**NAME ……………………………………………………………….ADM………CLASS……**

**2022 FORM 3 TERM 1 OPENER EXAM- (APRIL 2022)**

**TIME: 2 HOURS**

**SECTION A(20 MARKS)**

1. Convert 4.034g/cm3 into kg/m3 (1mk)

2. Define the term “accuracy” and state the accuracy of a metre rule. (2mks)

3. A form one student was attempting an experiment when he got electrocuted. State the first aid measure that should be carried out to help him. (1mk)

4.Water flows steadily along a horizontal pipe at a volume rate of 8.0 x 10-3m3/s. if the cross section area of the pipe is 20cm2, calculate the velocity of the fluid. (2mks)

5. A boy standing in front of a cliff blows whistle and hears the echo after 0.55. He then moves 17metres away from the cliff and blows the whistle again. He now hears the echo after 0.65. Determine the speed of the sound. (3mks)

6. The circuit below shows lamps in parallel. Indicate on the diagram where you would put a switch to control both lamps together. (1mk)

7. A student observed her face in a concave mirror of focal length 100cm. if the mirror is 80cm away, find the image distance and state two characteristics of the image formed. (3mks)

8. State two factors that affect the speed of sound in air. (2mks)

9. The figure below shows a conductor carrying current placed in the magnetic field of two magnets. Complete the diagram by showing the field pattern and the diagram of force F that acts on the conductor. (1mk)

N S

10. A student observed some pollen grains on the surface of water in a beaker with a help of hand lens as shown in the figure.

Hand lens

Transparent pollen grains

lid

beaker

Support

a) State the observation made. (1mk)

b) Explain the observation in (a) above. (1mk)

c) What conclusion can be drawn from the above experiment. (1mk)

SECTION B

1a.Explain the meaning of

i)Streamline flow. (1mk)

ii) Turbulent flow. (1mk)

b) State three assumptions when deriving the equation of continuity. (3mks)

c) Water flows along a horizontal pipe of cross sectional area 30cm2. The speed of water is 4m/s but it reaches 7.5m/s in a constriction in the pipe. Calculate the area of the constriction. (3mks)

d) It is dangerous to stand too close to a railway line on which a fast moving train is passing. Explain. (2mks)

e) Two table tennis balls are in the same level while suspended from threads a short distance apart. A stream of air is blown between the balls in a horizontal direction. Explain what happens to the balls. (2mks)

f) The figure 12 represents a tube through which liquid is flowing in the direction shown by the arrow. The vertical tubes have oval cross- sectional area,

Air

brown

X Y Z

Show on the figure the relative positions of the level of the liquids in section marked X, Y and Z. (1mk)

2a) State the difference between mechanical wave and transverse wave (2mks)

b) The sketch is a displacement time graph of a wave travelling at 320m/s. the waves takes 1.2 seconds to move from point A to B

4

A B

- 4

1.2S

Find the i) amplitudes. (1mk)

ii)Frequency (3mks)

iii) The wavelength (2mks)

c) Explain the term “phase” as used in waves (1mk)

ii) Calculate the wavelength of the KBC fm ratio waves transmitted at a frequency of 95.6 mega Hertz (V=3.0 x 108m/s ) (3mks)

3. The diagram below shows a series circuit.

A

a) A current of 2x10-3A flows around the circuit.

i) State the sub-atomic particles responsible for the flow of current (1mk)

ii) How much charge passes through the liquid in 3 minutes (2mks)

b) The capacity of an accumulator is 120Ah. What does this mean (1mk)

c) Polarization is a defect in a simple coil. Explain the meaning of polarization and suggest how you would minimize its effect in the cell (2mks)

4a) State hooke’s law (1mk)

b) It is easier to bend an iron rod than a glass rod of the same dimensions at the same ………………. Explain this. (1mk)

c) State two factors that govern the strength of a spring of a given material (2mks)

d) Two identical spring of each spring constant 5.0 N/cm are used to support 60N as shown below

60N

Determine the total extension of the system (3mks)

5. The diagram below shows two bar magnets X and Y and the magnetic pattern.

A B C D

X Y

Identify B and C (1mk)

ii) State with a reason which magnet X or Y is stronger (2mks)

iii) State two way magnetizing a magnetic material (2mks)

6. The figure below shows a point obsect O placed in front of a place mirror.

E

a) On the same Diagram, draw a ray to locate the position of the image I as seen from the eye E (2mks)

b) Explain what is meant by a virtual image (1mk)

c) An object of height 10cm is placed 5cm in front of concave mirror of focal length 3cm. determine position, name and size of the image by scale drawing (3mks)

d) Show the magnification of a convex mirror is given by m= (3mks)