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

**FORM 3**

**MID TERM EXAM -2024**

**PHYSCIS**

**SECTION A (25mks)**

1. According to Bernovill’s principle, how are the pressure and velocity of a fluid related. (1mk)
2. Explain why it is dangerous for a bus to carry standing passengers. (2mks)
3. Distinguish between mass and weight stating SI unit in each case. (2mks)
4. Pure water at 00c is heated up to 100c sketch the graph of volume against temperature on the axes given below. (2mks)
5. State one reason why alcohol is preferred over mercury for use in cold regions. (1mk)
6. Calculate the critical angle of a material whose refractive index is 1.4. (2mks)
7. State two factors, which would affect the resistance of a metal conductor other than the temperature. (2mks)
8. Efficiency of a machine is always less 100% explain. (2mks)
9. a) State ohms law (2mks)

b) Differentiate between ohmic and non – ohmic cuntucm. (2mks)

1. The figure below shows a uniform 50cm rod. It is balanced horizontally by a load of 4N on one end. Calculate the weight of the rod. (2mks)

 20cm

4N

1. The figure below shows a pith ball in a container.



State and explain what would happens if air is blown over the mouth of the container. (2mks)

1. A body whose initial velocity is 30ms-1 moves with a constant retardation of 3ms-2. Calculate the time taken for the body to come to rest. (2mks)
2. In an experiment to determine how force and extension of a helical spring vary, the graph below was drawn from data obtained.

 Force, F A

 (n) E

 O S Extension,e (m)

a) What do points A and E represents. (2mks)

b) Name the type of deformation that occurs along E A. (1mk)

***SECTION B (55Mks)***

1. The figure below shows a pulley system.



1. What is the velocity of the system? (1mk)
2. Calculate the efficiency of the system. (4mks)
3. Draw a labeled diagram of a pulley system with a velocity ratio of 3 (2mks)
4. a)i) Distinguish between inelastic and elastic collision. (2mks)

ii) A particle A of mass, M, is moving with an initial velocity u, makes a head – on collision with another particle B of mass 2m, B being initially at rest. In terms of U, calculate the final velocity of A if the collision is perfectly inelastic. (3mks)

b) The diagram below shows a sphere moving in a viscous liquid in a tall measuring cylinder.



i) Show on the diagram the force acting on the sphere. (3mks)

ii) Sketch a graph showing the variation of velocity with time. Show on the graph the terminal velocity. VT. (2mks)

1. A man uses the inclined plane to lift a 50kg load through a vertical height of 4.0M. the inclined plane makes an angle of 300 with the horizontal. If the efficiency of the incline plane is 72%, calculate;

 c

 effort

50kg

 300

B

1. Determine the velocity. (2mks
2. The effort needed to move the load up the inclined plane at a constant velocity.(3mks)
3. a) State any two factors that affect the speed of sound. (2mks)

b)A policeman standing between two high walls fires a gun. He hears the first echo after 3 seconds and the next 2 seconds later. What is the distance between the wall? (take velocity of sound 330mls. (4mks)

1. An oil trop forms a circular patch of area 5 x10 -3 m2 . if the oil drop has a volume of 9x10-12 m2, estimate the diameter of the oil molecules. (3mks)

d)i) Define the term temperature and state its SI unit. (2mks)

ii) State three properties of mercury as a thermometric liquid over other liquid. (3mks)

1. The work done against friction in raising the load through the height of 4.0m (take g = 10NKg-1). (4mks)
2. In the circuit below determine.



1. The total resistance between A and B. (2mks)
2. Total effective resistance in the circuit. (2mks)
3. Total current in the circuit. (2mks)
4. In an experiment to determine the focal length of a concave mirror, the following data was obtained.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Object distance u (cm) | 15 | 20 | 25 | 30 | 35 | 40 | 45 |
| Magnification (m) | 2.0 | 1.0 | 0.668 | 0.500 | 0.400 | 0.333 | 0.289 |
| Image distance, v (cm) |  |  |  |  |  |  |  |

1. Fill the table with values of v(cm) (1mk)
2. Draw a graph of m (y – axis) against v(cm) x – axis (5mks)



(iii) Given the following as the equation of the graph m = v/f  - 1 use your graph to determine the focal length of the lens. (3mks)