MINISTRY OF EDUCATION AND VOCATIONAL TRAINING

CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

URBAN WEST REGION - ZANZIBAR

FORM FOUR (IV) MOCK EXAMINATION - 2025

PHYSICS 1

(For Both School and Private Candidates)

031/1

TIME: 3 :00 HOURS

JUNE 2025

INSTRUCTIONS:

1. This paper consists of sections **A, B** and **C** with a total of **eleven (11)** questions.
2. Answer **all** questions in sections **A** and **B** and **two (2)** questions from section **C**.
3. Section **A** carries **sixteen (16)** marks, section **B fifty four (54)** marks and section **C** carries **thirty (30)** marks.
4. Cellular phones and any unauthorized materials are **not allowed** in the examination room.
5. Non-Programmable calculators and mathematical tables **may be used.**
6. Write your **Examination Number** on every page of your answer booklet(s).
7. Where necessary the following constants **may be used:**
   - **(i)** Acceleration due to gravity, $g = 10\ m/s^2$.
   - **(ii)** Density of water $= 1.0\ g/cm^3$.
   - **(iii)** Pi, $\pi = 3.14$.
   - **(iv)** Speed of light $= 3.0 \times 10^8\ m/s$

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SECTION A: (16 Marks)

Answer all questions in this section.

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

(i) What is the diameter of a wire measured by the micrometer screw gauge shown below?

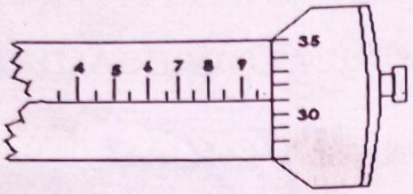


Figure1.

A. 9.53mm B. 0.981cm C. 95.31mm D. 98.31mm E. 0.930cm

(ii) A man climbs a ladder. Which quantities can be used to calculate the useful power of the man?

A. The weight of the man and the time taken only.

B. The weight of the man and the vertical distance moved only.

C. The work done by the man and the time taken only.

D. The work done by the man and the vertical distance moved only.

E. The mass of the man and the time taken only.

(iii) The instrument used to measure the rate of charges flowing in a conductor is:

A. Voltmeter B. Potentiometer C. Resistor

D. Capacitor E. Ammeter

(iv) In an experiment to observe the flow of different liquids in the same container, it takes 3 minutes and 10 minutes to pour cooking oil and honey into a 5 litre gallon, respectively. How is honey distinguished from cooking oil?

A. Honey has a higher viscosity than cooking oil B. Honey offers low resistance than cooking oil

C. Cooking oil has higher viscous force than honey D. Honey is heavier than cooking oil

E. Cooking oil offers high resistance than honey

(v) What is the distance and displacement covered by an athlete who runs 100 m to the North, 70 m to the East, 100 m to the South and 70 m to the West to complete the race?

A. Distance is 0 m and displacement is 340 m. B. Distance is 340 m and displacement is 0 m.

C. Distance is 340 m and displacement is 340 m. D. Distance is 0 m and displacement is 0 m.

E. Distance is 700 m and displacement is 700 m

(vi) Wet clothes dry quickly when hang opened on a laundry line than when folded, this explains that;

A. Evaporation is faster when intermolecular force of liquid is weak.

B. Evaporation is faster when the rate of removal of vapour (wind) is high.

C. Evaporation is high when the density of evaporating liquid is low

D. The rate of evaporation depends on the area exposed to the atmosphere. E. The liquid is volatile.

(vii) Which statement is correct about the half-life of radioactive source?

A. It is half the time for the radioactive source to become safe.

B. It is half the time it takes an atom to decay.

C. It is half the time it takes the activity of the source to decrease to zero.

D. It is the time it takes the activity of the source to decrease by half.

E. It is the time for the radioactive element to decay half of its time.

(viii) The orbit of the Moon around the Earth is modelled as a circular path of radius 3.8×10^5 km. The orbital period is 29.5 days ($\approx$710 hours). What is the orbital speed of the Moon?

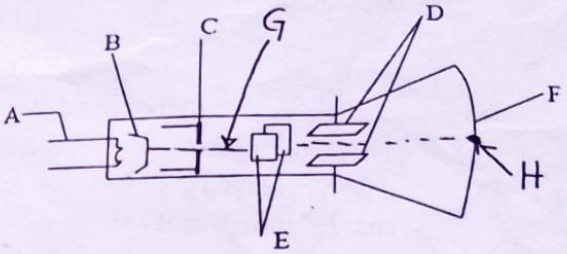
A. 3.4×10^3 km/h B. 1.1×10^3 km/h C. 1.7×10^3 km/h

D. 3.3×10^4 km/h E. 5.35×10^{-2} km/h

(ix) The electromotive force (e.m.f.) of a mobile phone battery is 3.7V. What does this mean?
A. 3.7J is the maximum energy the battery can provide in 1.0s.
B. 3.7J is the total energy the battery can provide before it has to be recharged.
C. 3.7J of energy is provided by the battery to drive a charge of 1.0C around a complete circuit.
D. 3.7J of energy is provided by the battery to drive a current of 1.0A around a complete circuit.
E. 3.7J of energy is required to charge a mobile phone for 1.0 hour.

