



THE UNITED REPUBLIC OF TANZANIA
MBEYA CITY COUNCIL ACADEMIC COMMITTEE
FORM TWO PRE-MOCK II EXAMINATION

031**PHYSICS****Time: 02:30 HRS****Friday, 19th May 2023 a.m.****Instructions**

1. This paper consists of sections A, B and C with a total of **ten (10)** questions.
2. Answer **all** questions.
3. Section A and C carry **fifteen** (15) Marks each and section B carries seventy (70) Marks.
4. All answers must be written in space provided.
5. All communication devices, calculators and any unauthorized materials are not allowed.
6. All writings must be in blue or black ink **except** drawings which must be in pencil.
7. Where necessary the following constants may be used:
 - (i) Acceleration due to gravity, $g = 10 \text{ m/s}^2$
 - (ii) $\pi = 3.14$

QUESTION NUMBER	FOR EXAMINER'S USE ONLY	
	SCORE	EXAMINERS INITIALS
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
TOTAL		
CHECKER'S INITIALS		

SECTION A (15 MARKS)

Answer **all** questions

1. For each of the items (i) – (ii), choose the correct answer from the given alternatives and write its letter in the box provided.

(i) The quantity of space that an object occupies is called_____.

A	Mass	B	Area
C	Volume	D	Matter

(ii) The area under a speed - time graph represents:

A	Displacement	B	Velocity
C	Distance	D	Acceleration

(iii) If a bottle capable of holding 200g of a liquid of density 800kg/m^3 is allowed to hold 160g of sand of density 3200kg/m^3 then the mass of water needed to fill up the bottle is

A	200g	B	40g
C	90g	D	150g

- (iv) If a body of mass 4.5kg falls freely from rest for 2.0 seconds before it strikes the ground, the maximum kinetic energy it will gain is

- | | | | |
|---|--------|---|---------|
| A | 900 J | B | 864.4 J |
| C | 1000 J | D | 450 J |

- (v) A wheel and axle of efficiency 75% is used to raise a load of 1500N. if the radius of the wheel is 40 cm and that of the axle is 4cm, then the effort required to overcome the load is:

- | | | | |
|---|-------|---|--------|
| A | 150N | B | 200N |
| C | 2000N | D | 20000N |

- (vi) The property of a material to return to its original shape and size on removal of a stretching force is called

- | | | | |
|---|-------------|---|------------|
| A | Elasticity | B | Plasticity |
| C | Hooke's law | D | Cohesivity |

- (vii) The pair of physical quantities having the same meaning are:

- | | | | |
|---|----------------------|---|--------------------|
| A | Mass and weight | B | Velocity and speed |
| C | Impulse and momentum | D | Energy and power |

- (viii) A positively charged rod is brought near the cap of a positively charged electroscope. The divergence of the gold leaf will:

- | | |
|---|----------------------------|
| A | Decrease |
| B | Increase |
| C | Decrease and then increase |
| D | Increase and then decrease |

- (ix) A device used to detect the presence of electric current in a circuit is called

- | | | | |
|---|--------------|---|-----------|
| A | Ammeter | B | Voltmeter |
| C | Galvanometer | D | Manometer |

- (x) The following statement are true about impulse. EXCEPT.

- A It is the product of force and time
- B It is the change in momentum
- C In long jump we should land on soft sand
- D Impulse should happen in a very short time

2. Match the functions of simple measuring instruments in **List A** with their corresponding instruments in **List B** by writing a letter of the correct response below the item in the table provided.

List A	List B
(i) An instrument that measures volumes of liquid.	A. Spring balance.
(ii) An instrument that measures force of pull.	B. Clinical thermometer.
(iii) An instrument that measures length, depth, internal and external diameters.	C. Pipette.
(iv) An instrument that measures specific volume of liquid and transfer it from one container to another	D. Vernier caliper.
(v) An instrument that measures body temperature	E. Measuring cylinder.
	F. Micrometer screw gauge.
	G. Burette.

Answers

(i)	(ii)	(iii)	(iv)	(v)

SECTION B (70 Marks)

Answer **all** questions

3. (a) Differentiate between the terms *magnetic field* and *magnetic lines of force*.
(04 marks)

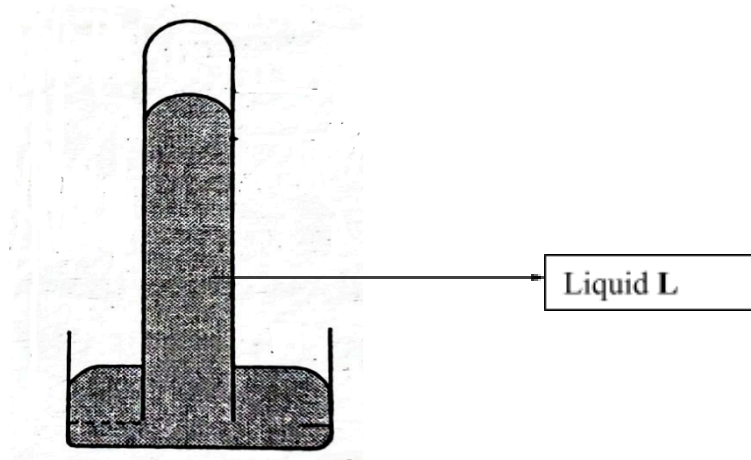
- (b) (i) Two bar magnets are placed on a horizontal table with the N-pole of one facing the S-pole of the other. Sketch the possible lines of

force between them.

(03 Marks)

- (ii) With reasons, state the material which you will consider most suitable being a permanent magnet. **(03 Marks)**

4. (a) The figure below shows an instrument used to measure atmospheric pressure.



