

DR TULIA ACKSON SECONDARY SCHOOL PHYSICS FORM THREE HOME-PACKAGE EXAMS AUGUS 2026
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THE UNITED REPUBLIC OF TANZANIA
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REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
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FORM THREE HOME PACKAGE EXAMINATION ASSESSMENT
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PHYSICS
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TIME 3:00 hours Thursday 27th August 2026

Instructions

1. This paper consists of section A, B and C with a total of **eleven (11)** questions.
2. Answer **all** questions in section A and B and **two (2)** question from section C.
3. Section A carries **sixteen (16)** marks, section B carries **fifty-four (54)** marks and section C carries **thirty (30)** marks.
4. All writings must be in **blue** or **black** ink, **except** drawing which must be in pencil.
5. All communication devices and any unauthorized materials are **not** allowed in the examination room.
6. Write your **Examination Number** on every page of your answer sheets provided.
7. Where necessary, the following constants may be used
 - (a) Acceleration due to gravity, $g = 10\text{m/s}^2$
 - (b) Speed of sound in air, $V = 340\text{m/s}$
 - (c) Pie, $\pi = 3.14$
 - (d) Speed of light in vacuum = $3 \times 10^8 \text{ m/s}$
 - (e) Specific heat capacity of water (C_w) = 4.18 kJ/kg K

SECTION A. (16 MARKS)

Answer **ALL** questions from this section

1. For each of the items (*i*) – (*x*) choose the correct answer from among the given alternatives and write its letter beside the items number. **(10 marks)**

(i) A soft iron hollow cylinder can be used to concentrate magnetic lines of force on its body, leaving the hollow part free of magnetic influence. This phenomenon is called

- A. Demagnetization
- B. Magnetization
- C. Magnetic reduction
- D. Neutral point
- E. Magnetic shielding

(ii) If no lubricating oil used, the metal **X** of a piston rubs against metal **Y** of an engine casing. The amount of heat produced depends on ?

- A. Specific heat capacity of **X**.
- B. The mass of **Y**
- C. The specific heat capacity of **Y**.
- D. The conductivity of **X** and **Y**.
- E. Frictional force between **X** and **Y**.

(iii) Some ice floats in 20 cm^3 of water in a measuring cylinder. Which of the following statements is correct?

- A. The mass of ice is 20 g
- B. The volume of ice is 20 cm^3
- C. The density of ice is greater than that of water.
- D. The weight of ice is equal to the weight of water displaced.
- E. The mass of ice is equal to the weight of water displaced

(iv) The acceleration of a moving object may be found from

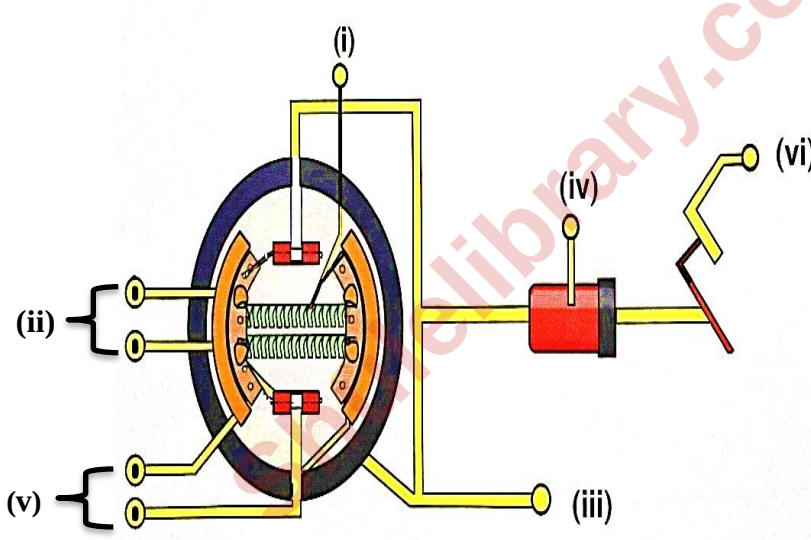
- A. The area under its velocity - time graph
- B. The slope of the velocity - time graph
- C. The area under the distance - time graph
- D. The slope of the distance - time graph
- E. The slope at the peak of its distance - time graph

