

SUNSHINE SECONDARY SCHOOL

FORM 1

PHYSICS

MIDTERM EXAM - JUNE 2019

TIME: 2HRS

NAME: CLASS: ADMIN NO:

Chloe - 6
WGRE - 2
ERIC - 5
MANZA - 8
DININGO - 4
MILONGO - 3
WATHOME - 7
Millicent - 7 } SHARE

INSTRUCTIONS

- Answer all Questions in the spaces provided
- All working must be clearly shown
- Non programmable silent electronic calculators may be used

FOR EXAMINERS USE ONLY

MAXIMUM SCORE	70

1. The following data was obtained from an experiment to determine the height of a tree.

Length of shadow of 30cm ruler = 80cm

Length of shadow of the tree = 3.2m

Determine the height of the tree.

(3mks)

$$\frac{L.R}{L.T} = \frac{L.S.R}{L.S.T}$$

$$\frac{30}{x} = \frac{80}{320}$$

$$x = \frac{320 \times 30}{80} = 120 \text{ cm}$$

- 2a) Define density and state its SI unit.

Mass per unit volume

Kilogram per cubic metre

(2mks)

- b) State any two precautions that must be taken when using a density bottle. (2mks)

- Should be wiped carefully on outside
- Avoid air bubbles
- Hold by the stopper known

- c) Use the information below to answer the questions that follow

Mass of clean density bottle = 9.7g

Mass of density bottle with some lead shots = 60.3g

Mass of density bottle with the lead shots filled up with liquid X = 130.2g

Mass of density bottle with completely filled with liquid x only = 86.5g

Determine the :

- i) Volume of the density bottle (Density of liquid X = 800 kg/m^3) (3mks)

$$\rho = \frac{m}{V}$$

$$V = \frac{m}{\rho}$$

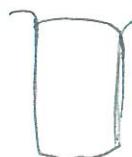
$$130.2 - 9.7$$

$$= 76.8 \text{ g}$$

$$\frac{76.8}{0.8} = 96 \text{ cm}^3$$

(3mks)

- ii) Volume of the lead shots



$$130.2 - 60.3 \\ = 69.9 \text{ g}$$

$$V = \frac{\pi r^2 h}{4} = \frac{69.9}{0.8}$$

$$= 87.375 \text{ cm}^3$$

$$96 \text{ cm}^3 - 87.375$$

$$= 8.625 \text{ cm}^3$$

- iii) Density of the lead shots.

(2mks)

$$\rho = \frac{m}{V}$$

$$60.3 - 9.7 = 50.6 \text{ g}$$

$$\frac{50.6}{8.625} = 5.86667 \text{ g/cm}^3$$

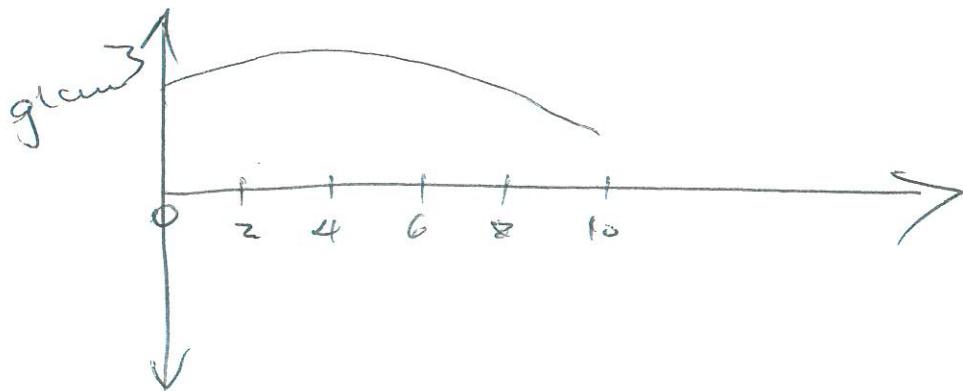
3. Explain why liquids expand more than solids for the same temperature change. (2mks)

Liquids have more space between particles than solids
so they can move easily and expand.

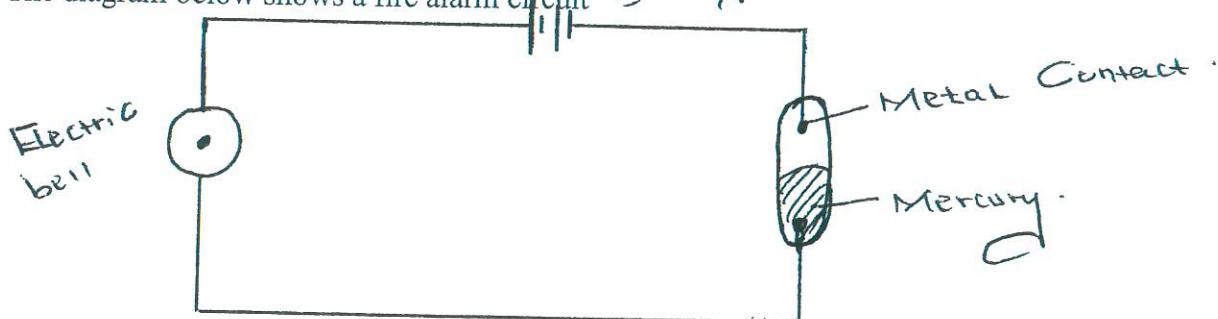
4. When hot water is poured into a thick walled glass container it cracks but a thin walled glass container does not crack. Explain. (2mks)

Due to non-uniform expansion and contraction in thicker glass causes stress.