(x) The type of the wave which travels only on solid and at the surface of liquid.
A. Transverse mechanical wave
B. Longitudinal mechanical wave
C. Electromagnetic waves
D. Stationary waves
E. Progressive waves

2. Match the functions of the parts of cathode ray tube from **list A** with the correct part shown in the diagram from **list B,** and write the letter of correct response beside the item number in the answer booklet provided. **(6marks)**

S/N	LIST A:	LIST B:
(i)	The metal filament which gain enough energy to emit electrons from the surface.	 Figure 2.
(ii)	Used to deflect the beam vertically.	
(iii)	Used to pull and accelerate electron beam.	
(iv)	Used to provide thermal energy required for electron emission.	
(v)	Used as a display component of CRT.	
(vi)	Used to deflect the beam horizontally.	

SECTION B (54 Marks)
Answer all questions in this section.

3. (a). A convex mirror is used as a driving mirror in moving vehicles.Use diagram to explain the characteristics of image of cars as observed from the mirror. **(4 marks)**

(b). A projector lens is used to produce a sharp image of an object when the distance between the object and the screen is 270cm. If the linear magnification is 8, calculate the focal length ofthe lens.**(5 marks)**

4. (a). Briefly explain the followings

(i) Tractors work on soft grounds are made with very big and wide tyres**(2 marks)**

(ii) Air bubbles increase in volume as they rise up from the bottom to the top of the pond.**(2 marks)**

(b). The diagram below shows a wooden bar of 15kg and 8m long placed horizontally exceeding the edge of the table. Find the maximum weight of a boy who can walk along the whole bar without overturning. **(5 marks)**

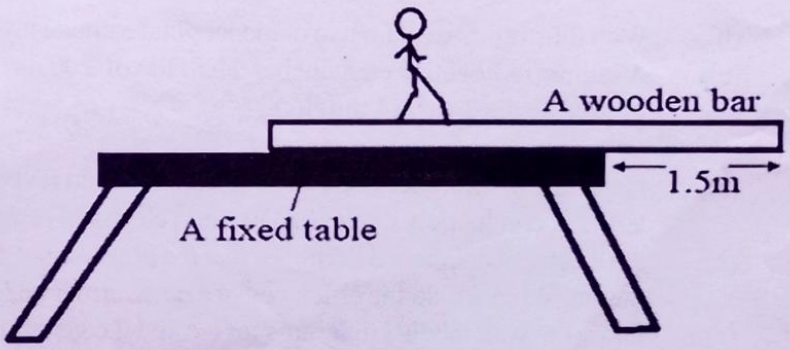


Figure 3.

5. (a). An object moving with an initial speed 'u' accelerates uniformly with an acceleration 'a' and attain a final velocity 'V' after a time 't'. If the distance covered during the accelerating period is 'S" Show that :
(i) $V = u + at$ **(1 mark)** (ii) $S = \frac{1}{2}t(u + V)$ **(4 mark)**

(b). Draw an inclined plane as it is used in simple machine, and show that the velocity ratio (V.R) is the reciprocal of the sine of angle of inclination (θ).**(4marks)**

6. (a). Use kinetic theory of matter to explain why liquid expand more when heated than solid.**(4 marks)**

(b). Compare and contrast between conduction and convection of heat transfer.**(5 marks)**

7. (a). Consider two organ pipes A and B sounded with their fundamental notes and then their second overtone. If pipe A is closed at one end and pipe B is open at both ends. Draw diagrams to show the mode of vibration in each of the four cases. **(4 marks)**

(b). How does the position of an element changes in a periodic table when it emit out a beta (β) particle? Support your answer by giving an example.**(5 marks)**

8. (a). Outline any four (4) differences between stars and planets?**(4 marks)**

(b). In your village people are complaining on the increase in temperature nowadays. What are you going to explain to them about the two possible causes of the prevailing temperature? Hence explain to them the three measures to be taken to mitigate the situation **(5 marks)**

SECTION C (30 Marks)

Answer anytwo (2) questions from this section.

9. (a). The gold leaf electroscope has a number of uses in different field of study. Briefly explain how positive charged gold leaf electroscope is used to identify the type of charges present in a given charged rod. **(6 marks)**

(b). Four resistors are arranged in a square circuit ABCD as shown in figure 4 below. Find the ratio of total resistance between A and B to the total resistance between A and C.**(6 marks)**

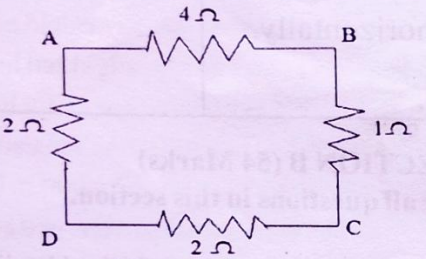


Figure 4

(c). Can a body have energy without having momentum? Explain. **(3 marks)**

10. (a). The displacement – distance graph of vibrating string is as shown in figure 5 below.
If the speed of the wave is 12m/s, how many circles does the wave make for a second? **(5 marks)**

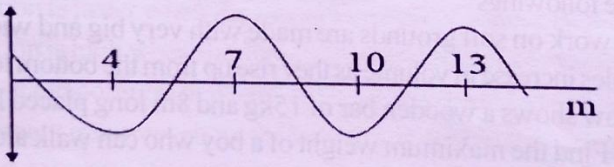


Figure 5

(b). With illustration explain two evidences that cathode rays are negatively charged particles.**(6marks)**

(c). A sample radioactive element has a half life of 200 days. After how many days will 20% of sample be decayed? **(4 marks)**

11. (a). Explain the differences between forward bias and reverse bias of a normal junction diode in terms of conduction, depletion layer and electrical resistance. **(6 marks)**

(b). An electrical engineer determines that the power input of a transformer is five times the power output. What would the efficiency of a transformer be? **(3 marks)**

(c). Draw the well labeled diagrams for a.c and d.c generators hence state two advantages of a.c generator over a d.c generator. **(6 marks)**