THE UNITED REPUBLIC OF TANZANIA

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

DR. TULIA ACKSON SECONDARY SCHOOL

FORM THREE WEEKELY EXAMINATION ASSESMENT

031/1 **PHYSICS 1**

(For Both School and Private Candidates)

TIME: 3 Hours **Saturday, 1st August 2026 a.m.**

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) Measurement of mass by using equal–arm beam balance uses the principle of:

A. Conservation of momentum.

B. Conservation of energy.

C. Moments.

D. Gravitational pull of the earth.

E. Conservation of matters.

(ii) The resistance of most metal conductors:

A. Increases with increase in temperature.

B. Increases with decreases in temperature.

C. Decreases with increase in temperature.

D. Decreases with decrease in temperature.

E. Its remain constant.

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(iii) The part of the human eye that corresponds to the film in a camera is the:

A. Iris. B. Pupil.

C. Retina. D. Cornea. E. Lens.

(iv) Which of the following conditions must be satisfied for a body to float?

A. Up thrust equal to the weight of the fluid displaced.

B. Real weight of a body equals to its up thrust.

C. Apparent weight is equal to the product of real weight of a body and it's up

thrust.

D. Density of a body is equal to the density of the surrounding fluid.

E. Volume of a body is equal to the difference between real weight of a body and it's up thrust.

(v) Which among the following is the reason for the sky to appear blue while being observed from the earth?

A. Regular reflection of sunlight.

B. Irregular refraction of sunlight.

C. Diffuse refraction of sunlight.

D. Selective scattering of sunlight.

E. Regular refraction of sunlight.

(vi) Two liters of water is poured in saucepan and heated for thirty (30) minutes. If the water undergoing evaporation, what happens to the mass and weight of water in the saucepan?

A. Both mass and weight decrease.

B. Mass decrease while weight remains constant.

C. Mass stays constant while weight decrease.

D. Both mass and weight stays constant.

E. Mass increases while weight decreases.

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(vii) Which among the following is there as on for the sky to appear blue while being observed from the earth?

A. Regular reflection of sunlight.

B. Irregular refraction of sunlight.

C. Diffuse refraction of sunlight.

D. Selective scattering of sunlight.

E. Regular refraction of sunlight.

(viii) The acceleration of the moving objects may be found from.

A. The area under its velocity time graph.

B. The slope of velocity time graph.

C. The area under its distance time graph.

D. The slope of the distance time graph.

E. The slope of the peak of the distance time graph.

(ix) A wire X is half diameter and half the length of wire Y of similar materials. The resistance of wire X to that wire Y is

A. 8:1 B. 4:1 C. 2:1

D. 1:1 E. 1:4

(x) An athlete runs before long jump to get advantage on

A. Inertia of motion

B. Frictional force

C. Moment of a force

D. Principle of moments

E. Newton third law of motion

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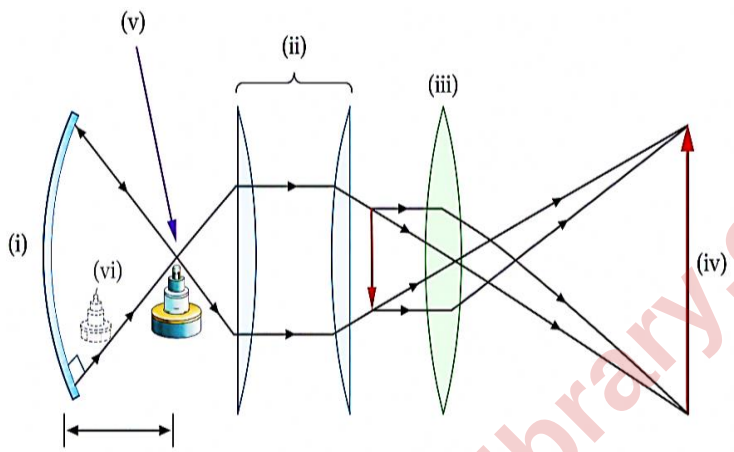
2. Match the parts of a certain optical instrument from **LIST A** with the corresponding functions in **LIST B** by writing the letter of the correct response beside the item number in answer sheet provided. **(6 marks)**

LIST A	LIST B
	A. Magnifies invert image so as to be seen upright on the screen. B. It inverts image side way. C. Real image. D. It diverges light which would otherwise be partly wasted. E. Virtual image. F. It concentrates light which would otherwise be partly wasted. G. It's a doublet to reduce chromatic aberration. H. Provide illumination. I. It directs maximum amount of light from the image to the slide.

