# PRESIDENT'S OFFICE

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

GEITA ADVENTIST SECONDARY SCHOOL

FORM FOUR HOLLIDAY PACKAGE   27TH APRIL 2020

PHYSICS

01. A river boat heads east on a river that flows north. The river boat is moving at 5m/s with respect to the water. The water moves north with respect to the boat at a speed of 3m/s.

    a. Determine the resultant velocity of the riverboat with respect to the shore.

    b. If the river is 70m wide, determine the time required for the boat to cross the river.

    c. Determine the distance that the boat will travel downstream.

02. A glass stopper is weighed in air then immersed wholly in water and re – weighed. The readings obtained are 2.4 N in air and 2.0N in water. Calculate the density of the stopper. (Density of water = 100kg/M^3).

03. The resistance of copper wire is found to be 10 Ω. Calculate the resistance of a copper wire of the same length but whose radius is twice that of the first wire.

04. A volume of 100cm^3 of gas, measured at 10^{0}C and 780mmHg has a mass 0.12g. Find its density at S.T.P.

05. A metal piece which is 1m long at 40^{0}C increase in length by 0.3% when carrying steam at 100^{0}C. Find the coefficient of expansion of the metal.

06. The tension in the sonometer string of 0.3m long is 0.5 N. Find the frequency the string vibrates if its linear density is 0.01 kg/m.

07. From the diagram below find the horizontal force that must be applied to the weight to keep the string at an angle of 40^0. Find also the tension in the string.
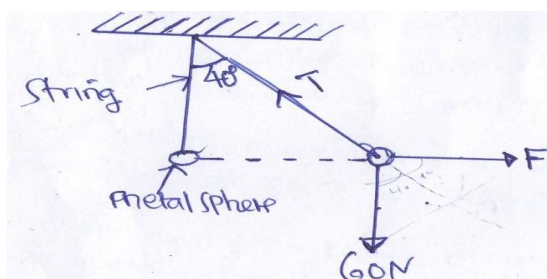
08. A piece of cork with volume $100cm^3$ is floating on water. If the density of the cork is $0.25g/cm^3$.

      a. Calculate the volume of cork immersed in the water.

      b. What force is needed to immerse the cork completely? (Assume mass of 1g has a weight of 0.01N) and (Density of water $= 1g/cm^3$).

      c. Ice has a density of $0.9\ g/cm^3$. what fraction of the volume of an iceberg is;

          i. Submerged in water?

          ii. Remain above the water surface?

09. The temperature of a piece of copper of mass 250g is raised to 100^0C and is then transferred to a well lagged aluminium can of mass 10.0g containing 120g of ethylated spirit. The temperature after the mixture has been well stirred is 32.7^0C, Find the specific heat capacity of copper.

      - S.H.C of aluminium is 900 J/kg ^0C

      - S.H.C of spirit is 2400J/kg ^0C.

10. A ball is thrown velocity vertically upward from the ground with the velocity of 40m/s. Calculate.

      a) The maximum height reached and

      b) the time taken to reach the ground again.

11. A pendulum bob of mass 20g is pulled aside to a vertical height of 80cm – from the horizontal and then released. Find: -

      a. The maximum potential energy of the bob

      b. The maximum speed of the bob

      c. The kinetic energy of the bob when it is at a height of 20cm from the horizontal.

12. 2 meters of resistance wire, area of cross section $0.5mm^2$, has a resistance of 2.2 Ω calculate.

      iii. Calculate the resistivity of the metal

      iv. The length of the wire which when connected in parallel with the 2-meter length, will give resistance of 2.0 Ω.

13. Sand falls gently at a constant rate of 50 g/s onto a horizontal belt moving steadily at 40 cm/s. Find the force in newtons exerted by the sand on the belt. State any assumptions made in your calculation.

14. (i) Define the coefficient of dynamic friction.

   (ii) A body of mass 40 kg is placed in a straight track sloping at an angle of 45° to the horizontal. If the body is held from slipping by friction, calculate the normal reaction and the force of friction.

15.(a)(i)State two ways in which the image formed in plane mirror differs from that in a pin hole camera.

 (ii) What is the effect of moving the pinhole camera closer to the object?

 (b) (i) List three rules used to locate images in curved mirrors.

(ii)Give two similarities and two differences that exist between the human eye and a lens camera.

(c)A mirage is often seen by a motorist as a pool of water on the road some distance ahead.

 (i) Draw a sketch diagram to show the formation of such a mirage.

(ii) Briefly explain how mirage is formed.