

Last Name: _____
(Printed)

First Name _____
(Printed)

ID# _____

Signature _____

Recitation TA: _____

(Nawanath Budhathoki, Hsin-Wei Hsia, Fnu Pinki, Pooja Shrestha, Reshna Shrestha, Arif Ullah)

Recitation Day & Time: _____

- You are allowed a calculator and ONE 8.5"x11" sheet of paper with whatever you wish written on it (both sides).
- You must show ALL your work to receive full credit for regular problems. Numerical answers must have the right units.
- Use the back of the problem page if you need more space and mark OVER on the front to indicate that there is material on the back side.
- For the multiple-choice questions, clearly write the letter of your choice on the front page. No points will be given if two or more choices are circled

Answers to Multiple Choice Questions: (Please write your answers clearly here)

1.	2.	3.	4.	5.	6.
7.	8.	9.	10.	11.	12.

Please note that giving or receiving aid on an exam or any act of academic dishonesty is cause for dismissal from the University.

<u>Question</u>	<u>Score</u>	<u>Grader</u>
1 - 12	_____	_____
13	_____	_____
14	_____	_____
15	_____	_____
16	_____	_____
<u>TOTAL</u>	_____	_____

USEFUL CONSTANTS:

Acceleration due to gravity: $g = 9.8 \text{ m/s}^2$ Gravitational constant: $G = 6.67 \times 10^{-11} \frac{\text{N}\cdot\text{m}^2}{\text{kg}^2}$
(Unless otherwise specified questions apply to objects on Earth.)

Multiple Choice Questions

You do not need to show your work. Please write down the answer on the front page.
No partial credit will be given. (3 points each)

- 1) A horizontal force of 200 N is applied to a 50-kg block for 10-m along a level surface. How much work is done by the horizontal force?
A. 0 J B. 2,000 J C. 10,000 J D. 100,000 J
- 2) What is the net work performed on an object equal to?
A. The object's change in mechanical energy
B. The object's change in kinetic energy
C. The object's change in potential energy
D. The object's change in thermal energy
- 3) A grand piano weighing 3200 N is lifted 15-m by a crane over a period of 120 seconds. What was the average power output of the crane?
A. 400 W B. 1200 W C. 25600 W D. 48000 W
- 4) The impulse experienced by a body is equal to its change in:
A. Velocity
B. Kinetic Energy
C. Momentum
D. None of the above
- 5) A 20-kg object sitting at rest is struck elastically in a head-on collision with a 10-kg object moving at +3.0 m/s. What is the final velocity of the 20-kg object after the collision?
A. -1.0 m/s B. -2 m/s C. +1.5 m/s D. +2.0 m/s
- 6) You swing a ball at the end of string in a vertical circle. At the bottom of the ball's path, what is the centripetal force equal to?
A. $F_c = T - mg$ B. $F_c = T + mg$
C. $F_c = T$ D. $F_c = mg$

- 7) Do the planets and stars obey different laws of physics than objects on Earth? (SLO 1)
- Yes, objects on Earth do not make orbits as described by Kepler's Laws.
 - Yes, celestial objects must experience a force in the direction of their motion.
 - No, Newton's Laws predict both the motions of objects on Earth as well as the orbits of planets.
 - No, but optical illusions make the motion of celestial objects appear curved.
- 8) Which of the following is the correct way to verify a hypothesis according to the scientific method? (SLO 2)
- Design an experiment that tests the hypothesis.
 - Verify that the results of the experiment support the hypothesis.
 - Share the details of the experiment with other scientists so they can reproduce it.
 - All of the above are needed to verify a hypothesis.
- 9) Which of the following is NOT a likely outcome of the continuous use of a scientific theory over time? (SLO 3)
- Disproof
 - Validation
 - Absolute truth
 - All of the above are likely outcomes.
- 10) What is the gravitational potential energy of two masses, $m_1 = 10.0 \text{ kg}$ and $m_2 = 20.0 \text{ kg}$, separated by a distance of 5.00 m ? Universal Gravitational constant is $6.67 \times 10^{-11} \frac{\text{N}\cdot\text{m}^2}{\text{kg}^2}$.
- $-2.27 \times 10^{-9} \text{ J}$
 - $-2.67 \times 10^{-9} \text{ J}$
 - $1.96 \times 10^2 \text{ J}$
 - $-5.34 \times 10^{-10} \text{ J}$
- 11) A thin-walled hollow tube ($I = MR^2$) rolls without slipping along the floor. The ratio of its translational kinetic energy to its rotational kinetic energy (about an axis through its center of mass) is?
- 1
 - 2
 - 3
 - 1/2
- 12) A child, with the arms at her sides, is spinning on a light frictionless turntable. When she extends her arms:
- her angular velocity increases
 - her angular velocity remains the same
 - her rotational inertia decreases
 - her angular momentum remains the same