

**PRESIDENT'S OFFICE**  
**REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT**  
**GEITA REGION**  
**FORM FOUR PRE-MOCK EXAMINATION**  
**PHYSICS 1**

Time: 3 Hours

Year: 2024

**Instructions**

1. This paper consists of sections A, B and C with total of eleven (11) questions
2. Answer all questions in sections A and B and two (2) questions in section C.
3. Communication devices and any unauthorized materials are not allowed in the examination room.
4. Non-programmable calculators and mathematical tables may be used.
5. Write your Examination Number on every page of your answer booklet(s)
6. Where necessary the following constants may be used:
  - (i) Acceleration due to gravity,  $g = 10 \text{ m/s}^2$
  - (ii) Specific latent heat of ice  $= 340000 \text{ J/Kg}$
  - (iii) Specific latent heat of steam  $= 2300000 \text{ J/Kg}$
  - (iv) Specific heat capacity of water  $= 4200 \text{ J/Kg K}$

**SECTION A (16 MARKS)**

Answer all questions in this section

1. For each of the following items (i) – (x), choose the correct answer from among the given alternatives and write its letter beside the items number in the answer booklet provided
  - (i) Which of the following best describes why the knowledge of physics is necessary to understand all other sciences?
    - A. Physics explains how energy passes from one objects to another
    - B. Physics explains how gravity works
    - C. Physics explains the motion of objects that can be seen with naked eye
    - D. Physics explains the fundamental aspects of the universe
    - E. Physics is a fun
  - (ii) The scientific assumption or prediction of the outcome is called
    - A. Hypothesis
    - B. Observation

- C. Data analysis
  - D. Data interpretation
  - E. Conclusion
- (iii) Which of the following instrument is most suitable for measuring the internal diameter of 100 ml beaker?
- A. Metre rule
  - B. Vernier caliper
  - C. Measuring tape
  - D. External caliper
  - E. Beam balance
- (iv) Forces can cause the following changes when applied to an objects except
- A. Speed of an objects
  - B. Direction of an objects
  - C. Shape of an objects
  - D. Size of an objects
  - E. Mass of an objects
- (v) What is density of liquid of mass 50g and volume 25 cm<sup>3</sup>?
- A. 0.5g/cm<sup>3</sup>
  - B. 2.0g/cm<sup>3</sup>
  - C. 8.0g/cm<sup>3</sup>
  - D. 10.0g/cm<sup>3</sup>
  - E. 5.0g/cm<sup>3</sup>
- (vi) Instrument used to measure relative density of liquid is known as :
- A. Hydrometer
  - B. Thermometer
  - C. Speedometer
  - D. Mercury meter
  - E. Buoyancy meter
- (vii) Which of the following statements is true?
- A. Water move from region of high water potential to the region of low water potential through a semi permeable membrane by osmosis

- B. Water does not move from region of high water potential through a semi permeable membrane by osmosis
  - C. Water move from region of high concentration to the region of low concentration through a semi permeable membrane by osmosis
  - D. Water move from region of low water potential to the region of high water potential through semi permeable membrane by osmosis
  - E. Water cannot move by osmosis through semi permeable membrane
- (viii) “When the pressure is applied at any point on the surface of a fluid in an enclosed container, the pressure is transmitted equally throughout the fluid and the container’s wall” this principle is known as:
- A. Pascal’s principle
  - B. Principle of moment
  - C. Archimedes’ principle
  - D. Pressure principle
  - E. Principle of conservation of pressure
- (ix) The energy possessed by a stationary object at certain height is known as:
- A. Nuclear energy
  - B. Heat energy
  - C. Light energy
  - D. Kinetic energy
  - E. Potential energy
- (x) What is number of images formed when two mirrors are placed at an angle of  $90^\circ$ ?
- A. 3
  - B. 10
  - C. 4
  - D. 5
  - E. 7

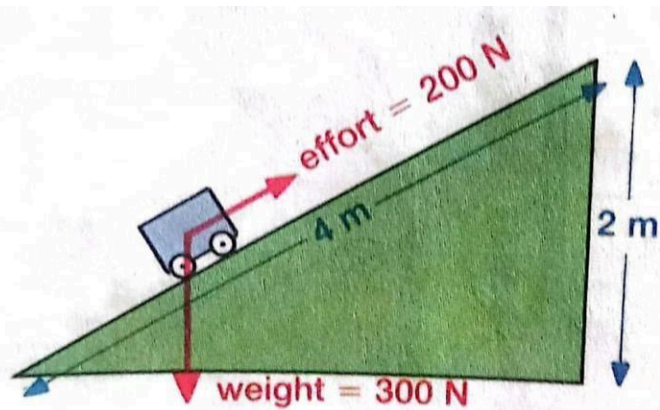
2. Match the terms used to describe the linear motion in list A with the corresponding in list B by writing the letter of the correct response beside the corresponding item in the booklet provided.

