



**THE PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
KILIMANJARO REGIONAL COMMISSIONER'S OFFICE
FORM THREE JOINT EXAMINATION**



PHYSICS

3:00 Hours

November, 2025

INSTRUCTIONS

1. This paper consists sections A, B and C with the total of eleven (11) questions
2. Answer all questions in both section A and B and only two questions in Section C
3. Section A carries Sixteen (16) marks, section B fifty-four (54) marks and section C Carries thirty (30) marks.
4. non-programmable calculator may be used.

Where necessary the following constants may be used:

- i. Density of water = 1000 kg/m^3 or 1 g/cm^3 .
- ii. Acceleration due to gravity, $g = 10 \text{ N/kg}$.
- iii. Density of mercury = 13.6 gcm^{-3}
- iv. Density of sea water = 1100 kg/m^3
- v. $\alpha_{\text{of iron}} = 0.0000109/\text{K}$ and $\alpha_{\text{of copper}} = 0.0000168/\text{K}$

SECTION A. (16 MARKS)

Answer all Questions from this section

1. For each of the items (i) - (x), choose the correct answer among the given alternatives and write its letter besides the item number in your answer.
 - i. A uniform beam XY is pivoted at one end X, and a vertically upward force of 4N at Y keeps the beam horizontal. The weight of the beam in Newton's is?
A. 8
B. 6
C. 4
D. 2
E. 1
 - ii. A force F Newton's gives a mass of 2 kg an acceleration of 4 m/s^2 . A force of 3F Newton's will give a mass of 8kg an acceleration in m/s^2 of ?
A. 1
B. 3
C. 6
D. 12
E. 24

iii. In a single rope 4-pulley system, the mechanical advantage is less than 4. Because

- A. The effort may vary.
- B. The upper pulley does not move.
- C. Friction act on a pulleys
- D. The weight of the lower pulley can be neglected.
- E. The road is raised.

iv. A physics teacher asked the students to explain briefly things which may cause fire in the physics laboratory. The students tried to answer but some explanations were not correct. Identify the explanations which were not correct

- A. Electric faults.
- B. Presence of flammable materials.
- C. Carelessness in using gas lighter and match boxes.
- D. The colour of some chemicals supports combustion.
- E. Presence of corrosive materials

v. A measuring cylinder is filled with oil. A girl says that the pressure at the bottom of the cylinder depends on?

- 1. The height of the oil.
 - 2. The area at the bottom.
 - 3. The oil lubrication property.
 - 4. The oil density.
- Which one of A, B, C, D and E is correct?
- A. 1 and 3
 - B. 2 and 4
 - C. 1 and 2
 - D. 1 and 4
 - E. 3 and 4

vi. A car moving at steady speed has a frictional force on its surface whose size depends on?

- A. Its speed and surface area
- B. Its speed only.
- C. Its area only.
- D. Its weight.
- E. Its wheel speed only.

vii. A cooking oil was mixed with water and poured into a measuring cylinder and allowed to settle for three minutes, which one will be the observed phenomenon?

- A. Meniscus of water appeared convex in shape at the surface.
- B. Cooking oil floats over water.
- C. Water floats over the oil.
- D. Water and oil completely mixed up.
- E. Cooking oil are soluble in water

viii. The following is a reason why objects in air tend to fall at the same time when they are released from the same height h above the ground level.

- A. They have the same weight.
- B. There is usually no resistance in the air.
- C. Acceleration due to gravity is the same.
- D. Gravity does not affect
- E. None of the above.

ix. A house building contractor fitted window glass panes which someone cannot see through, but the rooms are fully illuminated with light. These types of glass pane materials are said to be:

- A. Dim.
- B. Opaque.
- C. Translucent.
- D. Transparent.
- E. Black materials.

X. Apparent weight is equal to:

- A. Up thrust
- B. Weight of liquid displaced
- C. Apparent loss in weight
- D. Weight of body when in liquid

2. Match the terminologies used in curved mirrors in LIST A, with its correct meaning in LIST B, by writing the letter of correct response beside the item number in your sheet

LIST A	LIST B
i. Concave mirror ii. Pole iii. Centre of curvature iv. Principal focus v. Focal length vi. Diverging mirror	A. Centre of the sphere forming curved mirror. B. The point through which all ray parallel to the principal axis converges or appears to diverge after reflection through the mirror. C. Centre of an arc forming the sphere whose mirror is a part. D. The distance between the pole and centre of curvature. E. Point through which all rays parallel to the principal axis converges or appears to diverge after refraction through the lens. F. The distance between the pole and principal focus of curved mirror G. Mirror whose reflecting surface curves outward (polished inside) H. Point through which refraction takes place I. Mirror whose reflecting surface curves inside (polished outside)

SECTION B. (54 MARKS)

Answer all Questions from this section

3. (a) Why efficiency of a pulley system always less than 100%? Give two reasons.

