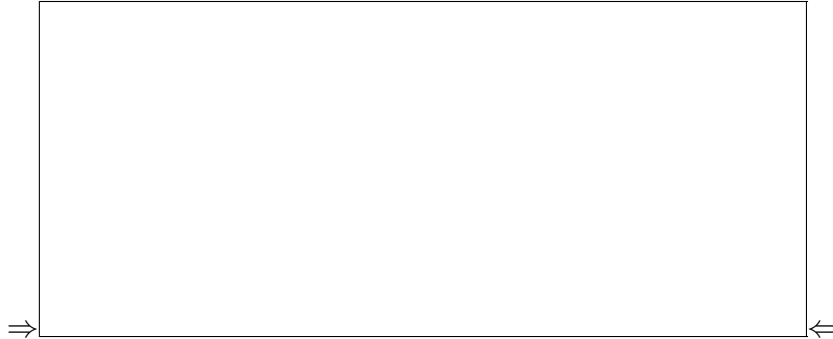


Physics 116 - First In-Class Practice Exam
Prof. Schnetzer and Kloet



Your name sticker with **exam code**

Turn off and put away cell phones!

1. The exam will last from 5:00 pm to 6:20 pm Use a #2 pencil to make entries on the answer sheet. Enter the following ID information now, before the exam starts.
2. In the section labelled NAME (Last, First, M.I.) enter your last name, then fill in the empty circle for a blank, then enter your first name, another blank, and finally your middle initial.
3. Under STUDENT # enter your 9-digit student ID.
4. Enter 161 under COURSE, and your section number (see label above) under SEC.
5. Under CODE enter the exam code given above.
6. During the exam, you may use pencils, a calculator, and one **handwritten** 8.5 x 11 inch sheet with formulas and notes, without attachments.
7. There are 15 multiple-choice questions on the exam. For each question mark only one answer on the answer sheet. There is no deduction of points for an incorrect answer, so even if you cannot work out the answer to a question, you should make an educated guess. **At the end of the exam, hand in the answer sheet and the cover page.** Retain this question paper for future reference and study.
8. When you are asked to open the exam, make sure that your copy contains all 15 questions. Raise your hand if this is not the case, and a proctor will help you. Also raise your hand during the exam if you have a question.
9. Please SIGN the cover sheet under your name sticker and have your student ID ready to show to the proctor during the exam.

Good Luck!

1. An object is thrown straight up from ground level with a speed of 49 m/s. If $g = 9.8 \text{ m/s}^2$ its distance above the ground level 1.0 s later is:
 - a) 39.2 m
 - b) 44.1 m
 - c) 49.0 m
 - d) 53.9 m
 - e) 58.8 m

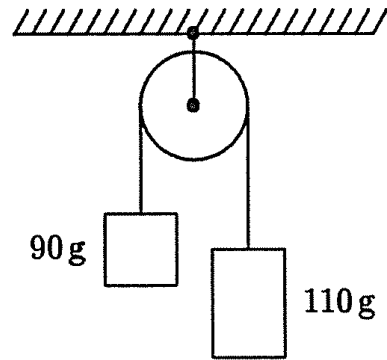
2. Which one of the following statements is correct for an object released from rest?
 - a) The average velocity during the first second of time is 4.9 m/s.
 - b) During each second the object falls 9.8 m.
 - c) The acceleration changes by 9.8 m/s^2 .
 - d) The object falls 9.8 m during the first second of time.
 - e) The acceleration of the object is proportional to its weight.

3. Two bodies with negligible air resistance are falling side by side, above a horizontal plane. If one of the bodies is given an additional horizontal acceleration during its descent, it:
 - a) strikes the plane at the same time as the other body
 - b) has the vertical component of its velocity altered
 - c) has the vertical component of its acceleration altered
 - d) more than one of the other answers
 - e) follow a straight line path along the resultant acceleration vector

4. A large cannon is fired from ground level over level ground at an angle of 30° above the horizontal. The muzzle speed is 980 m/s. Neglecting air resistance, the projectile will travel what horizontal distance before striking the ground?
 - a) 4.3 km
 - b) 8.5 km
 - c) 43 km
 - d) 85 km
 - e) 170 km

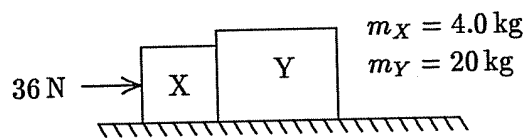
5. Two blocks are connected by a string and pulley as shown. Assuming that the string and pulley are massless, the magnitude of the acceleration of each block is:

- a) 0.049 m/s^2
- b) 0.020 m/s^2
- c) 0.0098 m/s^2
- d) 0.54 m/s^2
- e) 0.98 m/s^2