- (v) A parallel arrangement of $3\ \Omega$ and $6\ \Omega$ is placed in series with $8\ \Omega$ resistor. If a potential difference of $30\ V$ is connected across the whole circuit, the current in the $3\ \Omega$ resistor is
- A. $15\ A$
 - B. $10\ A$
 - C. $3\ A$
 - D. $2\ A$
 - E. $1\ A$
- (vi) Which of the following is a scalar quantity?
- A. Electric current
 - B. Acceleration
 - C. Force
 - D. Velocity
 - E. Displacement
- (vii) A card appears to be blue when it is seen in white light. In yellow light, it will appear to be
- A. Green
 - B. Dark blue
 - C. Yellow
 - D. Black
 - E. White
- (viii) If an object is $30\ \text{cm}$ from a concave mirror of radius of curvature $30\ \text{cm}$, the image will be
- A. Upright
 - B. The same size as the object
 - C. Diminished
 - D. Virtual
 - E. Twice the object size
- (ix) Colours are produced when white light passes through a glass prism because
- A. The light waves interfere
 - B. The glass colours the light
 - C. Diffraction of light occurs
 - D. The different colours are filtered

E. Different colours travel at different speed in glass

- (x) The death of deep seas creatures is when brought shallow water. This happens because
- The pressure inside bodies is greater to the surrounded pressure of water.
 - The pressure of dead body is equal to that of atmospheric pressure
 - The density of dead body is equal to that of water.
 - Volume of body displaced is equal to volume of water
 - Their pressure made inside bodies is less than that surrounded pressure of water

2. Match the parts of a hydraulic brake instrument from **LIST A** with the corresponding parts in **LIST B** by writing the letter of the correct response beside the item number in answer booklet (**s**) provided. **(6 marks)**

LIST A	LIST B
	- Returning spring - Hydraulic fluid - Sliding pedal - Master cylinder - Brake drum - Brake shoes - Spring balance - Brake pedal - Slave cylinder

SECTION B. (54 MARKS)

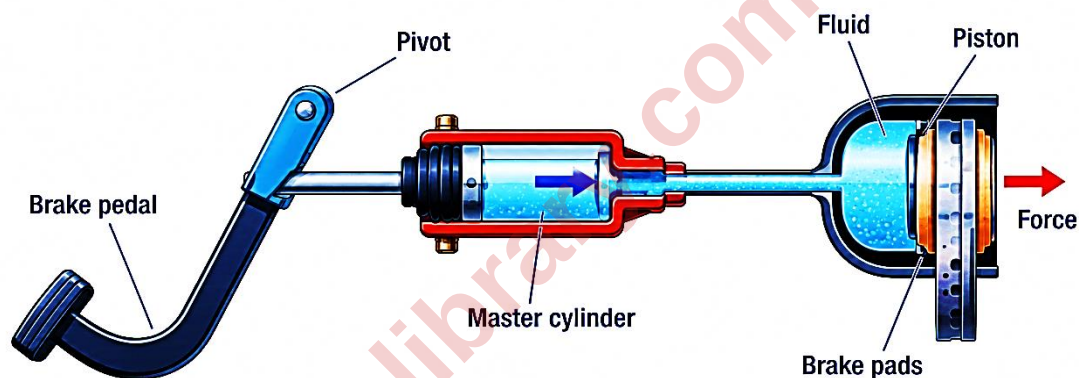
Answer **ALL** questions in this section

- 3.(a) Explain why a dentist would prefer to use a concave mirror rather than a plane mirror. **(4 marks)**
- (b) An object is placed 15 cm in front of a concave mirror of radius of curvature 20 cm. Calculate the position, nature and magnification of the image formed. **(5 marks)**

- 4.(a) **Figure below** shows an athlete lifting weights while standing with feet apart. Explain why standing with the feet apart improves the athlete's stability. (3 marks)