5. In the space below sketch a graph showing how the density of water varies with temperature when heated from 0°C to 10°C . (2mks)



6. The diagram below shows a fire alarm circuit



Explain how the alarm functions.

(3mks)

When temp. increase the mercury expand becoming the metal cause change alarm ring or cooling it causes decrease heat metal alarm goes off

Visual

- Uniform expansion of Centres of

- Wide range of temp.

- Not hot inside part of tube

8. Name a pair of metals that can be used to make a bimetallic strip.

(1mk)

Iron & Copper

9. Define force and state its SI unit.

(2mks)

Push or a Pull
Newton (N) (Henry (N) also)

10. Distinguish between cohesive and adhesive forces.

(2mks)

Cohesive force of attraction between molecules of different same kind while adhesive force of attraction between molecules same kind

11. An object weighed 16N on the moon's surface where gravitational field strength is

1.6 N kg^{-1}

i) Calculate the mass in kg

(3mks)

$$W = mg$$
$$16 = 1.6 \times m$$

$$m = \frac{16}{1.6} = 10 \text{ kg}$$

10kg.

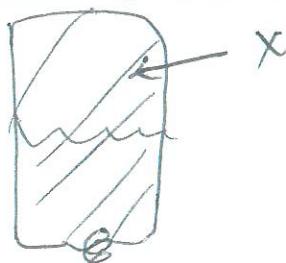
ii) If the same object is weigh on the earth's surface where $g = 10 \text{ N/kg}$ calculate its weight.

(3mks)

$$W = mg$$

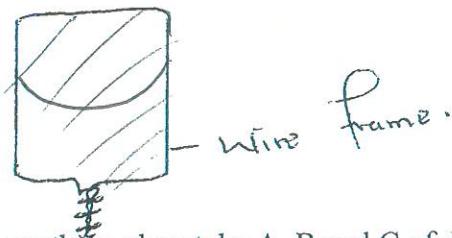
$$10 \times 10 = 100 \text{ N}$$

- iii) A wireframe with a cotton thread which is tied and made into a loop is dipped into a soap solution and soap film is formed as shown in the diagram.

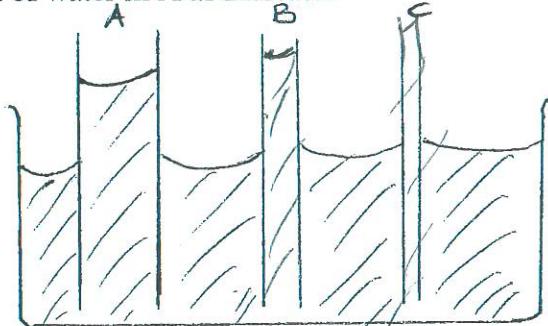


The film is touched with a filter paper at X. Sketch on the diagram below the observation made

(2mks)



12. The diagram below shows three glass tube A, B and C of different diameters dipped in water. The level of water in A as indicated



- i) Mark the appropriate levels of water in B and C (2mks)

- ii) Explain your observation above

(1mk)

Due to high surface tension water forms a concave meniscus.

13. a) Define matter as used in p[ysics.]

(1mk)

Anything that has mass & occupy space

- ii) State the kinetic theory of matter.

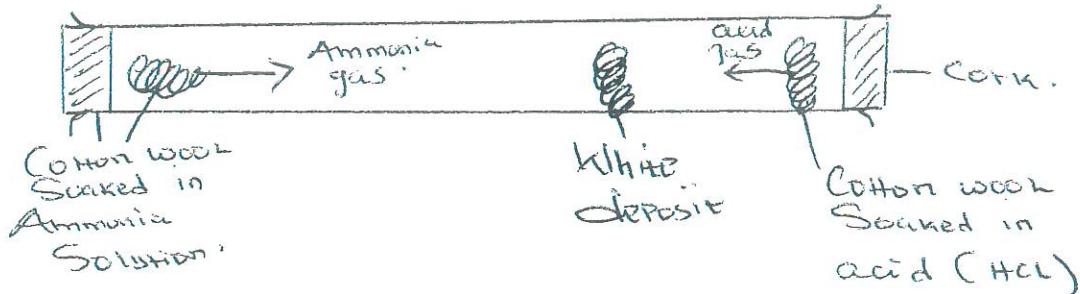
(1mk)

Matter is made up of tiny particles that are in continuous random motion

- iii) State two evidences that show matter is particulate in nature.