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SECTION B (54 MARKS)

Answer **all** questions in this section

3. (a) A convex mirror is often used as the wing mirror of a car instead of plane mirror. Justify this statement by giving one point. **(4 marks)**

   (b) A rod of length $10\ cm$ lies along the principal axis of a concave mirror of focal length $10\ cm$ in such a way that its end closer to the pole is $20\ cm$ away from the mirror. What is the length of the image? **(5 marks)**

4. (a) Why the overhead power cables more likely to break and fall during the cold season of the year than warm season of the year, even though they carry the same weight all the year around.

   (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)**

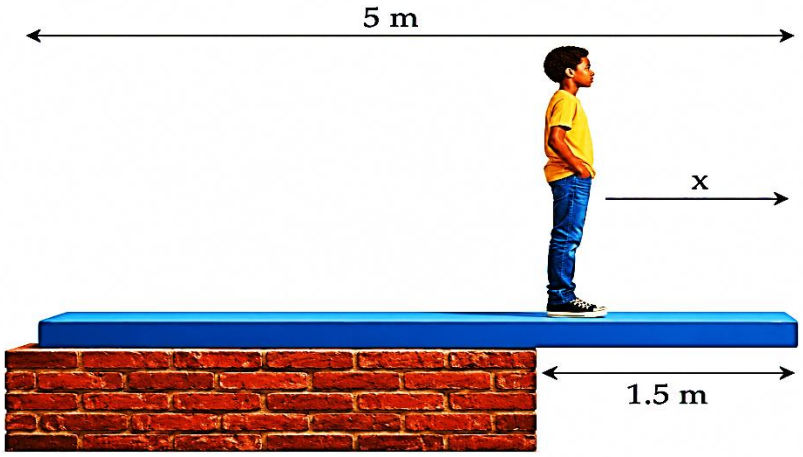
5. (a) With the aid of a well labelled diagram explain the energy changes of a simple pendulum and write the formula for its periodic time. **(4 marks)**

   (b) Water is heated using a heater connected to $240\ V$ mains for 20 minutes with the current of $10\ A$ flowing. If the water is heated from a temperature of 20^0C to 90^0C. What is the mass of water heated? **(5 marks)**

6. (a) Explain why a car with cambered wheels cannot overtone when it is tilted to the side?

   (4 marks)

   (b) A Uniform wooden plank with a mass of $75\ kg$ and a length of $5\ m$ is placed on top of a brick wall so that $1.5\ m$ of the plank extends beyond the wall's edge. How far beyond the edge of the wall can $100\ kg$ woman walk before the plank began to rotate? (Let the plank's axis of rotation be at the wall's edge) **(5 marks)**



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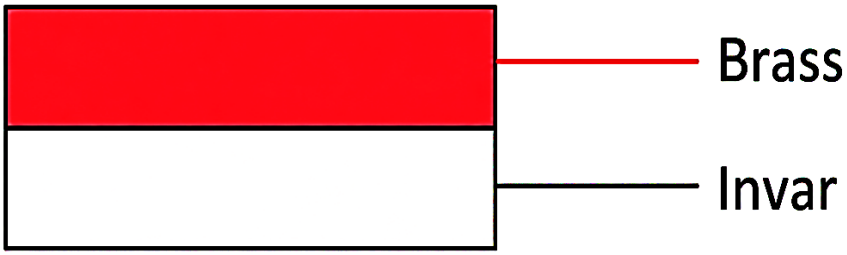
7. (a) It is possible to compress gases but not solids or liquids. How can you explain this? **(4 marks)**

