**NAME……………………………………………CLASS…… ADM.NO………..**

**JOINT EVALUATION**

**PHYSICS FORM 4**

**MID-TERM EXAM 2021 AUGUST**

1. Three electric bulbs are connected in series with a battery of two dry cells and a switch. At first the bulbs light brightly.
   1. State a reason why they gradually light (2mks)
2. State two reason why a steel sphere resting on a horizontal surface is said to be neutral (1mk)
3. A horizontal force of 15N is applied on a wooden of mass 2kgplaced on a horizontal surface. It causes the block to accelerates at 5m/. Determine the frictional force between the block and the surface. (3mks)
4. The figure shows two pieces of copper metal A and B of different cross-section area into each other and a piece of paper wrapped tightly around the junction.

Paper

Copper A copper B

It is observed that when the flame is applied around the paper at the function, the side of the paper around the copper labeled A burns first. Explain this observation. (2mks)

1. State the law of floating (1mk)
2. The figure shows a piece of cork held with a tight thread attached to the bottom of a beaker.

water

cork

Inextensible string

1. Name the forces that acts on the cork (3mks)
2. Write an expression showing the relation between the forces
3. When an enclosed cylinder full of gas is exposed to high temperature for some time, the cylinder bursts. Explain what cause the bursting of the cylinder. (2mks)
4. When a stone tied with an inextensible string of length L is whirled in a horizontal circular path it experiences a centripetal force state what provides the centripetal force on the stone (1mk)
   1. A student whirls a stone of mass 0.2kg tied to a string of length of 0.4m in a vertical plane at constant speed of 2 revolution per second (take acceleration due to gravity as 10ms‑2
      1. State one force acting on the stone when it is at the highest point (1mk)
      2. Determine angular velocity of the stone (2mks)
      3. Determine the tension in the string when the stone is at the highest point (2mks)
5. Two liquids X and Y have densities 125g/cm3 and 1.5g/cm3 respectively. Calculate the density of the mixture containing 25% of X by mass and the rest being Y. (3mks)
6. The figure shows a log of wood of mass 20kg submerged in water in a pond and held in a position by a string fixed to the bottom of the pond.

Log of wood

\_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ water

\_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ string

Given that the density of water is 1000kg/m3 and that of the wood is 800kg/m3, determine the

1. Volume of the log (2mks)
2. Tension of the spring (2mks)
3. (i) A broadcasting station processes radio waves of wavelength 800m. Determine their frequency (speed of air is 3 x 10 m/s) (2mks)

(ii) Arrange the following electromagnetic waves in the order of decreasing frequency; (1mk)

Microwaves, Gamma rays, Radiowaves, X-rays

(iii) An object of height 10 cm is placed 30 cm from a converging lens of focal length 18cm. Draw array diagram to locate the position of the image formed. (3mks)

(iv) From the diagram in part (iii) determine:

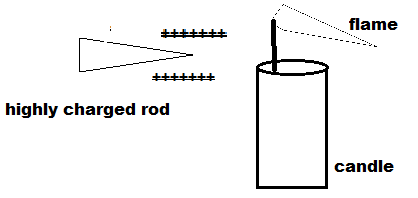
(a) Image height; (1mk)

(b) Image distance

(v) Show that the magnifying power of a simple microscope is given by M = – 1 where M is magnification v is image and f is focal length. (3mks)

(vi) An object stands before a diverging lens of focal length 24cm at a distance of 12cm. Determine the image distance. (3mks)

1. (a) How can you increase the strength and intensity of X – rays from an X – ray tube (2mks)
2. Distinguish between mechanical wave and electromagnetic waves. (2mks)
3. Give a reason why a candle flame is blown when a high charged conductor is brought close to it as shown below (3mks)



* + 1. State two factors that affect capacities of a capacitor (2mks)