Exam 1 Sample Questions

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. Since 1967 the standard definition for the second has been based on which of the following?
a. characteristic frequency of the cesium-133 atom
b. average solar day
c. sidereal day
d. Greenwich Civil Time

____ 2. In a 2-dimensional Cartesian coordinate system the *y-component* of a given vector is equal to that vector's magnitude multiplied by which trigonometric function, with respect to the angle between vector and *y-axis*?
a. sine
b. cosine
c. tangent
d. cotangent

____ 3. A block is launched up an incline plane. After going up the plane, it slides back down to its starting position. The coefficient of friction between the block and the plane is 0.3. The speed of the block when it reaches the starting position on the trip down:
a. is the same as the launching speed.
b. is less than the launching speed.
c. is more than the launching speed.
d. cannot be compared to the launch speed with the information given.

____ 4. As a basketball player starts to jump for a rebound, he begins to move upward faster and faster until he leaves the floor. During this time that he is in contact with the floor, the force of the floor on his shoes is:
a. bigger than his weight.
b. equal in magnitude and opposite in direction to his weight.
c. less than his weight.
d. zero.

____ 5. Vectors $\vec{\mathbf{A}}$, $\vec{\mathbf{B}}$, and $\vec{\mathbf{C}}$ have magnitudes 6, 11, and 20. When these vectors are added, what is the least possible magnitude of their resultant?
a. 25
b. 15
c. 2
d. 3

____ 6. An object weighs 100 N. If the gravitational constant G were half of what it is currently, what would the weight of the object be?
a. 100 N
b. 50 N
c. 25 N
d. 200 N

____ 7. A stone is thrown at an angle of 30° above the horizontal from the top edge of a cliff with an initial speed of 12 m/s. A stop watch measures the stone's trajectory time from top of cliff to bottom to be 5.6 s. What is the height of the cliff? (g = 9.8 m/s^2 and air resistance is negligible)
   a. 58 m
   b. 154 m
   c. 120 m
   d. 197 m

____ 8. There are six books in a stack, each with a weight of 5.0 N. The coefficient of friction between all the books is 0.20 as is the coefficient between the table and the bottom book. What horizontal push must I just exceed on the next to bottom book to start sliding the top five books off the bottom one?
   a. 1.0 N
   b. 5.0 N
   c. 3.0 N
   d. 7.0 N

____ 9. A high fountain of water is in the center of a circular pool of water. You walk the circumference of the pool and measure it to be 150 meters. You then stand at the edge of the pool and use a protractor to gauge the angle of elevation of the top of the fountain. It is 55°. How high is the fountain?
   a. 17 m
   b. 23 m
   c. 29 m
   d. 34 m

____ 10. A 100-N block, on a 30° incline, is being held motionless by friction. The coefficient of static friction between the block and the plane is 0.60. The force due to friction is:
   a. 0 N.
   b. 30 N.
   c. 50 N.
   d. 52 N.

Exam 1 Sample Questions
Answer Section

MULTIPLE CHOICE

1. ANS: A TOP: 1.1 Standards of Length, Mass, and Time
2. ANS: B TOP: 3.2 Components of a Vector
3. ANS: B TOP: 4.6 Forces of Friction
4. ANS: A TOP: 4.5 Applications of Newton's Laws
5. ANS: D TOP: Conceptual Problems
6. ANS: B TOP: Conceptual Problems
7. ANS: C TOP: 3.4 Motion in Two Dimensions
8. ANS: B TOP: 4.6 Forces of Friction
9. ANS: D TOP: 1.8 Trigonometry
10. ANS: C TOP: 4.6 Forces of Friction