List A	List B
(i) Acceleration	A. Rate of change of displacement
(ii) Constant velocity	B. Negative deceleration
(iii) Displacement	C. Zero acceleration
(iv) Speed	D. Is the length between two fixed point
(v) Velocity	E. Is the distance in a specific direction
(vi) Distance	F. Velocity time graph
	G. Rate of change of distance

### SECTION B (54 Marks)

Answer all questions in this section

3. (a) Why do swimming pools look shallower than they really are? (3 marks)
- (b) An object 4 cm high is placed 15 cm from a convex lens of focal length 5cm. Draw a ray diagram on a graph paper to find the position, size and nature of an image. (6 marks)
4. (a) How does a hydraulic brake work when a driver applies a brake on a moving car? (3 marks)
- (b) A car of mass 1000 kg is travelling at 30 m/s. What is its kinetic energy. If it slows to 10 m/s what is its kinetic energy change? And also, when it takes 80 meters to slow down what is the braking force? (6 marks)
5. (a) Action and reaction forces are equal in magnitude and opposite in direction but do not cancel to result in zero net force? (3 marks)
- (b) A trolley is being pulled up a ramp as shown in the figure below:



Calculate:

- (i) the work done on the load (2marks)
  - (v) The work done by the effort (2marks)
  - (vi) The efficiency of machine (2marks)
  6. (a) With the well labeled diagram explain how x-rays are produced? (3marks)
  - (b) "The Earth atmosphere is very importance in our daily life" with vivid example verify this statement using six points (6 marks)
  7. (a) With well labeled diagram how does thermos flask can minimize heat loss of hot liquid contained in it? (4marks)
  - (b) What is the quantity of heat required to change 2kg of ice at  $0^{\circ}\text{C}$  to steam at  $100^{\circ}\text{C}$ ? (5 marks)
  8. (a) A certain radioactive source emits both  $\beta$ - particles and  $\gamma$ - rays. Explain how can this emission be prevented from being spread out and cause effects to an organism? (3marks)
  - (b) Americium-241 decays by losing an alpha particle.
  - (i) Explain why smoke detectors containing americium- 241 are not danger to people. (3marks)
  - (ii) Complete the equation showing this decay by give the values for X and Y
- $$^{241}\text{Am}_{95} \rightarrow ^4\text{He}_2 + ^X\text{Np}_Y + \text{energy} \quad (3 \text{ marks})$$

### SECTION C (30 Marks)

Answer two (2) question from this section.

9. (a) With diagram explain how alternating current generator converted to direct current generator? (4 marks)
- (b) Diode is a device that allow current flow in one direction. Describe full wave rectification using four diodes (6 marks)
- (c) A 12V, 60 W, heater can be operated by a 240V main transformer which has 10000 primary turns

(i) If the transformer is 100% efficient calculate the number of secondary turn and current flowing in the main leads (2 marks)

(ii) Explain how an alternating voltage applied in primary coil can generate an alternative voltage in the secondary coil (3 marks)

10. (a) According to Band theory materials are classified into three classes. As four students use band theory to classify materials by considering their electrical conductivity, arrangements of bands and distribution of electrons in each band (6 marks)

(b) Two men in a boat want to determine the depth of the sea using SONAR. A Sonar pulse sent out by a boat arrives back after 3 seconds. If the speed of sound in water is 1500m/s how deep is water?(4marks)

(c) How is electromagnets used in daily life? (5marks)

11. (a) Why ammeter is connected in series in an electrical circuit while voltmeter is connected in parallel? (4marks)

(b) A battery of e.m.f 6V and internal resistance of  $2\Omega$  is connected to a resistance of  $4\Omega$ . Draw the circuit diagram of the above information and calculate the current flowing through it?(6 marks)

(c) Why a hunter who spear-fishing does not aim his spear at where fish appears to be? (5marks)