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Paix-Travail-Patrie
MINISTERE DES ENSEIGNEMENTS SECONDAIRES

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TEACHERS' RESOURCE UNIT TRU-RIP-STA MOCK EXAMS CMR. BAMENDA NORTH WEST REGION

REPUBLIC OF CAMEROON
Peace-Work-Fatherland
MINISTRY OF SECONDARY EDUCATION

TEACHERS' RESOURCE UNIT
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MARCH 2023

The Teachers' Resource Unit and the Regional Inspectorate of Pedagogy, in collaboration with NWAPT	SUBJECT CODE NUMBER 0580	PAPER NUMBER 2
GENERAL CERTIFICATE OF EDUCATION REGIONAL MOCK EXAMINATION	SUBJECT TITLE PHYSICS	
ORDINARY LEVEL		

Time Allowed: **TWO and a half hours**

INSTRUCTIONS TO CANDIDATES

Mobile phones are **NOT ALLOWED** in the examination room.

Answer ALL questions

SECTION 1

This section is designed to be answered in **1 hour**

Section 11

The questions in this section are paired. Answer **ONLY the EITHER or the OR question**. All questions carry equal marks. This section is designed to be answered in **1 ½ hour**. All questions carry 20 marks.

For your guidance the approximate marks for each part of a question are indicate in brackets.
You are reminded of the necessity for good English and orderly presentation in your answers

In calculations, you are advised to show all the steps in your working, giving your answers at each stage

Where necessary, assume the acceleration of free, $g = 10ms^{-2}$

Calculators may be used

SECTION I

1. (a) Define density and state its S.I unit. **(2 marks)**

(b) In order to determine the density of an irregularly shaped object, a form five student put up the apparatus as shown below in figure 1.

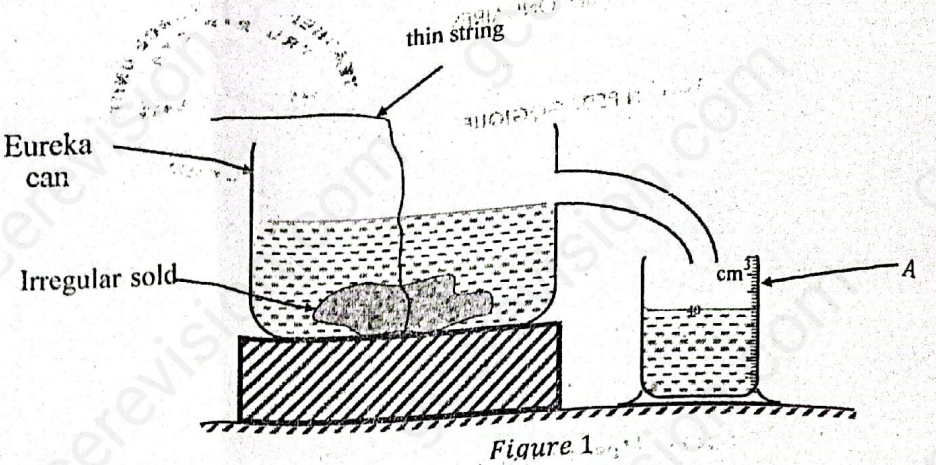

Figure 1

(i) State the name of the instrument labelled A and its function. **(2 marks)**

(ii) What is the volume of the solid? **(2marks)**

(iii) If the mass of the irregular solid is 24 g, determine its density **(2 marks)**

2. (a) Define energy. **(1 mark)**

(b) Joan moves from the ground floor of a storey building to the first floor of height $3\ m$.

(i) State the energy changes involved. **(2 marks)**

(ii) If her mass is $50\ kg$, calculate the work done in the process. **(2 marks)**

(iii) A bulb is rated $25\ W$. Explain the meaning of the statement. **(2 marks)**

3. (a) Sketch two separate diagrams to show how two forces of $3.0\ N$ and $4.0\ N$ can act on an object in order to produce a resultant force of:

(i) $1.0\ N$ upward. **(1 mark)**

(ii) $5.0\ N$. **(1 mark)**

(b) A car starts from rest and accelerates uniformly at $4\ m\ s^{-2}$ for $3\ s$ to a maximum velocity. The drive maintain the maximum velocity for $7\ s$ before finally going to rest with uniform deceleration in the next $5\ s$.

