DR TULIA ACKSON SECONDARY SCHOOL PHYSICS FORM THREE HOME-PACKAGE EXAMS AUGUS 2026

THE UNITED REPUBLIC OF TANZANIA

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

DR TULIA ACKSON SECONDARY SCHOOL

FORM THREE HOME- PACKAGE EXAMINATION ASSESMENT

031 PHYSICS

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, $g = 10 m/s^2$
   (b) Speed of sound in air, $V = 340 m/s$
   (c) Pie, $\pi = 3.14$
   (d) Speed of light in vacuum $= 3 \times 10^8 m/s$
   (e) Specific heat capacity of water $(Cw) = 4.18 kJ/kg K$

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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. They 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

a

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(v) A parallel arrangement of 3 Ω and 6 Ω is placed in series with 8 Ω resistor. If a potential difference of 30 V is connected across when whole circuit, the current in the 3 Ω resistor is

A. 15 A
B. 10 A
C. 3 A
D. 2A
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 cm from a concave mirror of radius of curvature 30 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. Diffracton of light occurs
D. The different colours are filtered

a

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E. Different colours travel at different speed in glass

(x) The death of deep seas creatures is when brought shallow water. This happens because

A. The pressure inside bodies is greater to the surrounded pressure of water.

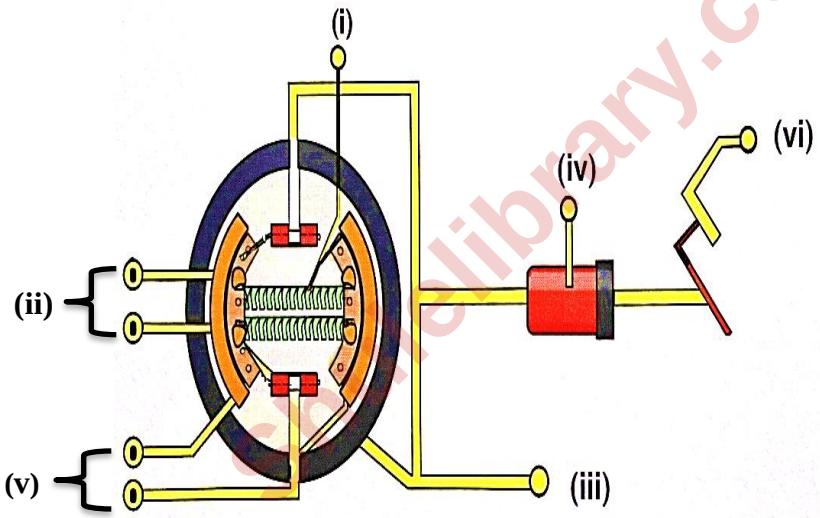
B. The pressure of dead body is equal to that of atmospheric pressure

C. The density of dead body is equal to that of water.

D. Volume of body displaced is equal to volume of water

E. 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
	A. Returning spring B. Hydraulic fluid C. Sliding pedal D. Master cylinder E. Brake drum F. Brake shoes G. Spring balance H. Brake pedal I. Slave cylinder

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SECTION B. (54 MARKS)

Answer **ALL** questions in this section

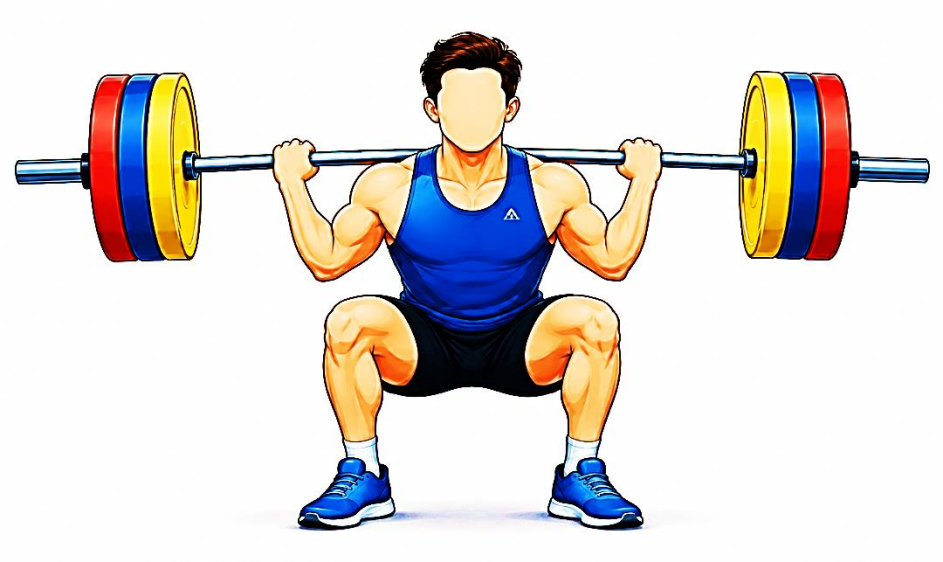
3.(a) Explain why a dentist would prefer to use a concave mirror rather than a plane mirror.

