THE PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
UKEREWE DISTRICT COUNCIL

FORM THREE EXAMINATION
PHYSICS

TIME 3:00 Hours **Year: 2025**

INSTRUCTIONS

1. This paper consists of three Sections A, B and C with a total of **eleven (11)** questions.
2. Answer **all** questions in section A and B and **two (2)** questions from section C.
3. Section A carries **16** marks, section B carries **54** marks and section C carries **30** marks.
4. Phones and any unauthorized materials are **not** allowed in the examination room.
5. Write your **Examination Number** on every page of your answer booklet(s)
6. Where necessary the following constants may be used
   (a) Acceleration due to gravity $=10ms^{-2}$
   (b) Gravitation force g = 10N/kg
   (c) Density of water = $1000kg/m^3$ or $1g/cm^3$.

SECTIONA (16 marks)

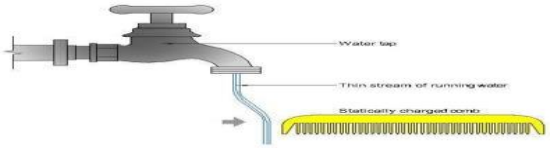
Answer all questions from this section

1. For each of the items (i) –(x) choose the correct answer from among given alternatives and write its letter beside the item number in the booklet provided**.** **(10 marks)**

(i) An object immersed in a liquid in a tank experiences an up - thrust. What is the physical phenomena that causes the up - thrust?
   A. The density of the body differs from that of the liquid
   B. The density of the liquid increases with depth
   C. The pressure in the liquid increases with depth
   D. The value of g in the liquid increases with depth

(ii) One of the following does not affect surface tension. It is ;
   A. Impurities B. Detergents C. Temperature D. Volume of the liquid

(iii) A Form Three student did an experiment to demonstrate electrostatic attraction between water and charged comb through rubbing it with hair. The charged comb was brought to a slow stream of water coming from the tap as seen in figure below. The result of the experiment found the water particle were attracted to the comb causing the stream of water to bend. This means that the charge on the comb



A. Is the same with that in water C. Is opposite to that in water
B. Is less than that in water D. Is larger than that in water

(iv) If a small displacement of a system from the rest position (after getting some energy) results in a small bounded motion about the equilibrium position , then the system is in :
A. Neutral equilibrium C. Stable equilibrium B. Unstable equilibrium D. Natural equilibrium

(v) Which of the following groups of machines represent first class lever?
A. Wheel barrow and bottle opener C. Crowbar and claw harmer
B. Fishing rod and sugar tongs D. Nut crackers and pair of scissors

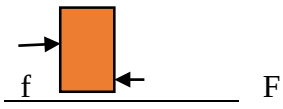
(vi) Whenever the surfaces in contact tend to move or move with respect to each other , the force of friction comes into play
A. Only if objects are solid
B. Only if one of the two objects is liquid
C. Only if one of the two objects is gaseous
D. Irrespective of whether the objects are solid, liquid or gaseous

(vii) In tropical countries shinny bright roofing materials are more preferred compared to dull brown tiles because;
A. shinny bright roofing materials are more attractive than dull brown tiles
B. shiny bright roofing materials are more durable than dull brown tiles
C. shinny bright roofing reflects the sun's radiant heat more than dull brown tiles
D. shinny bright roofing materials are lighter than dull brown tiles

(viii) At normal temperature due to a puncture the compressed air inside the tube of a car wheel suddenly starts coming out. Then the air inside the tube
A. Starts becoming hotter
B. Starts becoming cooler
C. Remains at the same temperature
D. May become hotter or cooler depending on the amount of water vapour present in air

(ix) If the e.m.f and internal resistance of a battery are 1.5V and 0.4Ω respectively, the current that this battery will supply a resistor of 14.6Ω will be :
A. 15A B. 10A C. 1.0A D. 0.1A

(x) A block of mass 10kg is lying at the front desk of a classroom. The coefficient of static friction is 0.5. A force of 40N is applied to the book. The book will
A. Move
B. Not move
C. Move up and down
D. Slide



2. Match the items in list **A** with the corresponding items in list **B (6marks)**

List A	List B

(i) Latent heat (ii) Specific heat capacity (iii)Heat absorbed or given out by a body when its temperature changes (iv)Heat capacity (v) Heat by electrical method (vi)Relation between heat capacity and specific heat capacity	(A) $\frac{Q}{\Delta T}$ (B) mL (C) Cal/g^{0}C (D) mcΔT (E) ItV (F) IV (G) Heat capacity = mass x specific heat capacity (H) Specific heat capacity = mass x heat capacity

SECTION B (54marks)

Answer all questions

3. (a) Explain the following pair of words Fog and Smog **(3marks)**

   (b) Tanzania meteorological agency (TMA) recorded dew point for temperature and dew point in four towns 12 noon as shown in table below.

