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SCIENCES

**DEPARTMENT OF PHYSICS**

**General Physics (Phys 1011) Mid. Term Exam for fresh man students (Natural science stream)**

Course Code: Phys1011;
Date of exam 09/08/2021G.C.
Semester: I

Time Allotted: 2:00 Hours
Max Marks: 30%
Program: Regular

Name _____ Id.No. _____ Section _____

**Part I Multiple choose 12% (1.9 pt. each)**

**Choose the correct answer from the given alternatives and write your appropriate answer on the answer sheet)**

1. In which of the following types collision both kinetic energy and momentum is conserved
   A. Elastic B) Inelastic C) Perfectly inelastic D) None
2. For which of the following conditions the range of the projectile motion become zero
   A. $\theta = 90^0$ B. $\theta = 45^0$ C. $\theta = 30^0$ D. $\theta = 60^0$
3. Consider two cars A and B of equal mass , if car A changes it's velocity from rest to v and car B changes from rest to $\frac{1}{4}v$ at time t then which of the following power relation is true
   A) $P_A = 8P_B$ B) $P_A = \frac{1}{8}P_B$ C) $P_A = \frac{1}{16}P_B$ D) $P_A = 16P_B$
4. Which one of the following is **Not True** about uniform circular motion?
   A. Velocity is always tangent to the circular path
   B. Velocity is perpendicular to the radius of the circular path.
   C. Acceleration is always perpendicular to the circular path.
   D. Acceleration points out ward from the center of the circle.
5. 'The radius vector connecting the centers of the Sun and the Planet sweeps out equal areas in equal intervals of time'. This law is known as
   A. Kepler's First Laws C. Kepler's second Law
   B. Kepler's Third Law D. The Law of Harmony
6. Which of the following is different from the other
   A. Action and reaction forces are always exist in pair
   B. A single isolated force cannot exist.
   C. Action and reaction forces act on different objects
   D. An object that is not in motion will not move until force acting upon it.
7. The Vector Represented by a letter (or symbol) with an arrow over its head is
   A. Algebraic Method C. Graphical method
   B. Geometric Method D. Parallelogram Method

8. Work is said to be done; which conditions should be satisfied?
   A. Force must be exerted on the object
   B. The force must cause a motion or displacement
   C. The force should have a component along the line of displacement
   D. All are correct
9. Which one of the following is **not true** about frictional force?
   A. The values of kinetic friction and static friction depend on the nature of the surfaces.
   B. The direction of the friction force opposite to the actual motion.
   C. The coefficient of friction is independent of the area of contact between the surfaces..
   D. The direction of the friction force is the same to the actual motion of the object.
10. One is defined as the quality of moving object to exert a force on anything that tries to stop it
   A. Impulse B. Power C. Work D. Momentum
11. If the velocity of the particle changes at the same rate, then which of the following is true
   A) Acceleration is constant
   B) Acceleration is equal to zero
   C) Average acceleration is equal to the instantaneous acceleration
   D) All except B
12. In an isolated system, which of the following physical quantity is conserved?
   A) Kinetic energy plus potential energy B) Both kinetic energy and potential energy.
   C) Potential energy D) Kinetic energy

**Part II Fill in the blank space (7%)**

**Write the correct answer on the space provided on the answer sheet**

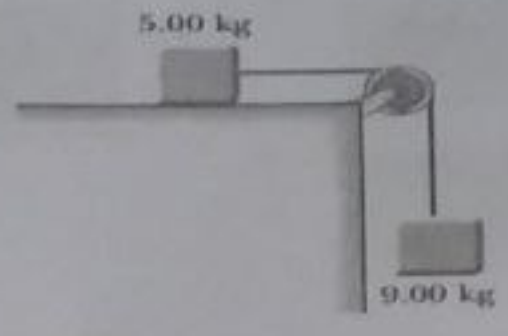
1. _____is a part of mechanics that study the motion of objects with considering the agents that cause the motion? **(1.0 pt).**
2. _____ gives the range of possible values of the measure and, which covers the true value of the measure. **(1.0 pt).**
3. _____ is dimensionless vector and it is used to point a given vector in specified direction.**(1.0 pt).**
4. . When a particle rotates in a circle, a force acts on it directed toward the center of the rotation. Why is it that this force does not do work on the particle? Explain. **(1.5pts).**
5. Clearly state the Newton's law of universal gravitation and write down its mathematical expression. **(1.5pts).**

## Part III work out (8%)

**Show all the necessary steps neatly and clearly**

1. Four objects are situated along the $x$-$y$ axis as follows: a 4.0 kg object is at (1, 3) m, a 2.0kg object is at (3, -2) m, a 3.0kg object is at the origin, and a 5.00kg object is at (-2, 2) m. Where is the center of mass of these objects? **(2.5pts.)**

2. A 5.00kg object is placed on a frictionless, horizontal table is connected to a string that passes over on a non rotating pulley and then is fastened to a hanging 9.00kg object, as shown in the Figure blow. Find the acceleration of the two objects and the tension in the string. **(3pts.)**




3. A ball of mass 0.2kg has a velocity of 1.5m/s; a ball of mass 0.3kg has a velocity of -0.4m/s. They meet in a head-on elastic collision. Find their velocities after the collision.**(2.5pts)**

4. $\vec{A}$ and $\vec{B}$ are vectors in the x-y plane. If $\vec{A}+\vec{B} = 3\hat{\imath}+9\hat{\jmath}$ and $\vec{A}=\frac{1}{2}\vec{B}$. Find the magnitude of vector $\vec{A}$ and $\vec{B}$ **(2.0 pts)**

5. A ball is thrown with an initial velocity of $(10\hat{\imath}+15\hat{\jmath})$ m/s, when it reaches the top of its trajectory, find
   (a) Its velocity **(1.0 pt)**
   (b) Its acceleration **(1.0 pt**