(4 marks)

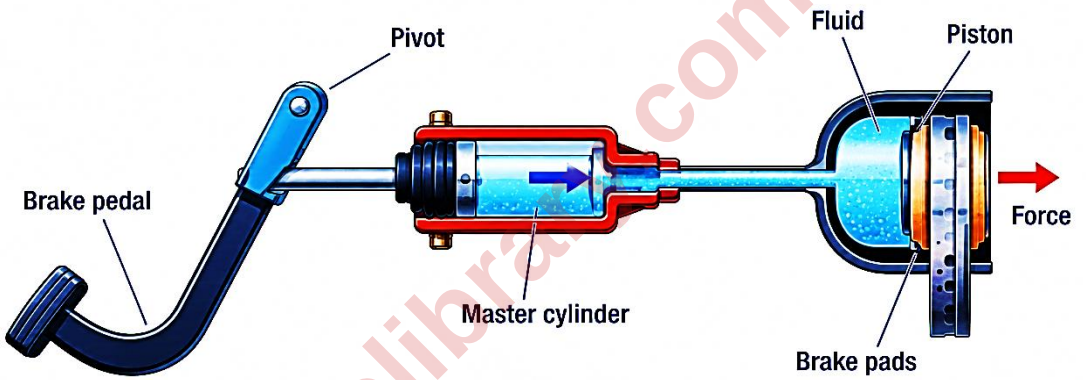
(b) An object is placed 15 cm in front of a concave mirror of radius of curvature 20 cm. Calculate the position, nature and magnification of the image formed. **(5 marks)**

a

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)**

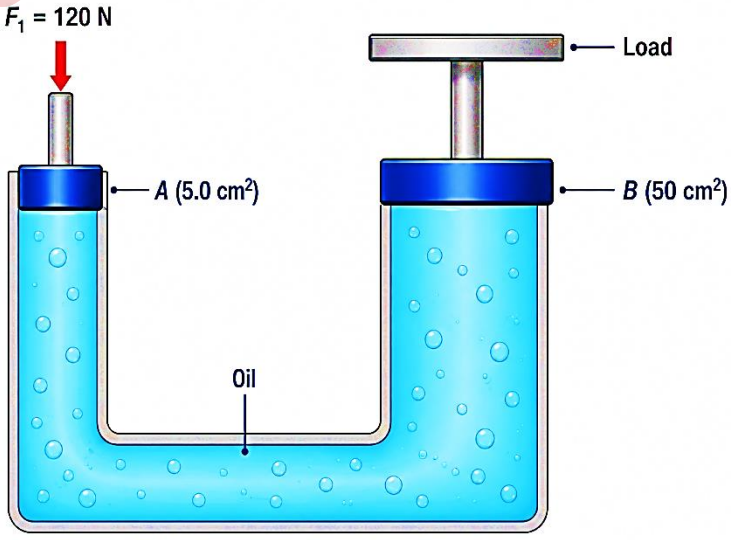


(b) (i) The diagram **below** shows a braking system.



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)**

a

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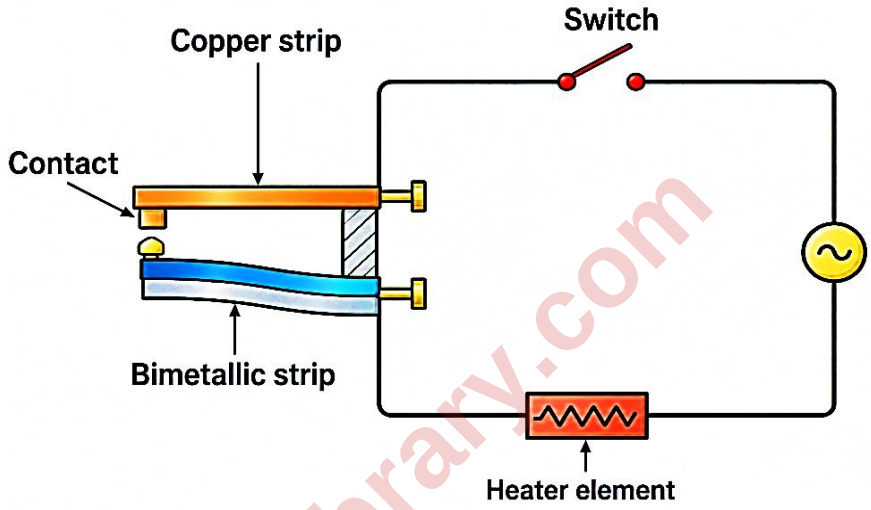
5.(a) Your inertia can kill you! With reference to moving vehicles, explain the physics behind this statement. **(4 marks)**