(2mks)

- b) In the figure below, ammonia gas and an acid gas diffuse and react to form a white deposit on the walls of the glass tube. The deposit forms nearer end B



- i) State which gas diffused faster. (1mk)

~~Ammonia~~

- ii) State and explain what happens when the experiment is performed under high temperature. (2mks)

~~All high temperature the rate of formation of white deposit increase due high heat gained by the particles hence high rate of diffusion.~~

- iii) State one factor that affects the rate of diffusion in gases. (1mk)

~~- Temperature~~

~~- de mass~~

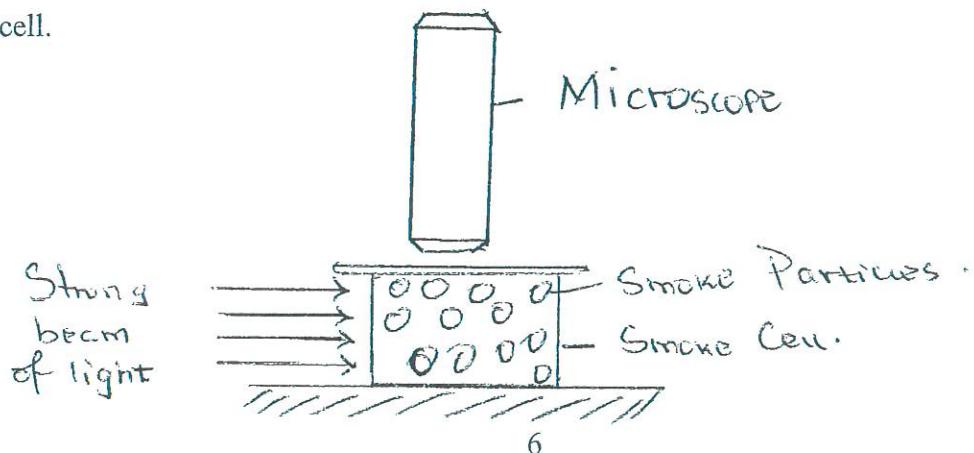
- c) Distinguishes between Brownian motion and diffusion (1mk)

~~Brownian motion is random movement of particles. Thus diffusion is movement of molecules from region of high conc to region of low conc.~~

- ii) Explain why it is possible to compress gases but not solids. (1mk)

~~They have large intermolecular distances places.~~

- d) The figure below shows apparatus used to observe the behavior of smoke particles inside a smoke cell.



i) State the functions of the following:

i) microscope

(1mk)

ii) Beam of light

(1mk)

ii) State and explain what is observed in the smoke cell.

(2mks)

iii) State what happens when the temperature in this experiment is lowered. (1mk)

14. Define pressure and state its SI unit.

(2mks)

- Force acting normally per unit area.
Newton per square metre (N/m^2)

13. Trucks which carry heavy loads have many wheels. Explain.

(2mks)

The wheels increase surface area so that the pressure exerted on the road is less.

14. The barometric height in a town is 65cmHg. Given that the standard atmospheric pressure is 76cmHg and density of mercury is 13600kg/m^3 , determine the altitude of the town. (Density of air is 1.25kg/m^3). (3mks)

$$\left(\frac{76 - 65}{1000} \right) \times 13600 \times 1.25 = 1196.8 \text{ m}$$

15. Explain how a person is able to draw milk from a glass using a straw. (2mks)

By drawing air through tubes inside the straw the high atmospheric pressure outside draws the milk into the tube.

16. State Pascal's principle. (1mk)

Pressure applied at one point of the fluid is transmitted equally to all other parts of the enclosed fluid.

17. A block measuring 20cm by 10cm by 4cm rests on a flat surface. The block has a weight of 6.0N. Determine:

- i) The minimum pressure it exerts on the surface. (2mks)

$$P_{\min} = \frac{F}{A_{\max}}$$

$$A = 20 \times 10 \text{ cm}^2$$

$$\frac{6}{0.02} = 300 \text{ N/m}^2$$

- ii) The maximum pressure it exerts on the surface (2mks)

$$P_{\max} = \frac{F}{A_{\min}}$$

$$\frac{6}{0.008} = 750 \text{ N/m}^2$$

- iii) The density of the block in SI units. (3mks)

$$\rho = \frac{m}{V}$$

$$w = mg$$

$$\frac{6}{10} = 0.6 \text{ kg}$$

$$\frac{0.6 \text{ kg}}{0.0008} = 750 \text{ kg/m}^3$$

18. State two properties of a liquid that makes it suitable as a hydraulic fluid. (2mks)

- Should have high B.P and low f.p.
 - Not Corrosive to metal parts.

19. State one factor that affects pressure in liquids. (1 mk)

- Depth
 - Density