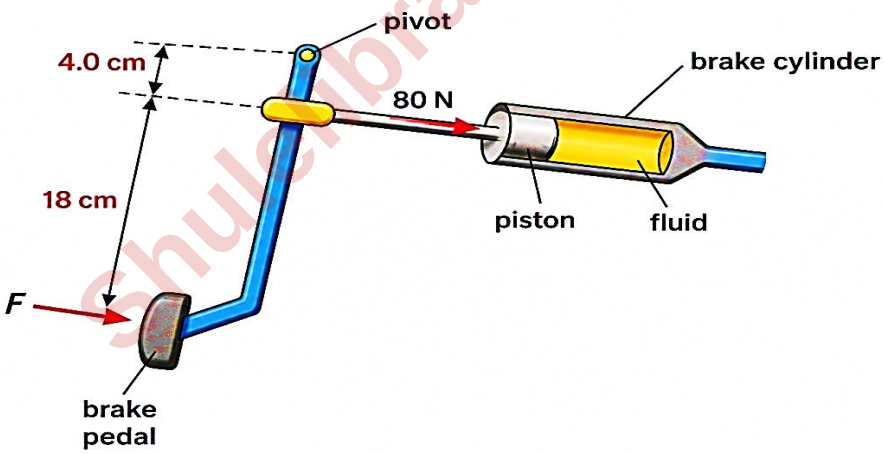
(b) The **figure 2** below shows a brass invar bimetallic strip at room temperature.



Given that brass expands more than invar when both are heated equally, sketch the appearance of the strip after being cooled to several degrees below room temperature. **(5 marks)**

8. (a) If a soles of shoes made up with iron the shoes will stay for a longer period of time, but all soles of shoes are made up with rubber material that is why it stay for short period. Explain the statement. **(4 marks)**

(b) **Figure 3** below shows the brake pedal of a car which is connected to a brake cylinder.



When a driver steps on the brake pedal, a force **F** is applied to the pedal, which transmits an axial force of 80 N to the piston inside the brake cylinder. Using the dimensions provided in the diagram: Calculate the total distance from the pivot to the point where force F is applied. (Assume the system is in equilibrium).

SECTION C (30 MARKS)

Answer only two Questions from this section.

9. (a) Overhead telephone cables and electrical transmission wires are loosely fixed on the poles during installation. Account for this observation. **(4 marks)**

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(b) As an expert in thermal expansion, you are consulted by a company to construct a thermometer. The company has provided you with mercury, alcohol and gasoline. With $justification$, explain which liquid will you use in constructing the thermometer. **(5 marks)**

(c) In the construction of the Tanzania Standard Gauge Railway, it is crucial to account for the thermal expansion of materials used. Steel bars each of $3\ m$ in length at a temperature of $29°C$, are to be laid down to form a rail line. To ensure safety and structural integrity, determine the appropriate gap that must be left between successive bars, considering that the highest temperature the bars may experience is $41°C$. **(6 marks)**

10. (a) Why red light is used in danger signals? **(4 marks)**

(b) In a light experiment, a narrow beam of light directed onto a glass prism leaves the prism and falls on a white screen. Draw a labelled diagram to show the experimental set- up and observation seen on a screen. **(6 marks)**

(c) Briefly explain why part of the road ahead of a person apparently looks as if it has a pool of water on a sunny day? **(5 marks)**

11.(a) Suppose you are interviewee in the battery manufacturing company and you are taken to the laboratory room having all items needed to prepare a dry cell. Sketch a well labeled diagram to represent the appearance of what you have assembled. **(6 marks)**

(b) A metal beam AB of mass $50kg$ is supported at its ends. The beam carries a mass of $200kg$ at a distance of $0.75m$ from end A. If the beam is $2m$ long, determine the thrust at supports A and B. **(6 marks)**

(c) Point out three uses of a simple microscope. **(3 marks)**

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