Instructor(s): *S. Obukhov*

PHYSICS DEPARTMENT

PHY 2004 Midterm Exam 1 February 5, 2016

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.

$g = 9.81\ \text{m/s}^2$ $G = 6.67 \times 10^{-11}\text{N}\cdot\text{m}^2/\text{kg}^2$

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1. Jane starts at the town center and drives 12 km due north, and then drives 5 km due east. How far is she from her starting point?

   (1) 13 km (2) 17 km (3) 7 km (4) 8.5 km (5) 19 km

2. Joe drops a pebble from a bridge. If the pebble hits the water 2.5 seconds after it is dropped, how far did the pebble travel?

   (1) 30.6 m (2) 22.1 m (3) 14.7 m (4) 88.3 m (5) 34.5 m

3. A ball is thrown up vertically at 25 m/s. How high will the ball go?

   (1) 31.9 m (2) 20.4 m (3) 51.0 m (4) 40.8 m (5) 37.1 m

4. A block of mass 10 kg sits on an inclined plane. The coefficient of static friction between the block and the surface is 1.00. At what angle with the horizon must the inclined plane be raised before the block begins to slide?

   (1) 45° (2) 37° (3) 30° (4) 60° (5) 62°

5. A police cruiser is traveling at 15 m/s. A car traveling in the same direction at 25 m/s passes the cruiser. At this moment the car begins to accelerate in the forward direction at a rate of 2 m/s^2, and the cruiser begins to accelerate in the forward direction at 4 m/s^2. How far does the cruiser travel until it catches up to the car?

   (1) 350 m (2) 400 m (3) 250 m (4) 150 m (5) 275 m

6. A horizontal force P pushes a 10 kg mass across a floor. What value of P is needed to move the block with an acceleration of 2 m/s^2 if the coefficient of kinetic friction os 0.4?

   (1) 59 N (2) 98 N (3) 37 N (4) 15 N (5) 72 N

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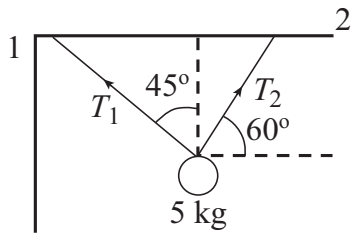
7. A 5 kg mass is held in equilibrium by 2 ropes as shown. What is the value of T_1, the tension in rope 1?



(1) 25 N
(2) 13 N
(3) 47 N
(4) 61 N
(5) 36 N

8. A man and his wife are moving a 200-lb sofa by lifting it at its two ends. If their 60-lb son sits one-fourth of the end carried by father, with what force must mother lift?

(1) 115 lb (2) 160 lb (3) 130 lb (4) 260 lb (5) 60 lb