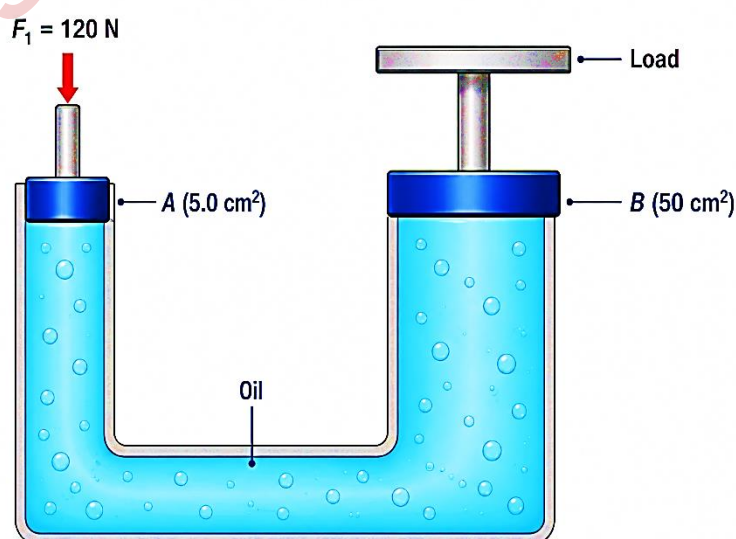


- (b) (i) The diagram **below** shows a braking system.



Why is the master cylinder made smaller than slave piston? (2 marks)

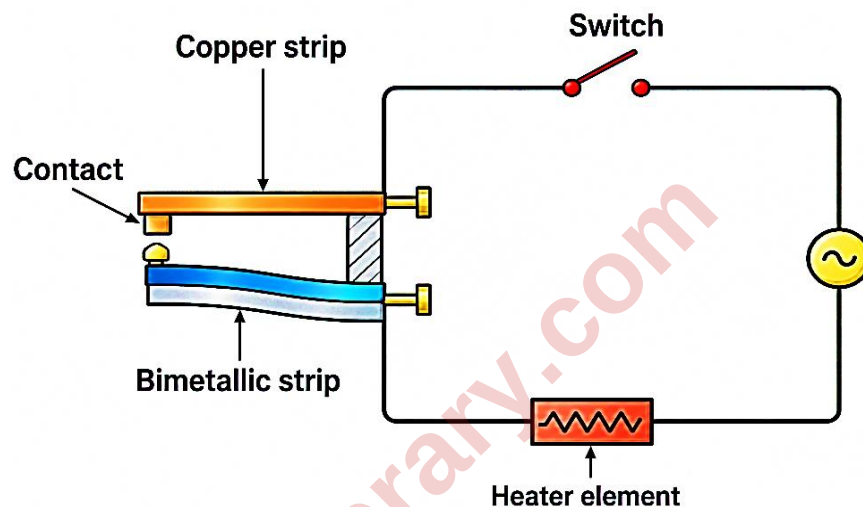
- (ii) The **figure below** shows a simple hydraulic machine containing oil, used to raise a heavy load.



Calculate the maximum load that can be raised at piston B. (4 marks)

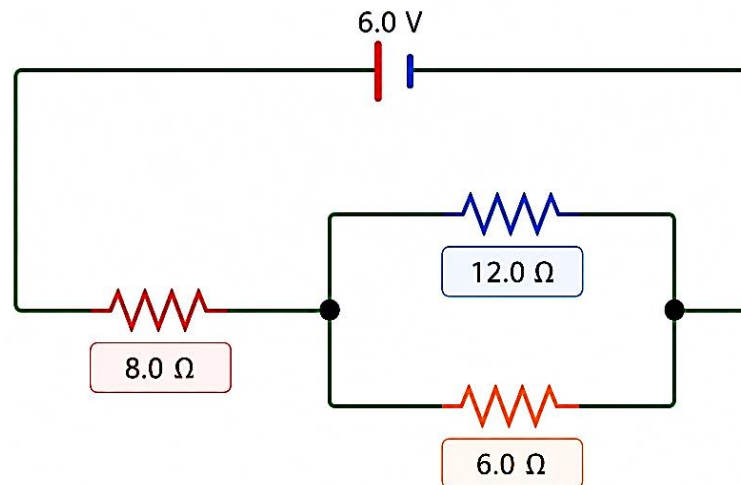
- 5.(a) Your inertia can kill you! With reference to moving vehicles, explain the physics behind this statement. (4 marks)
- (b) With the aid of a diagram show that the V.R of an inclined plane making an angle θ with the horizontal is given as $\frac{1}{\sin \theta}$, calculate the efficiency of an inclined plane making an angle of 60° with the horizontal which uses a force of $200N$ to raise a load of 50 kg . (5 marks)

- 6.(a) Analyze three practical applications of thermal expansion of solids in daily life situations. (3 marks)
- (b) The **figure below** shows a circuit diagram for controlling the temperature of a classroom.



