N (3) 280 N (4) 300 N (5) 350 N

3. A lady stands on a scale in an elevator. The total mass of the elevator system is 2000 kg. The lady's weight is 600 N, and the reading on the scale is 300 N. What is the tension T in the elevator cable?



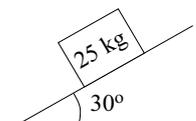
- (1) 10^4 N (2) 10^3 N (3) $5 \times 10^3 \text{ N}$ (4) 10^5 N (5) 10^6 N

4. A 50 kg trunk is pulled at constant speed across a horizontal floor by a force F_A of magnitude 200 N directed at an angle of 30° above the horizontal as shown. What is the value of the coefficient of kinetic friction?



- (1) 0.45 (2) 0.25 (3) 0.6 (4) 0.75 (5) not enough information

5. A block of mass 25 kg sits at rest on an incline that makes an angle of 30° with respect to the horizontal as shown. The block does not move. What is the force of friction on the block?



- (1) 123 N (2) 65 N (3) 79 N (4) 89 N (5) 101 N

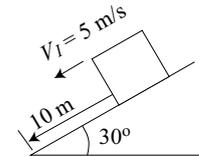
6. The mass of an elevator system is 2000 kg. The elevator starts from rest at the ground floor. Ten seconds later it is 10 m above the ground floor and its speed is 5 m/s. How much work is done by the tension in the elevator cable during this 10 second interval?



- (1) $2.2 \times 10^5 \text{ J}$ (2) $1.2 \times 10^4 \text{ J}$ (3) $35.6 \times 10^4 \text{ J}$ (4) $6.3 \times 10^5 \text{ J}$ (5) $9.8 \times 10^5 \text{ J}$
7. A 2000 kg auto accelerates uniformly from rest to 40 m/s in 10 s. What is the power output of the auto's engine when the auto reaches speed 40 m/s? (1 hp = 746 W)

- (1) 430 hp (2) 375 hp (3) 255 hp (4) 525 hp (5) 305 hp

8. A 20 kg block is initially moving at 5 m/s down along an incline that makes an angle of 30° with respect to the horizontal. The block comes to rest after traveling 10 m down along the incline. How much work is done by friction during this process?



- (1) -1230 J (2) -560 J (3) 290 J (4) -920 J (5) -1560 J