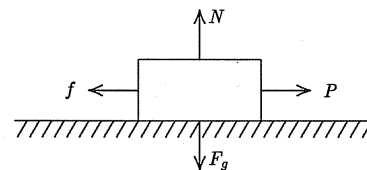
6. Two blocks (X and Y) are in contact on a horizontal frictionless surface. A 36 N constant force is applied to X as shown. The force exerted by X on Y is:

- a) 1.5 N
- b) 6.0 N
- c) 29 N
- d) 30 N
- e) 136 N



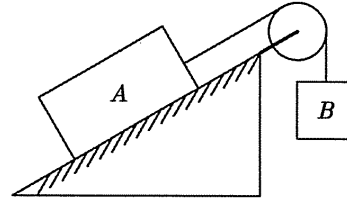
7. A wooden box is pulled along a rough horizontal floor at constant speed by means of a force of magnitude P as shown. In the diagram, f is the magnitude of the force of friction, N is the magnitude of the normal force and F_g is the magnitude of the force of gravity. Which of the following must be true?

- a) $P = f$ and $N = F_g$
- b) $P = f$ and $N > F_g$
- c) $P > f$ and $N < F_g$
- d) $P > f$ and $N = F_g$
- e) none of these



8. Block A with a mass of 10 kg, rests on a 35° incline. The coefficient of static friction is 0.40. An attached string is parallel to the incline and passes over a massless, frictionless pulley at the top. The smallest mass m_B , attached to the dangling end, for which A remains at rest is:

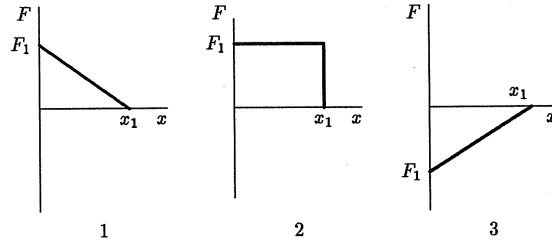
- a) 2.5 kg
- b) 3.5 kg
- c) 5.9 kg
- d) 9.0 kg
- e) 10.5 kg



9. A man pushes an 80 N crate a distance of 5.0 m upward along a frictionless slope that makes an angle of 30° with the horizontal. The force he exerts is parallel to the slope. If the speed of the crate is constant, then the work done by the man is:
- a) -200 J
 - b) 61 J
 - c) 140 J
 - d) 200 J
 - e) 260 J
10. An ideal spring is hung vertically from the ceiling. When a 2.0 kg mass hangs at rest from it the spring is extended 6.0 cm from its relaxed length. A downward external force is now applied to the mass to extend the spring an additional 10 cm. While the spring is being extended by the force, the work done by the spring is:
- a) -3.6 J
 - b) -3.3 J
 - c) -3.4×10^{-5} J
 - d) 3.3 J
 - e) 3.6 J

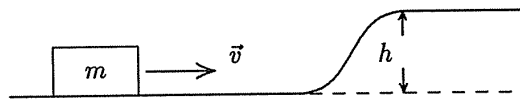
11. The graphs below show the force acting on a particle as the particle moves along the positive x -axis from the origin to $x = x_1$. The force is parallel to the (horizontal) x -axis and is conservative. The maximum magnitude F_1 has the same value for all of the graphs. Rank the situations according to the change in the potential energy of the particle associated with this force, least (or most negative) to greatest.

- a) 1, 2, 3
 b) 1, 3, 2
 c) 2, 3, 1
 d) 3, 2, 1
 e) 2, 1, 3



12. For a block of mass m to slide without friction up the rise of height h shown, it must have a minimum initial speed of:

- a) $1/2\sqrt{gh}$
 b) $\sqrt{gh/2}$
 c) $\sqrt{2gh}$
 d) $2\sqrt{2gh}$
 e) $2\sqrt{gh}$



13. A 3 g bullet is fired horizontally into a 10 kg block of wood suspended by a rope from the ceiling. The block swings in an arc, rising 3 mm above its lowest position. The velocity of the bullet was:

- a) unknown since the mechanical energy lost in the collision was not given
 b) 808 m/s
 c) 25 m/s
 d) 81 m/s
 e) 255 m/s

14. A 50 N force acts on a 2 kg crate that starts from rest. When the force has been acting for 2 s, the instantaneous power that it is delivering is:
- a) 75 W
 - b) 100 W
 - c) 1.0 kW
 - d) 2.5 kW
 - e) 5.0 kW
15. A very massive object traveling at 10 m/s strikes a very light object, initially at rest, and the light object moves off in the direction of travel of the heavy object. If the collision is elastic, the speed of the lighter object is:
- a) 5.0 m/s
 - b) 10 m/s
 - c) 15 m/s
 - d) 20 m/s
 - e) 7.5 m/s