(04 marks)

(b). A hydraulic press consists of a pump, load and two cylinders in which the larger cylinder is eight times the diameter of a small one. Use a well labeled cross-sectional diagram of hydraulic press to determine the value of mechanical advantage of this machine. If its work with efficiency of 90%.

4. (a) 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 40N. Calculate the volume of the sphere. **(05 marks)**

(b) A man climbing uphill tends to bend forward while a man descending downhill tends to bend backward. Briefly explain. **(04 marks)**

5. (a) The velocity of car A relative to car B is 5m/s when the two cars are moving in the same direction and 15m/s when the two cars are moving in the opposite directions. Determine the velocity of each car. **(05 marks)**

(b) It is found that a uniform wooden lath 100cm long and mass 95g balances on a knife-edge when a 5g mass is hung 10cm from one end. How far is the knife-edge from the centre of the lath? **(05 marks)**

6. (a) Briefly explain why a straight stick appears to be bent when partially immersed in a beaker of water? **(04 marks)**

(b) A pin at the bottom of the vessel 0.16m deep, when the vessel is filled with water it appears to rise when viewed from above. By what depth does the pin appear to be raised if the refractive index of water is 1.33? **(05 marks)**

7. (a) Explain briefly why ships float while a piece of iron sinks in water? **(04 marks)**

(b) A piece of cork of volume 100cm^3 is floating on water. If the density of cork is 0.35g/cm^3 . Calculate the volume of cork immersed in water **(05 marks)**

8. (a) A form three student was asked to illustrate the formation of image of a concave mirror for an object placed beyond centre of curvature. Explain three points he/she should consider when drawing a ray diagram **(05 marks)**

(b) A concave mirror is used to form an image of pin object. By using a well labelled diagram, show how you can obtain upright and enlarged image. **(04 marks)**

SECTION C (30 marks)

Answer any two (2) questions from this section

9. (a) An iron rod is 600cm long at 0°C . It is mounted alongside a copper rod and both are always maintained at same temperature. When they are heated to 100°C it is found that the difference in their lengths is the same as it was at 0°C . Find the length of copper rod at 0°C . **(6marks)**

(b) (i) Briefly explain how complementally colours are formed and mention them **(04 marks)**

(ii) Complete the table below by filling the empty spaces **(05 marks)**

Colours of light mixed	Colour formed
Red+Green+ Blue	
Yellow + Blue	
Yellow + Magenta + Cyan	
..... + Magenta	White light
Blue + Green	

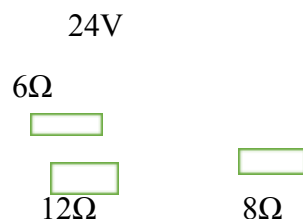
10. (a) Briefly explain three factors that determine the resistivity of the materials

(b) A fine wire has a resistance of $4\Omega/\text{m}$ and area of 0.15m^2 . When a coil made from this wire is connected to a 50V supply a current of 25mA flows.

(i) What is the length of wire making this coil?

(ii) Determine the resistivity of this wire.

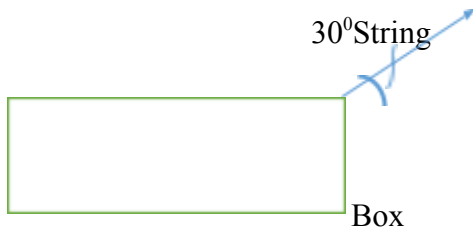
(c) A potential difference of 24V from a battery is applied to the network of resistors as shown in the figure below



- (i) What is the equivalent resistance in the figure above?
- (ii) What is the potential difference across 6Ω resistor?
- (iii) What is the current across 12Ω resistor?

11. (a) Why it is easy to roll a body than to slide it on the ground? **(3marks)**

(b).A box is being pulled on a floor using a string. The string makes an angle of 30° with the box as shown in the figure below:



If the force being applied at the string is 200N. Find:

- (i) The force which tend to lift the box **(03 marks)**
- (ii) The force which tends to pull the box forward **(03 marks)**

(b) An object of mass 1kg is initially placed on a frictionless plane inclined by an angle 30° . How long does it take the mass to move the distance of 10m down inclined? **(06 marks)**