- (i) State and explain the purpose of bimetallic strip. (3 marks)
- (ii) Describe how the circuit controls the temperature when the switch is closed (3 marks)
- 7.(a) Tanzania produce electricity from water energy by using hydroelectric power plant, explain three benefit for Tanzanian to use such kind of method in production of electricity? (4.5 marks)
- (b) With the aid of a sketched graph, explain how temperature affects the saturated vapour pressure of water. (4.5 marks)
- 8.(a) Briefly explain the three factors affecting the resistance of a conductor. (3 marks)

- (b) The battery in the circuit **below** has an e.m.f of 6.0 V and negligible internal resistance.

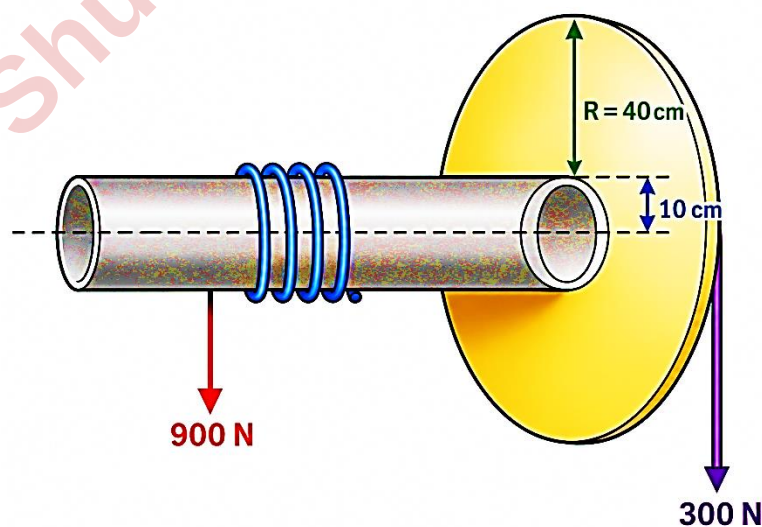


- (i) Calculate the combined resistance of the $12.0\ \Omega$ and $6.0\ \Omega$ connected in parallel. **(3 marks)**
(ii) Calculate the current in the $8.0\ \Omega$ resistance. **(3 marks)**

SECTION C. (30 MARKS)

Answer ONLY **two (2)** questions from this section

9. (a) Using newton's second law of motion, show that impulse is a change in momentum. **(4 marks)**
(b) The **figure below** shows a wheel and axle system, which uses an effort of 300 N to raise a load of 900 N using an axle of radius 10 cm .



Determine

- (i) Velocity ratio. **(2.5 marks)**
(ii) Efficiency of the system. **(2.5 marks)**

- (c) A tank holding 60kg is heated by 3KW electric immersion. Calculate the time taken for the temperature to rise from 10°C to 60°C . **(6 marks)**
10. (a) How much heat is required to change 10g mass of ice at -10°C to water at 0°C . **(5 marks)**
- (b) An engineer has one piece of metal plate only to be used in fixing a gap on a metal bridge. If the steel plate has area of 30.8 m^2 at 45°C , by how much must the engineer raise the temperature of the steel plate for it to fit a gap of 30.804 m^2 . **(5 marks)**
- (c) Given the displacement vectors $\mathbf{A} = 22\text{ m}$ at 135° and $\mathbf{B} = 12\text{ m}$ at 300° . Find $\mathbf{A} + \mathbf{B}$ by using component method. **(5 marks)**
11. (a) The diagram below shows a bimetallic strip after it has been heated from room temperature of 26°C to 40°C . Draw a possible shape of the bimetallic strip if its temperature is decreased from 40°C to 9°C . **(4 marks)**



- (b) Naphthalene of mass 0.5 kg contained in a copper calorimeter of mass 0.4 kg is melted in a water bath and raised to a temperature of 100°C . Calculate the total heat given out when the calorimeter and its contents are allowed to cool to room temperature of 30°C . Neglect the heat losses by evaporation during heating process. **(5 marks)**
- (c) Form three students at a certain secondary school they are claiming that friction is useless. As a form three student from Dr Tulia Ackson Secondary School. Prove them wrong in five points. **(5 marks)**

"Physics teaches us that nothing happens without a reason"
@ tHE Quantum Hustler