ADDIS ABABA UNIVERSITY
COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCES
DEPARTMENT OF PHYSICS

Multiple Choice Questions: One point each, circle the correct choice.

1. If vectors **A** and **B** are given by **A**=1 $\hat{i}$ +2 $\hat{j}$ and **B**=2 $\hat{i}$ +2 $\hat{j}$, what is magnitude and direction of **A**+**B**?
   (a) 5, 37^0 (b) 5, 53^0 (c) 3, 37^0 (d) 4, 53^0
2. At what degree of angle from the horizontal will the range of a projectile be maximum?
   (a) 0 (b) 60 (c) 45 (d) 30
3. What is the minimum number of non zero vectors required for their sum to be zero?
   (a) 4 (b) 1 (c) 2 (d) 3
4. If two objects are in free fall after being released some time apart, the distance between them as time passes
   (a) is unknown (b) decreases (c) remains constant (d) increases
5. A projectile can have same range when thrown at how many different angles with same speed?
   (a) 2 (b) 1 (c) 4 (d) 3
6. Can an object have negative speed?
   (a) yes (b) no (c) unknown (d) depends on the direction
7. the average velocity can be _____ the average speed?
   (a) greater or equal to (b) less or equal to (c) only equal to (d) only less than
8. A car traveled north at 30m/s for 10 seconds and then east at 40m/s for another 10 seconds. What is the the total distance and displacement of the car in meters respectively?
   (a) 500, 700 (b) 700, 500 (c) 100, 500 (d) 400, 500
9. Work done by a person carrying 10 Kg object and covering distance of 10 m horizontally is ($g=10m/s^2$)
   (a) 500 J (b) 0 J (c) depends on the object (d) 1000 J
10. If a car is traveling with out skidding on a road, what is the type of friction is involved?
    (a) kinetic (b) static (c) both (d) none
11. A work done by a frictional force on an object traveled some distance is
    (a) negative (b) zero (c) negative (d) unknown

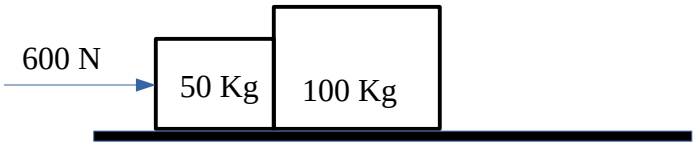
12. How much is a spring of K= 100N/m compressed when a 10N force is applied to it?
    (a) 10 cm (b) 1m (c) 1cm (d) 0.1cm
13. In a uniform circular motion, the object has
    (a) constant velocity (b) constant speed (c) constant acceleration (d) b and c
14. An object of mass m is in circular motion, what direction will it follow if the string breaks?
    (a) radial (b) tangential (c) combination of a and b (d) unknown
15. A 10 Kg object is moving with a velocity of 2 m/s in the x-direction and a net force of 5 N is applied to it in the direction of travel. What is the final velocity after traveling 5 m under the influence of the force?
    (a) 3.6 m/s in the x direction (b) 10.1m/s in the -x direction
    (c) 3.2 m/s in the x direction (d) 4.6 m/s in the +x direction
16. A tall person of height 2 m picked up an object of mass 100 Kg and placed it on his head and traveled 100 meters and placed it on a car which is 1m above ground. How much work did the person did on the object?
    (a) 0 J (b) 1 KJ (c) 2KJ (d) 100 KJ

Short answer questions

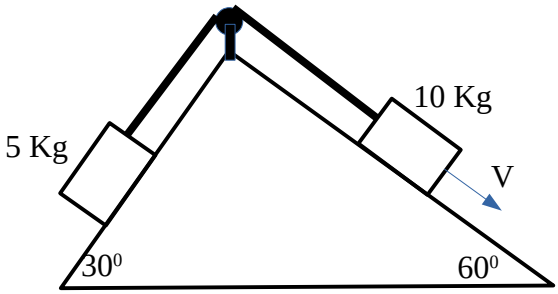
1. An object in uniform circular motion is always accelerating. Underline your choice.
   True/False
2. Why is a spring force is called a restoring force?
   _____
3. Why Action and Reactions forces don't cancel out?
   _____
4. List two advantages and disadvantages of friction.
   Advantages:1_____
   2_____
   Disadvantages:1_____
   2_____
5. If you want to move a wheelbarrow across a step, which way will be easier?
   Pushing or pulling the wheelbarrow across the step?
   _____

Problems:

1. Two objects of mass 50 Kg and 100 Kg are in contact while being pushed by a force of 600 N on a frictional surface with a coefficient of friction 0.2.Use g=10m/s^2
   a) What is the acceleration of the two objects?
   b) What is the contact force between the objects
   c) What is the contact force between the objects if the direction of the force is reversed



2. Two objects of mass 5kg and 10 Kg are moving on a frictional inclined surface with kinetic coefficient of friction 0.3 as shown in the figure. The smaller mass is moving up the incline and the other one moving down. Use g=10m/s^2
   a) Calculate the acceleration of the objects
   b) Calculate the tension in the string connecting the objects.



3. An object of mass 10 Kg is moved by a force of 600N which acting on the object.
   a) What is the work done by the force if the object moves a distance of 5 m?
   b) What is the net work done if surface has coefficient of friction 0.2? Use g=10m/s^2