City	Dew point
Arusha	1
Morogoro	12
Zanzibar	5
Dar es Salaam	4

Assume that all cities have their air temperature of 22^{0}C

(i) In which town is the relative humidity the highest? **(2.5marks)**

(ii) In which town is the relative humidity the slowest? **(2.5marks)**

4. (a) Name, draw and mention one use of the three different types of diverging lenses **(3marks)**

   (b) Why does the swimming pool appear much shallower than its actual depth? **(2marks)**

   (c) A converging lens produces an upright image four times the object height. If the focal length is 25cm, find the object distance. **(4marks)**

5. (a) Why an iron ball sinks in water? **(3marks)**

   (b) A crown made of gold and silver has a volume of 60cm^3 and mass of 1. 05kg.Find the mass of gold contained in the crown. (Density of silver = 10.5g/cm^3 and density of gold = 19.3g/cm^3) **(6marks)**

6. (a) State two ways that can be used to improve the efficiency of the machine (3marks)

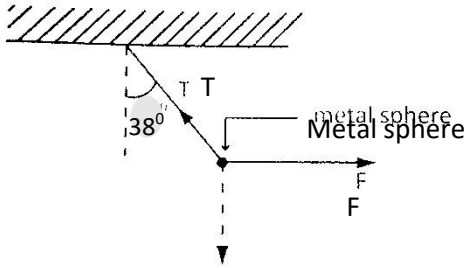
   (b) A certain first class lever of length 2.5m has a velocity ratio of 12 and an efficiency of 85%

   (i) How far from the fulcrum is the effort force applied? **(3marks)**

   (ii) What effort is required to lift the load weighing 75N? **(3marks)**

7. (a) State parallelogram law of force**. (4marks)**

   (b) A metal sphere weighing 60N is suspended from a beam by a thin string. What horizontal force must be applied to the weight to keep the string at an angle of 38^0 to the vertical? What is the tension in the string? **(5marks)**



8. (a) Give two difference between elastic collision and inelastic collision **(3marks)**

(b) A 4kg object is moving to the right at 2m/s when it collides elastically head-on with a stationary 6kg object. After collision, the velocity of the 6kg object is 1.6m/s to the right.

(i) What is the velocity of the 4kg object after the collision?
(3marks)

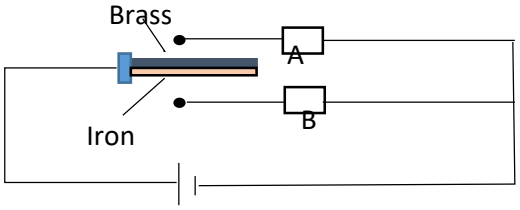
(ii) What is the total kinetic energy before and after collision?
(3mark)

SECTION C (30marks)
Answer ONLY two questions

9. (a) i) Explain how the efficiency of the vacuum flask would be affected if the double walled glass bottle was replaced with a double-walled metal bottle. **(4marks)**

ii) Why do you feel warmer during cloudy night than during clear sky night? **(4marks)**

iii) The diagram below show a bimetallic thermostat used to regulate a cooler and heat in a class room. Given Linear expansivity of brass = $18.9 \times 10^{-4}K^{-1}$ and Linear expansivity of iron = $10.2 \times 10^{-4}K^{-1}$. To keep the temperature in the room constant, which of the two devices A or B should be the heater? Explain your answer **(2marks)**



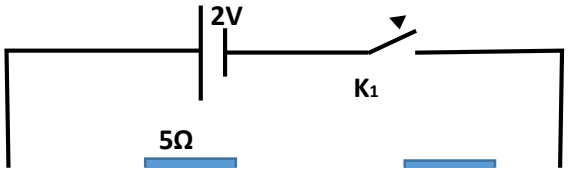
(b) A hollow metal sphere of mass 5kg is tied to the bottom of the sea –bed by a rope. The tension in the rope is 60N. Calculate the volume of the sphere. **(5marks)**

10. (a) i) How can a simple electric cell be constructed? **(2marks)**

ii) Sketch a diagram of the simple electric cell and locate the anode and cathode **(3marks)**

iii) Write the chemical reactions taking place at each electrode and within the electrolyte **(4marks)**

(b) Study the circuit below and then answer the questions that follows.



Calculate the current passing through the circuit when:

(i) Switch k_1 is closed **(2marks)**

(ii) Switches k_1 and k_2 are both closed **(2marks)**

(iii) Switch k_1 is open and k_2 is closed **(2marks)**

11. (a) In which part of a fridge or a microwave oven do magnetic strips installed? Why? **(5marks)**

(b) White and light coloured clothes are more suitable in hot seasons. Explain **(4marks)**

(c) A plastic tray weighing 48g and containing 200g of water at 20^0C is put in a refrigerator which abstract heat at a uniform rate of 2100J/min. Calculate the;

(i) The time taken for the tray and water to reach at 0^0C **(3marks)**

(ii) Total time taken to freeze all the water to ice at 0^0C. **(3marks)**

Given specific heat capacity of plastic = 1050J/kgK; specific latent heat of fusion of water = 335000J/kg.