GIANCHERE FRIENDS SECONDARY SCHOOL

FORM 1 PHYSICS HOLIDAY ASSIGNMENT

1) Name and briefly 3 explain the branches of physics

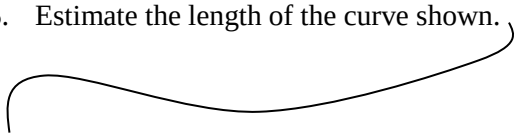
2) Give instances where physics interdependent with agriculture.

3) Group the following form 1 physics topics into the various branches of physics.

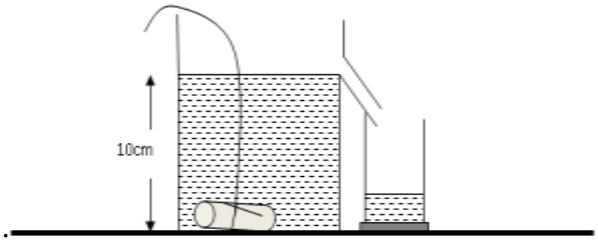
	Topic	Branch of physics
1	Measurement I	
2	Force	
3	Pressure	
4	Particulate nature of matter	
5	Rectilinear propagation of light and reflection at plane surfaces	
6	Thermal expansion	
7	Heat transfer	
8	Electrostatics	
9	Simple cells and electric circuits	

4. convert the following into derived SI units
   (a) 0.01cm
   (b) $100cm^2$
   (c) 20days
   (d) 3.625g
   (e) 324tonnes
   (f) $5dm^3$

5. Estimate the length of the curve shown.



6. Define density and give its SI units.
7. A burette shows a liquid level as $20cm^3$. Ten drops of the same liquid each of volume $0.5cm^3$ are added. Calculate the new liquid level.
8. An empty density bottle has a mass of 15g. When full of alcohol of density $0.8g/cm^3$, its mass is 47g. Calculate:-
   i) The volume of the bottle.
   ii) Its mass when full of water.
   iii) It mass when full of mercury of density $13.6g/cm^3$.
9. A measuring cylinder contains 8 cm^3 of water. A small piece of brass of mass 24g is lowered carefully into a measuring cylinder so that it is carefully submerged, if the density of the brass is $8g/cm^3$, what is the new reading of the level of water in the cylinder in m^3.
10. A Eureka can of mass 60g and cross sectional area of $60cm^2$ is filled with water of density $1g/cm^3$. Apiece of steel of mass 20g and density $8g/cm^3$ is lowered carefully into the can as shown



Calculate;

   a) The total mass of water and the Eureka can before the metal was lowered.
   b) The volume of water that over flowered.
   c) The final mass of the eureka can and its contents
   d) In finding the density of liquid, why is the method of using density bottle more accurate than the one of using a measuring cylinder.
11. $25cm^3$ of a liquid x of density $1.2g/cm^3$ is mixed with liquid of volume 30 cm^3 and $0.9g/cm^3$ without change in volume. Calculate the density of the mixture.

12. The mass of an empty density bottle is 25.0g. Its mass when filled with water is 50.0g and when filled formalin its mass is 60.0g. Calculate.

a) Mass of water
b) Volume of water.
c) Volume of bottle.
d) Mass of formalin.
e) Volume of formalin.
f) Density of formalin.

13. A butcher has a beam balance and masses 0.5 kg and 2 kg. How would he measure 1.5 kg of meat on the balance at once?
14. Determine the density in kg/m^3 of a solid whose mass is 40g and whose dimensions in cm are 30 x 4 x 3

15. Define the terms.

a) Mass
b) Weight.

16. The mass of a lump of gold is constant everywhere, but its weight is not. Explain this.
17. A man has a mass of 70kg. Calculate:

a) His weight on earth, where the gravitational field strength is 10N/kg.
b) His weight on the moon, where the gravitational field strength is 1.7N/kg.

18. A mass of 7.5kg has weight of 30N on a certain planet. Calculate the acceleration due to gravity on this planet.
19. Define the following terms, giving examples.

a) Vector quantity
b) Scalar quantity

20. (a) Define a resultant vector.