(i) Calculate the maximum velocity attained. **(2 marks)**

(ii) Sketch the velocity-time graph for the entire motion. Indicate useful values on both axes. **(3 marks)**

(iii) Use the graph to calculate the distance covered during the decelerated motion. **(2 marks)**

4. (a) What is charging? **(1 mark)**

(b) A glass rod is robbed with a dry cloth. State the type of charge acquired by the rod. **(1 mark)**

(c) With the aid of a diagram, describe how the glass rod can be used to separate the charges in bodies A and B in contact as shown in figure 2 below, each placed on an insulating stand. **(4 marks)**

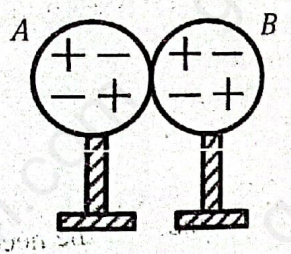

Figure 2

(d) Which method of charging is described in (c) above? **(1 mark)**

5. (a) State the fundamental particle that is positively charged. **(1 mark)**

(b) State the difference between a conductor and a semiconductor in terms of the particles responsible for conduction in each. **(2 marks)**

(c) What is the name given to a pure semiconductor? **(1 mark)**

6. In order to produce a spectrum of white light, Nkeh incident a beam of white light on a glass prism as shown in figure 3 below.

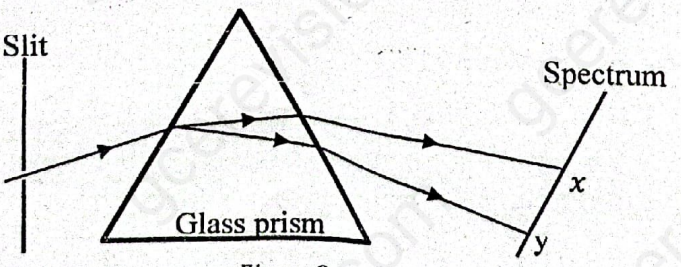

Figure 3

(a) What name is given to the process of separation of colours of white light above? **(1 mark)**

(b) Which wave phenomenon is responsible for the separation of the different colours? **(1 mark)**

(c) Explain why the spectrum produced above is termed impure spectrum. **(1 mark)**

(d) State the specific device that can be introduced in the set up above in order to produce a pure spectrum. **(1 mark)**

(e) State one natural occurrence where the different colours of white light are separated. **(1 mark)**

SECTION II

Answer all questions choosing EITHER (a), (b) and (c) OR (d), (e) and (f) of each question.

Answer EITHER 7 (a), (b) and (c)

7. (a) (i) Waves can be classified under mechanical or electromagnetic waves. Differentiate between these categories of waves, stating one example of each. **(4 marks)**

(ii) Describe an experiment to show that sound requires a material medium to pass through while light does not. Your description should include:

A labelled diagram of the experimental setup,

Procedure you will follow,

Observations,

Conclusion **(6 marks)**

(b) Figure 4 below shows part of a displacement-time graph of a wave travelling across water with a velocity of 4 cm/s.

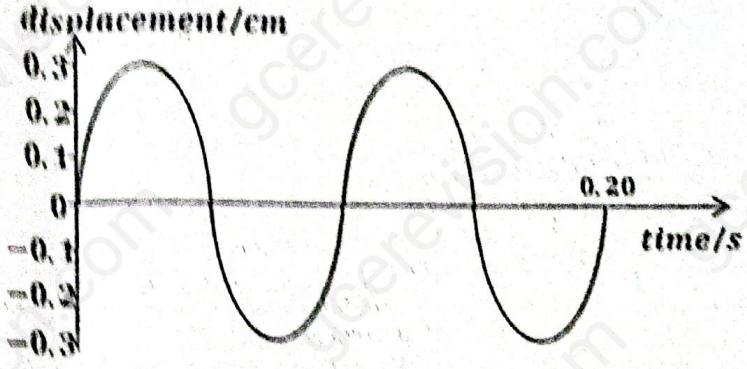

Figure 4

(i) State the value of the amplitude. **(1 mark)**

Calculate:

(ii) The frequency of the wave. **(2 marks)**

(iii) The wavelength. **(2 marks)**

(c) A stationary wave can be produced on a taut string.

