

THE UNITED REPUBLIC OF TANZANIA
PRIME MINISTER'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
MBEYA CITY COUNCIL
DR TULIA ACKSON SECONDARY SCHOOL
FORM ONE (HOME PACKAGE) EXAMINATION ASSESMENT
031/1 **PHYSICS**

TIME: 2:30 HOURS

MAY, 2026

INSTRUCTIONS

1. This paper consists of ten (10) questions.
2. Answer all questions.
3. All work done and answers of each question must be shown clearly in the space provided.
4. Communication devices and any unauthorized materials are not allowed in the examination room.
5. Non-programmable calculators and mathematical tables may be used.
6. Write your **Full Name** at the top right corner in the space provided.
7. Where necessary the following constants may be used
 - (i) Acceleration due to gravity = 10 m/s^2
 - (ii) Density of water 1 g/cm^3 or 1000 kg/m^3

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

SECTION A (15 Marks)

Answer **all** questions in this section

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

(i) How does studying physics contribute to our understanding of the natural world and the universe?

A. Physics is not related to the study of the natural world and the universe.

B. Physics helps us understand the behavior of matter and energy, from subatomic particles to celestial bodies.

C. Physics only deals with artificial and human-made systems.

D. Physics is not essential for understanding the natural world and the universe.

☐

(ii) Physics is the fundamental branch of science, because the knowledge obtained in studying Physics is strongly connected to other branches of science. Which among the following statements describes how physics is connected to other disciplines like chemistry and biology?

A. Physics studies the properties of matter and energy, which are fundamental to all sciences.

B. Physics focuses solely on celestial bodies and space exploration.

C. Physics deals with the human mind and cognitive processes.

D. Physics has many applications in medical field.

☐

(iii) Physics is the study of matter, energy and the interaction existing between them. What is the significance of the interaction of matter and energy in physics?

A. It helps us understand the human body and its functions.

B. It allows us to explore different planets and their atmospheres.

C. It helps explain the behavior of objects and phenomena in the universe.

D. It is not relevant to the study of physics.

☐

(iv) To measure the length using a meter rule, wrong position of the eye leads to:

- A. Parallax error. B. Eye error. C. Zero error. D. Meter error.

☐

(v) Which of the following instruments is most suitable for measuring the internal diameter of 100 ml beaker?

- A. Meter rule. B. Vernier caliper.
C. Measuring tape. D. External caliper.

☐

(vi) A force acting on an object causes some properties of the object to change. Which of the list contains properties that can be changed by the action of force?

- A. Mass, motion, and shape. B. Mass, motion and size.
C. Mass, shape, and size. D. Motion, shape and size.

☐

(vii) In Physics test students were asked to mention the examples of friction. The response of one candidate was as listed below.

1. Tension in a spring
 2. Air resistance
 3. Weight
- Which among the alternatives shows the correct examples of friction?

☐

- A. 1 only B. 1 and 3 C. 2 only D. 2 and 3

(viii) Which of the following best describes a variable?

- A. A trend that shows an experimental relationship
B. Something whose value can change over multiple measurements
C. A measure of how much a plot line changes along the y-axis
D. Something that remains constant over multiple measurements

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(ix) Why does a piece of steel sink in water but a steel ship float?

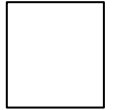
- A. The density of the steel ship is less than the density of water
B. Steel is denser than the steel ship
C. Steel ship has the same density to that of steel
D. The average density of steel ship is less than the density of water

☐

(x) A block of material X has a mass of 240 g and occupies a volume of 80 cm³. Another material Y has the same mass but occupies a volume of 120 cm³. Which of the following statements is correct?

- A. Material X is denser than material Y

- B. Material Y is denser than material X
- C. Both materials have the same density
- D. Density cannot be determined with the given information.



2. Match the item in list A with the correct responses from list B by writing the letter of the correct answer in the space provided. **(5 marks)**

LIST A	LIST B	Answers
(i) Stretching	A. effect of magnet on iron material.	(i)
(ii) Attraction	B. force in string.	(ii)
(iii) Friction	C. extension of rigid material such as spring.	(iii)
(iv) Viscosity	D. two rough surfaces in contact.	(iv)
(v) Tension	E. resistance to motion in fluid.	(v)

SECTION B (70 Marks)

