Federal Ministry of Education

Federal Government Girls' College

Abuloma - Port Harcourt.

Mid-Term Assignment

Class: SS1 **Subject: Physics**

Section A: Circular Motion

1. Define the following terms;
a. Circular Motion
b. Angular velocity/Speed
c. Centripetal force
2. Calculate the magnitude of the centripetal force on a particle of mass $5.0\text{x}10^{-6}$kg revolving round the earth with a radial acceleration of $6.0\text{x}10^{7}\text{ms}^{-2.}$
3. A stone is whirled round a circular part of radius 15cm. If the stone makes 30 oscillations in 10seconds, calculate;
a. Angular speed
b. Tangential velocity
c. Centripetal acceleration of the stone (take $\pi = 3.14$)

Section B: Work, Energy and Power

1. Define and state the S.I units of the following;
a. Workdone
b. Energy
c. Power
2. A girl of mass 48kg runs up 25 steps, each of height 0.2m to reach the first floor of a storey building. The power expended by the girl is 400W, calculate the time taken (g= 10ms^{-2})
3. An object of mass 0.5kg has a kinetic energy of 25J, calculate the speed of the object.
4. A body of mass 0.6kg is thrown vertically upward from the the ground with a velocity of 20ms^{-1}. calculate the potential energy at its maximum height (g = 10ms^{-2})
5. A ball of mass 100g falls from a height of 5m onto a concrete floor and rebounds to a height of 3m. calculate the energy lost. (g = 10ms^{-2}).
6. A load is pulled 5m along a horizontal floor by a constant force of 200N which acts at 30^{o} to the floor. Calculate the workdone by the force

Section C: Heat Energy

1. Define Heat and Temperature
2. State five(5) differences between heat and temperature
3. Explain three(3) effects of heat on an object

4. A relative density bottle of volume $50cm^3$ is completely filled with a liquid at 30^oC. It is then heated to 80^oC such that $0.75cm^3$ of the liquid is expelled. Calculate the apparent cubic expansivity of the liquid.
5. A solid metal cube of side 10cm is heated from 10^oC to 60^oC. If the linear expansivity of the metal is $1.2x10^5K^{-1}$, calculate the increase in its volume.
6. A piece of brass of mass 170kg has its temperature raised from 0^oC to 30^oC. Calculate its increase in volume, given the density of brass at 0^oC as $8.5x10^3kgm^{-3}$ and the linear expansivity as $5.7x10^{-1}K^{-1}$
7. The length of a zinc rod at 23^oC is 200m. calculate the increase in length of the rod when its temperature rises to 33^oC. If the zinc rod at 23^oC is used to make a square of perimeter 200m, what is the new area of the rod at 33^oC. (linear expansivity of zinc = $2.6x10^{-5}K^{-1}$)
8. Define state three(3) areas of application of;

a. Conduction
b. Convection
c. Radiation

9. Explain how a vacuum flask minimizes heat loss to its surrounding

Section D: Electrostatics

1. State the law of electrostatic
2. With a detail diagram explain charging by induction
3. sketch and label the diagram of a gold leaf electroscope and state two(2) uses of Electroscope
4. Explain how negative and positive charges are produced in the Lab