(i) Sketch a diagram to show how a stationary wave would vibrate at its fundamental frequency. Also include in the diagram, overtones; clearly indicate (label) fundamental frequency **(2 marks)**

(ii) State which electromagnetic wave can be detected with the eyes. **(1 mark)**

(iii) Which of the electromagnetic waves has the smallest wavelength? **(1 mark)**

OR *(d), (e), and (f)*

7. (d) (i) Conductors can be classified under ohmic or non-ohmic conductors. Differentiate between these categories of conductors, stating one example of each. **(4 marks)**

(ii) Describe an experiment to show that a conductor is an ohmic conductor. Your description should include:

A labelled diagram of the experimental setup

The Procedure you will follow

Observations

Conclusion **(6 marks)**

(e) Figure 5 is a circuit diagram

8 State the function of the part labelled *k*

Calculate: **(1 mark)**

(i) The total resistance when k is adjusted to have a value of 1.5 Ω. **(2 marks)**

(ii) The current in the circuit. **(2 marks)**

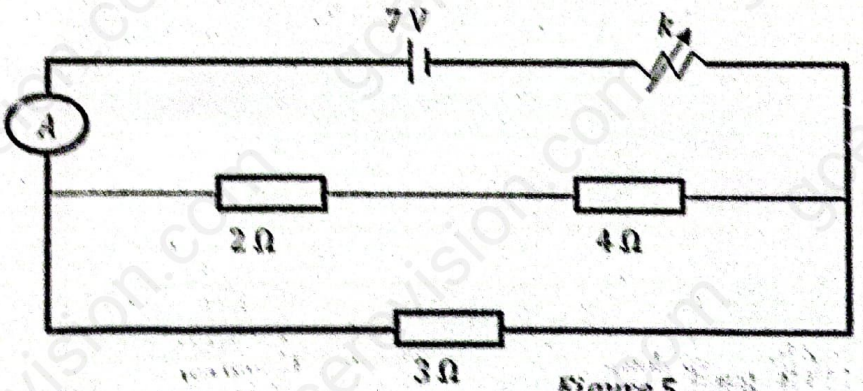

Figure 5

(f) (i) Sketch a current-time curve for an alternating current for exactly two cycles. Clearly indicate (label) the amplitude. **(3 marks)**

Which current, a.c or d.c can be:

(ii) Easily stepped up or down? **(1 mark)**

(iii) More dangerous if a naked wire carrying it is accidentally touch with the fingers. **(1 mark)**

Answer EITHER 8 (a), (b) and (c)

8. (a) (i) Define *heat* and state its S.I unit. **(2 marks)**

(ii) Define *boiling point of water* and state its value on the Celsius scale. **(2 marks)**

(iii) State with precision, the name of the instrument used in the hospital to measure patient's temperature. **(1 mark)**

(b) A student was investigating how a liquid in a beaker cools in the laboratory. The data collected is as shown in the table below:

Temp (θ) °C	98	80	65	45	29	15	10	4
Time (t) mins	0.0	0.5	1.0	2.0	3.0	4.0	5.5	8.0

(i) Differentiate between heat conduction and heat convection. **(2 marks)**

(ii) Plot a graph of temperature (θ) on the vertical axis and time (t) on the horizontal axis. **(6 marks)**

(iii) From your graph, determine the time taken for the liquid to cool to half its initial temperature. Clearly show the method on your graph. **(2 marks)**

(c) (i) Define specific heat capacity and state its SI unit. **(2 marks)**

(ii) 16800 J of heat was supplied to 0.5 kg of a liquid to increase its temperature from 42 °C to 50 °C. Calculate its specific heat capacity and hence give the name of the liquid. **(3 marks)**

OR 8 (d), (e), and (f)

8. (d) (i) Define *half-life* and state its unit. **(2 marks)**

(ii) Define *background radiation* and state one of its sources. **(2 marks)**

(iii) State the name of the instrument used in detecting the presence of radioactive radiation. **(1 mark)**

