**MID TERM EXAM FORM 2 PHYSICS**

**MARKING SCHEME**

1. Differentiate fundamental quantities from derived quantities.(2mks)
* ***Fundamental quantities cannot be derived from any other physical quantities while derived quantities can be obtained through multiplication and divisiom of other physical quantities***
1. a) What is surface tension?(1mk)
* ***is a force that makes the surface of a liquid to appear like a thin stretched elastic skin***

 b) The diagram below shows a wire loop with two threads tied across it. The loop is dipped into a soap solution such that the soap film covers it as shown.

**C**

**B**

**A**

Region B is punctured such that the soap film in that section is broken. On the space alongside the diagram sketch the resulting shape of the wire loop. Give a reason for the shape.(2mks).***Puncturing B breaks the surface tension .Surface tension being greater at A and C pulls the thread to form a perfect curve.***

1. The figures (a) and (b) below shows capillary tubes inserted in water and mercury respectively.

 **Tube**

 **Water**

 **Mercury**

 **Tube**

***(a)***

***(b)***

**Beakers**

It is observed that in water the meniscus in the capillary tube is higher than the meniscus in the beaker, while in mercury the meniscus in the capillary tube is lower than the meniscus in the beaker. Explain these observations.(2mk) ***Cohesive forces in water are weaker than the adhesive forces; this makes water to rise up in the tube. While in mercury, cohesive forces are stronger than the adhesive forces making the meniscus to be lower than in the beakers***.

1. a) Define pressure and state its SI units(2mks)

***Pressure refers to a force acting normally per unit area. Its SI unit is*** $N/M^{2}$

 b) A block measuring 20cm by 10cm by 4cm rests on a flat surface. The block has a weight of 6N. Determine:

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

$p=\frac{F}{A}, \frac{6}{0.02} =300N/M^{2}$

 ii) The density of the block in kg/m3 (3mks)

$$Density=\frac{Mass}{Volume}, \frac{600}{20×10×4} =0.75g/cm^{3}$$

c) Water dams are built with thicker walls at the bottom than at the top. Explain why. (2mks)

***Thick walls at the bottom of the dam withstand high pressure due to water at the bottom***

d) The barometric height of a certain town is 65cmHg. Given that the standard atmospheric pressure is 76cmHg and the density of mercury is 13600kg/m3 , determine the altitude of the town. (Take density of air = 1.25kg/m3 (3mks)

**(hpg) air =(hpg)mercury**

$h=\frac{0.11×13600×10}{1.25×10}$ **, 1196.8m**

1. The figure below shows apparatus used to observe the behavior of smoke particles in a smoke cell.

**Microscope**

**Smoke particles**

**Smoke cell**

**Strong**

**Beamof light**

1. State and explain what was observed (2mk)

***Bright specks are observed moving randomly due to constant collision with air particles which are in a continuous random motion***

1. Explain what would be happen if the temperature was raised(1mk)

***The random motion will be vigorous due to increase in kinetic energy of the colliding particles***

1. a) State the law of electrostatic charge.(1mk)

***Like charge repel while unlike charge attract***

1. Explain why a dressing table mirror may become dusty if wiped with a cloth on a warm day. (1mk)

***Wiping creates charges which attract the dust particles.***

1. State and explain two defects of simple cells. (2mks)

***Polarization-refers to the accumulation of gas bubbles around a copper plate.***

***Local action refers to the process by which zinc is eaten away.***

1. a) state the basic law of magnetism (1mk)

***Like poles repel while unlike poles attract***

 b) Give a reason why attraction in magnetism is not regarded as a reliable method of testing for polarity (1mk) ***Repulsion occurs only when two like poles of a magnet exist while attraction can occur between two unlike poles of a magnet and between a magnet and a magnetic material.***

 c) A soft iron ring is placed between two magnets. Draw the magnetic field pattern between the two magnets. (2mks)

**N**

**S**

**Soft iron ring**

1. state one way of magnetizing a magnet (1mk)
* ***hammering***
* ***stroking***
* ***conduction***
1. a) What is the micrometer screw gauge reading shown in the diagram below? (2mks)

**15**

**10**

 **0**

**2.11mm**

b) A small drop of oil has a volume of 6 x 10-5 cm3. When it is put on the surface of some clean water, it forms a circular film of 2 x 104 cm2 in area.

 i) State the assumptions made in the above experiment (2mks)

* ***the oil patch is a mono layer***
* ***the oil drop is a perfect sphere***

ii) Calculate the thickness of the oil patch (2mks)

$t=\frac{V}{A} =\frac{6 x 10^{-5} }{ 2 x 10^{4}}= 3x 10^{-9}$**cm**

1. a) Define the term moment of a force.(1mk)

***Product of a force and the perpendicular between the line of action of a force and the point of support.***

 b) State the principle of moments.(1mk)

***For a system in equilibrium, the sum of clockwise moment, about a point is equal to the sum of anticlockwise movement,about the same point.***

 c) A uniform meter rule pivoted at its centre is balanced by a force of 100N at 20cm and another force of F at the 75cm mark.

 **50cm**

**100N**

**F**

 **75cm**

 **20cm**

**0**

**100cm**

1. Calculate the force F. (3mks)

$f\_{1}d\_{1}=f\_{2}d\_{2}$, $f=\frac{100×30}{25}=125N$

1. What is the reaction at the pivot?(2mks)**R=F1+F2=100+120=220N**
2. Name two activities which produce a turning effect (2mks)
* ***Opening and closing of water taps***
* ***Opening and closing of doors***
1. Why is it very difficult to open a door from a point too close to hinges?(1mk)
* ***The moment produced is not enough when the distance between the line of action and the point of support is short***
1. State three differences between mass and weight. (3mks)
* ***Mass is constant everywhere while weight varies from place to place.***
* ***Mass is measured in kg while weight is measured in newton.***
* ***Mass is a scalar quantity while weight is a vector quantity.***