NAME…………………………………………………………………………………….

INDEX NO…………………………………. CLASS………………………. DATE………………………

GATITU DAY MIXED SECONDARY SCHOOL

PHYSICS PP 1

TRIAL 2 EXAM

TIME : 2HRS.

**Instructions**

Answer all the questions in section A and B.

**SECTION A (25MKS)**

1. The diagram below shows a micrometer screw gauge used by a student to measure thickness of her hair. If it has a zero error of - 0.04 mm, what is the actual thickness of the hair? (2mks)

2. A spring extends by 2cm when a mass of 50 g is hanged on it. What force is required to extend it by 2.5 cm? (2mks)

3. State the effect of a decrease in temperature on surface tens (1mk)

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

5. Smoke particles in an air cell is suitably illuminated and viewed through a microscope.

a) State and explain what is observed. (2mks)

b) What change is expected in the observations as the contents in the air cell were warmed? (1mk)

6. On a frosty day, the metal handle bars of a bicycle feel colder than the rubber grips. Give a reason for this. (1mk)

7 a) Why is concrete reinforced with steel in constructing beams? (1mk)

b) The diagram below shows a bimetallic strip after it has been heated from room temperature of 26 0c to 40 0c. Draw a possible shape of the bimetallic strip if its temperature is decreased from 40 0c to 10 0c. (1mk)

8. A wooden block having a mass of 4500g is tied to a string and in a horizontal frictionless circular path of radius 4 m with a speed of 632cm/sec. calculate the tension force in the string. (3mks)

9. Give a reason why an object with a narrow base topples easily than one with a wide base (1mk)

10. A student did an experiment to determine the specific latent heat of fusion of a block of ice. 0.05 kg of ice 00C melted up into 400g of water at 25 0C in an aluminium can of mass 500g. If the temperature of the mixture falls to 15 0C, determine the specific latent heat of fusion of ice. (3mks)

Take: specific heat capacity of water = 4200JKg-k-1

Specific heat capacity of aluminium =390 JK g- k-1

11.The diagram below shows a coin resting on the surface of a paper placed on top of a glass.

State, with reason, what happens to the coin when the paper is pulled sharply in the direction shown by the arrow? (2mks)

12. A car decelerates uniformly from 20m/s to rest in 5 seconds then reverses with uniform acceleration back to its original starting point in 5 sec. On the axes provided, sketch a velocity –time graph for the whole motion. (2mks)

**SECTION B (55MKS)**

13. (a) i) The diagram below is used to demonstrate Boyle’s law . Use the diagram to answer the question that follow.

Sketch a possible graph of pressure volume (PV) against pressure (p) (1mk)

ii. State Boyles law (1mk)

iii. Hydrogen of volume 2400 cm3 at 54 0c and pressure of 2.4 N/ m2 is compressed until its volume is 3000 cm3 and its pressure is 6 Pascals. Determine the temperature of the gas after compression. (3mks)

iv. Name one limitation of gas laws. (1mk)

(b) With the aid of a well labeled diagram, describe an experiment to determine the specific heat capacity of a metal by electrical method. (5mks)

14. a) i. State Archimedes’ principle. (1mk)

ii. The figure below shows a rectangular object of mass 100kg tethered to the sea bed by a wire. The dimensions are 4m \* 1.5m \* 2m.

Calculate the:

i) Weight of sea water displaced by the buoy ( density of sea water =1100kg/m3) (3mks)

ii) Upward force exerted on the water. (1mk)

iii. Tension in the wire (2mks)

b) A test tube of mass 10 g and uniform cross sectional area 4 cm3 is partly filled with lead shots and floats vertically in water with 5 cm of its length submerged.

Find the:

i. Mass of the lead shots. (2mks)

ii. Length of the test tube that would be submerged in a liquid of density 0.75 g/cm3. (2mks)

15. a) A boy lifts 80 sand bags from the floor of a room onto a shelf 1.6 m high in 100s.

i) Find the useful work done in lifting the sand bags. (2mks)

ii) State the total potential energy developed when all the sand bags are on the shelf. (1mk)

iii) Determine the boy’s useful power output. (2mks)

iv) One sand bag fell from the shelf. Explain what happens to its kinetic energy when it hits the ground. (1mk)

b) i) Draw a diagram of a single pulley system with a velocity ratio of 2. (2mks)

ii) In an experiment using a pulley system , results collected were used to plot the graph below. From the graph, determine the velocity ratio of the system. (3mks)

iii) Explain the shape of the graph. (1mk)

16. a) A bullet of mass 30g travelling at a speed of 200m/s embeds itself in a block of wood of mass 970g suspended so that it can swing freely, as shown in the figure below

Determine :

i) The velocity of the bullet and block immediately after collision (3mks)

ii) The height through which the block rises. (2mks)

b) State Newton’s second law of motion (1mk)

c) A steel ball is dropped into a cylinder containing oil. Sketch a grph showing the variation of velocity with time. (2mks)

d) A trolley of mass 40kg is initially at rest on a horizontal surface. It is connected by a light inextensible rope running over a frictionless pulley to a mass of 10kg.

Determine the acceleration of the masses when the system starts to move. (4mks)

17. a) i) Distinguish between streamline and turbulent flow. (1mk)

ii) A boat travelling at a high speed is likely to be dragged into a ship travelling in the opposite direction also at a high speed. Explain this observation. (2mks)

iii) The figure below show a non – viscous fluid that is not compressible moving through a tube of varied cross sectional area

If the area of the narrower region is 0.05m2, calculate diameter of the wider region. (3mks)

b) The diagram below represents a motor car hydraulic braking system.

(i) State two properties of the liquid used as a brake fluid. (2mks)

(ii) Explain briefly how the system works. (2mks)