(e) A student chose to measure the half-life of a radioactive sample by monitoring the activity of the source. The data collected was as shown in the table below;

$Activity(A)/Bq$	980	700	570	380	260	150	50	30
$Time(t)/s$	0.0	0.5	1.0	2.0	3.0	4.5	6.5	8.0

(i) Differentiate between nuclear fusion and nuclear fission. **(2 marks)**

(ii) Plot a graph of activity (A) on the vertical axis and time (t) on the horizontal axis **(6 marks)**

(iii) From your graph, determine the time taken for the activity to decrease to half of its initial value. Clearly show the method used on your graph. **(2 marks)**

(f) (i) Define an isotope and state the symbol of one of the isotopes of Lithium. **(2 marks)**

(ii) Calculate the neutron-proton ratio of $^{218}_{84}Po$ and $^{214}_{84}Po$ and hence state which is more stable. **3 marks)**

Answer EITHER 9 (a), (b) and (c)

9. (a) (i) Define *contact* force and state an example of it. **(2 marks)**

(ii) State one difference between mass and weight **(2 marks)**

(iii) A man moves from the equatorial region to the polar region of the earth. Is it his mass or weight that changes? Explain **(2 marks)**

(b) A car is moving on a rough road as shown in figure 6 below.

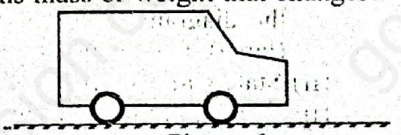

Figure 6

(i) Copy the diagram and indicate the two forces acting on it. **(2 marks)**

(ii) If the car stops suddenly, will the passengers standing in it fall forward or backward. Explain. **(2 marks)**

(iii) State Newton's second law of motion and state one of its applications. **(3 marks)**

(c) (i) Define momentum. **(1 mark)**

(ii) State the law of conservation of linear momentum. **(1 mark)**

A trolley B of mass 10 kg, moving with a velocity of 6 $m\,s^{-1}$ collides with a stationary body C of mass 5 kg and coalesced.

(iii) Calculate the total momentum before collision and hence calculate their common velocity after collision **(4 marks)**

(iv) Why is the collision considered inelastic? **(1 mark)**

OR 9 (d), (e), and (f)

9. (d) (i) Draw the magnetic field pattern for two vertical conductors, each carrying a downward current. **(2 marks)**

(ii) Differentiate between a hard magnetic material and a soft magnetic material. **(2 marks)**

(iii) A coil is placed vertically and its ends connected to a centre-zero galvanometer. State what is observed when a bar magnet is dropped so that it falls parallel to its length passing through the coil. **(2 marks)**

(e) Water is filled in a tall container containing holes of equal size at points A, B, and C as shown in figure 7.

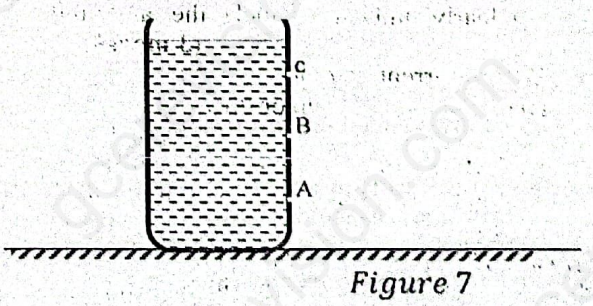

Figure 7

Copy the diagram and indicate the horizontal distance covered by water jets from each of the holes Aan$C$. **(2 marks)**

(i) Briefly explain the origin of sea breeze **(2 marks)**

(f) (i) Define electromagnetic induction. **(1 mark)**

(ii) State Faraday's law of electromagnetism. **(2 marks)**

(iii) State Lenz's law of electromagnetism. **(2 marks)**

A 240 V step down mains transformer is used in supplying 115 W power at the secondary coil. If it draws 1 A in the primary coil, calculate:

(iv) The power input in the primary coil. Hence calculate the efficiency of the transformer. **(4 marks)**

(v) Draw the circuit symbol for the transformer **(1 mark)**

END