- (i) Name the instrument _____.

(02 Mark)

- (ii) Name the liquid L and state its property which makes it the most suitable liquid for this use. **(03 Marks)**

- (b) Why water is unsuitable for use in the instrument above? **(05 marks)**

5. (a) On your way back to home, you hear two Form two students arguing that acceleration is a scalar quantity because it describe the rate of change of speed. As a well-trained form two student explain how will you correct this argument.

(03 Marks)

- (b) (i) Assume you are in the third floor of a certain apartment and you suddenly release your 2kg bag accidentally. If it takes 2 seconds to reach the ground, what is the possible height of the apartment.

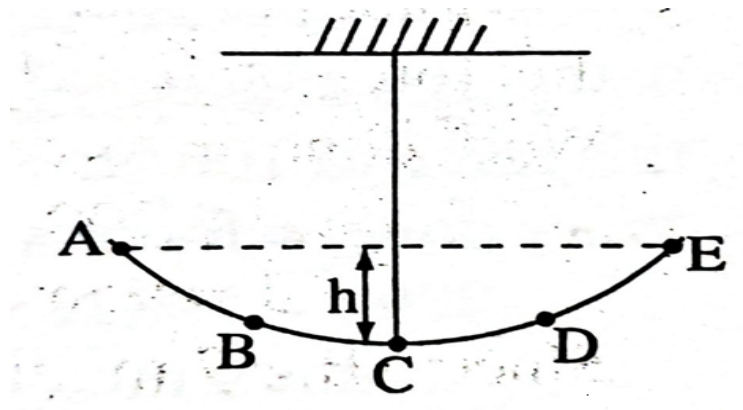
(04 Marks)

- (ii) A 1kg bag is also released from the same height, also takes the same time to hit the ground. Explain this phenomenon. **(03 Marks)**

6. (a) (i) An elevator at PJ. ENGINEERING COMPANY carries 100 people of average mass 72kg to a height of 5m in half a minute. Find the power needed to do so. **(05 Marks)**

- (ii) In real sense, it has been found that the power needed by this machine is greater than the calculated power above. Explain **(02 Marks)**

- (b) Figure below shows a pendulum bob swinging from side to side. Name latter of the points that the bob has;-



(03 Marks)

- (i) Maximum gravitational potential energy _____
- (ii) Maximum kinetic energy _____
- (iii) Partly potential and partly kinetic energies _____

7. (a) If a metal rod is given a negative charge and brought near another metal rod that

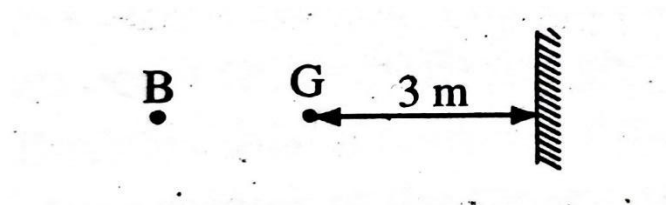
is Neutral,

- (i) Will there be an electric force between them? **(02 marks)**

- (ii) If there is a force will it be attractive or repulsive? Why? **(03 marks)**

- (b) Capacitors of $2\mu\text{F}$ and $3\mu\text{F}$ are connected in series in a given amplifier circuit. Calculate the value of a single equivalent capacitor that will provide the same magnitude to be fixed in the amplifier circuit. **(05 Marks)**

8. (a) A boy B and a girl G stands at different point in front of a plane mirror.



If the boy's image is 8.0m from the girl how far apart are B and G? **(02 Marks)**

(b) A ray of light strikes a plane mirror, such that angle with the mirror is 20° .

(i) What is the value of angle of reflection? **(04 Marks)**

(ii) What is the angle between incident ray and reflected ray? **(04 Marks)**

9. (a) Explain the following terms as applied in measurement

(i) Relative Density **(02 Marks)**

(ii) Density **(02 Marks)**

(b) In experiment to determine relative density of liquid X, the following results were obtained after various measurements.

Mass of empty bottle = 15g

Mass of bottle + liquid X = 35g

Mass of bottle + water = 40g

Volume of bottle = 25cm³

Calculate:-

- (i) The density of water in kg/m³ **(02 Marks)**

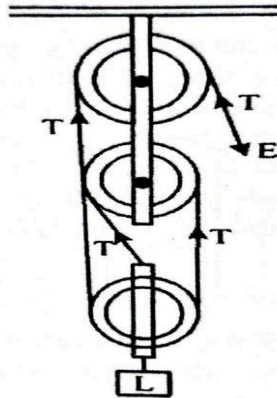
- (ii) The density of liquid X in kg/m³ **(02 Marks)**

- (iii) Density of liquid X relative to that of water **(02 Marks)**

SECTION C (15 Marks)

Answer question **ten (10)**

10. Suppose you have been given the simple machine below, where an effort of 40N is used to overcome the load.



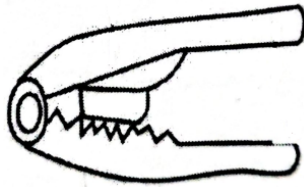
- (a) Deduce the value of velocity ratio of the machine and hence calculate the value of the Load being raised **(06 Marks)**

- (b) Design and sketch the simple machine like the one in 10 (a) above that will give you a Mechanical advantage of 4. **(05 Marks)**



- (c) Examine the following simple machines and recommend to what classes of lever do they belong. **(04 Marks)**

- (i) Nut cracker



Lever Class _____

- (ii) Bottle opener



Lever Class _____