(a) Find the resultant of a force of 4N and a force of 8N acting at the same point on an object if:

i) The force act in the same direction in the same straight line.
ii) The force act in the opposite directions but in the same straight line.

21. Show diagrammatically how forces of 7N and 9N can be combined to give a resultant to give a resultant force of:

(a) 16N (b) 2N

22. Sketch how a vector quantity is represented on a diagram.
23. Define force and give SI unit.
24. Name all the forces acting on the following bodies:

(a) A box placed on a table
(b) A mass suspended from a spring balance.
(c) A moving car negotiating a bend.

25. Define cohesive force and adhesive force.
26. Explain why a man using a parachute falls through air slowly while a stone fall through air very fast.
27. A spring stretches by 6cm when supporting a load of 15N.

(b) By how much would it stretch when supporting a load of 5kg?
(c) What load would make the spring extend by 25mm?

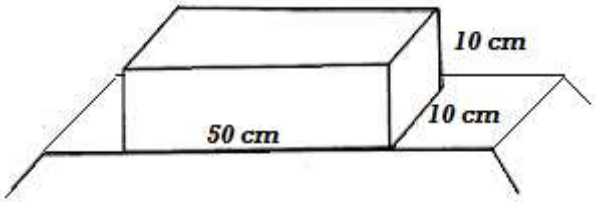
28. Explain each of the following, using the behaviour of molecules where possible:

(a) A steel needle placed carefully on the surface of water does not sink.
(b) When a small drop of detergent is placed on water, the needle moves rapidly away from it and sinks when more detergent is added. (assume that detergent does not affect the density of water)
(c) A match –stick rubbed at one end with soap starts moving immediately in one direction when placed on the surface of water.

29. Define surface tension.

a) How does temperature rise and impurities affect the surface tension of water?
b) How would the surface tension of water be increased?

30. A piston whose diameter is 1.4m is pushed into a cylinder containing a fluid, If the pressure produced in the cylinder is 4.0 x 10^5 pa, Calculate the force applied on the piston.
31. An octopus is resting in the ocean. If the octopus is at a depth of 47m in sea whose water has a density of 1200 kg/m^3, calculate the pressure experienced by the octopus (Take atmospheric pressure = 1.0125 x 10^5 Pa)
32. Explain why if air gets in the brake system would reduce the efficiency of the brakes. (2marks)
33. A concrete block of mass 50kg rests on the surface of the table as shown below.



What is the maximum pressure that can be exerted on the bench by the block?
34. A hole of area 4.0cm^2 at the bottom of a tank 5m deep is closed with a cork. Determine the force on the cork when the tank is filled with water. (Take g = 10ms^{-2} and density of water = 1000kgm^{-3}).
35. A measuring cylinder of height 25cm is filled to a height of 15cm with water and the rest is occupied by kerosene. Determine the pressure acting on its base (density of water = 1gcm^{-3} density of kerosene = 0.8gcm^{-3} and atmospheric pressure = 103,000pa).
36. State one advantage of hydraulic brakes over mechanical brakes.
37. Explain why a lady wearing sharp heeled shoes is not likely to skid on a slippery muddy road.
38. Why does atmospheric pressure decrease towards higher altitude?
39. Show that Pressure in fluids is given by P= hρg
40. Give a reason why nose bleeding is likely to occur at the top of a mountain.
41. A block of glass of density 2.5g/cm^3 has dimensions 8 cm by 10cm by 15cm. It is placed on one of its faces on a horizontal surface. Calculate:-
    a) The weight of the block
    b) The greatest pressure it can exert on the horizontal surface.
    c) The least pressure it can exert on the horizontal surface.
42. The reading of a mercury barometer is 75.58 cm at the base of a mountain and 66.37cm at the summit. Calculate the height of the mountain (Density of mercury = 13.6g/m^3 and density of air= 1.25kg/m^3
43. In a hydraulic brake, the master piston has an area of4mm^2 and the wheel piston each has an area of 4 cm^2. Find the forces applied to the wheel when a force of 10N is applied on the master piston.

ATTEMPT ALL QUESTIONS

EFFORT REWARDS

PHYSICS DEPARTMENT