(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 and angle of 60^0 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)**

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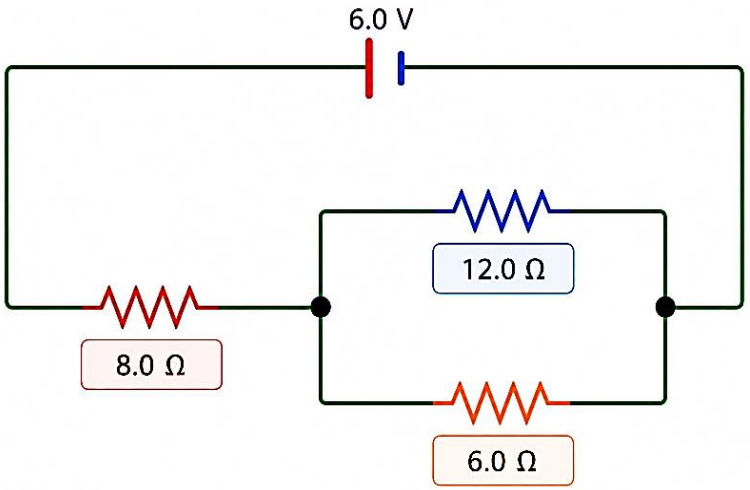
a

(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 Ω and 6.0 Ω connected in parallel. **(3 marks)**

(ii) Calculate the current in the 8.0 Ω resistance. **(3 marks)**

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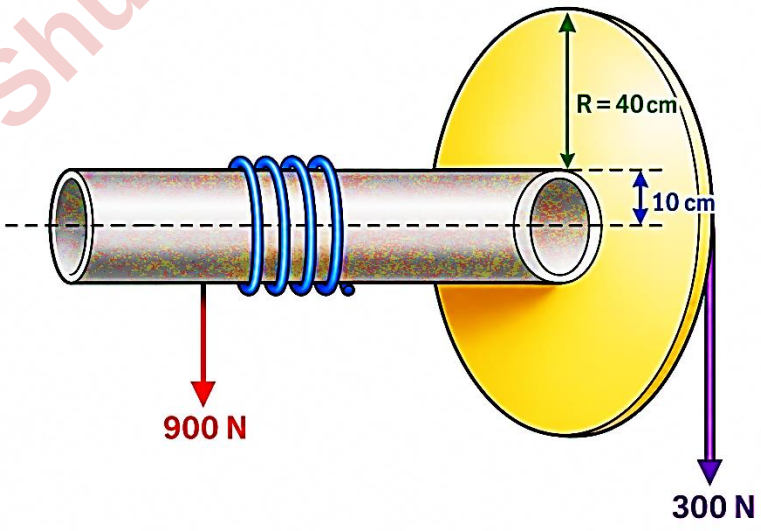
SECTION C. (30 MARKS)

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 land axle system, which uses an effort of 300N to raise a load of 900N using an axle of radius 10cm.



Determine

(i) Velocity ratio. **(2.5 marks)**

(ii) Efficiency of the system. **(2.5 marks)**

a

(c) A tank holding 60kg is heated by 3KW electric immersion. Calculate the time taken for the temperature to rise from 10^0C to 60^0C. **(6 marks)**

10. (a) How much heat is required to change 10g mass of ice at -10^0C to water at 0^0C. **(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 ^{o}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 **A** = $22\ m$ at 135^0 and **B** = $12\ m$ at 300^0 . Find **A** + **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 26^0C to 40^0C. Draw a possible shape of the bimetallic strip if its temperature is decreased from 40^0C to 9^0C. **(4 marks)**



(b) Naphthalene of mass $0.5kg$ contained in a copper calorimeter of mass $0.4kg$ is melted in a water bath and raised to a temperature of 100^0C. Calculate the total heat given out when the calorimeter and its contents are allowed to cool to room temperature of 30^0C. 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)**

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