Answer **all** questions in this section

3. (a) You notice that when you rub a balloon against your hair, it becomes negatively charged, and you can make small pieces of paper stick to it. What testable hypothesis can you formulate to explain this phenomenon? **(3 marks)**
- (b) A student conducts an experiment to measure the time taken for a pendulum to complete ten oscillations. However, the results are inconsistent as the measured time varies significantly between trials. What problem can be identified in this experiment? **(3 marks)**
- (c) Physics is the fundamental branch of science as it provides tools for learning other disciplines. The following statements provide an insight into how physics is connected with other disciplines. Classify the statements according to the respective field and suggest the set of instruments designed using physics theories and principles to assist the working of other fields if any:
- (i) Exploration of the very far objects in the sky. **(1 mark)**
- (ii) Diagnosis of disease and treatment of living organisms. **(1 mark)**

- (iii) Behavior of atoms and molecules, studying energy changes during chemical. **(1 mark)**
- (iv) Study of climate, weather patterns, ocean currents, and the behavior of Earth's crust. **(1 mark)**
4. (a) Differentiate between the mass and the volume of a substance. **(2 marks)**
- (b) A rectangular block measures height 1.00 cm , width 2.50 cm , and length 4.00 cm .
- (i) What instrument was used to measure the sides of the rectangular block? **(1 marks)**
- (ii) Calculate the volume of the rectangular block. **(3 marks)**
- (c) An athlete runs around a track three times. Her friend uses a stopwatch to record the time elapsed. At the start of the ride, the stopwatch recorded 6.00 s , after one round the stopwatch recorded 180.00 s and at the end of third round the reading from the stopwatch was 600.00 s . What is the average time for one round of the track? **(4 marks)**
5. (a) During the experiment, the following observations are recorded:
- Observation I:** One student always reads the position of the pendulum bob on the meter rule while sitting down at the lab bench, looking slightly upward at the scale.
- Observation II:** The meter rule being used has a worn-down, chipped end at the 0 cm mark, so the students start all their length measurements directly from the 1.0 cm mark instead, but forget to subtract 1.0 cm from their final data table.
- Observation III:** The digital stopwatch has a faulty internal quartz crystal that runs 2% slower than standard real-time.
- (i) Match each of these three observations to the correct type of error. **(3 marks)**
- (ii) Distinguish between three correct type of error. **(3 marks)**
- (b) In the process of measuring the diameter of a rod using a micrometre screw gauge with a least count of 0.01 mm , the sleeve shows a reading of 1.6 cm , and the thimble indicates 48 divisions . Calculate the accurate diameter of the rod. **(4 marks)**
6. (a) In each statement, suggest the type of force that comes into play.
- (i) You placed two bar magnets close to each other, and they pushed each other away. **(1.5 marks)**
- (ii) You exerted a force on a book to move it across a table, but it eventually comes to a stop. **(1.5 marks)**
- (iii) If you drop a ball from a height, what force pulls it down towards the ground? **(1.5 marks)**
- (b) You want to lift a heavy box. The force of gravity pulls it downwards with 500 N .
- (i) How much force will you have to apply to lift the box? **(2 marks)**
- (ii) If your friend supports the box from below with a force of 270 N , how much force will you have to apply to lift the box? **(3.5 marks)**
7. (a) What is relative density? Express relative density in terms of mass. **(4 marks)**

- (b) A Form One student in Physics class obtained the following results from an experiment:

Mass of an empty beaker = 48 g

Mass of beaker + liquid **M** = 60 g

If she had used a pipette 25 cm³ to transfer liquid **M** to the beaker, calculate the density of the liquid **M**. (6 marks)

8. (a) What is meant by the following terms as applied in physics. (7.5 marks)

- (i) Physics
- (ii) Measurement
- (iii) Force
- (iv) Density
- (v) Upthrust

- (b) The density of water is 1,000 kg/m³. What does it imply? (2.5 marks)

9. (a) Explain the following

- (i) Why physics is considered as fun subject? (1 mark)
- (ii) Why mangoes fall down when the mango tree is shaken. (1 mark)
- (iii) Why an inflated balloon floats in air? (1 mark)
- (iv) Why honey takes longer time to flow into the beaker than water. (1 mark)
- (v) Why it is advised to position eye directly above the mark to be read while taking measurement. (1 mark)

- (b) Why is it important to study physics? Give five (5) reasons. (5 marks)

SECTION C (15 Marks)

Answer question **ten** (10)

10. (a) State Archimedes' principle and law of floatation. (4 marks)

- (b) A salvage ship is attempting to raise an iron anchor off the ocean floor. The anchor has a mass of 560 kg and the density of iron is 7800 kg/m³. The cable used to lift the anchor can support a weight of 5 000 N before breaking. Use 1025 kg/m³ as the density of seawater.

- (i) Can the cable support the anchor while it is completely submerged? (3 marks)
- (ii) Can the cable support the anchor when it is completely out of the water? (3 marks)
- (iii) What percentage of the anchor will be out of the water when the cable breaks? (5 marks)

"Physics teaches us that nothing happens without a reason"

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