## GOVERNMENT BILINGUAL HIGH SCHOOL YAOUNDE MOCK APRIL -2021

ORDINARY LEVEL

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|---|---|
| SUBJECT TITLE | PHYSICS |
| PAPER NUMBER | 2 |
| SUBJECT CODE | 580 |

**Time allowed: TWO AND HALF HOURS**

**Answer all Questions**

**S**ection **I** is designed to be answered in 1 hour and section 2 in 1 1/2 hours

You are advised to divide your time accordingly

**In section II answer EITHER the a, b and c OR the d, e, and f of each question**

For your guidance the approximate mark for each part of a question is indicated in brackets

You are reminded of the necessity of good English and the orderly presentation of your answers

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

When necessary assume

-the acceleration due to gravity, $g=10m/s^2$

-the speed of light in air, $c= 3 \times 10^8 m/s$

-the charge on an electron $e = 1.6 \times 10^{-19} c$

Calculators are allowed

1. (a) Define contact force and give an example **(2 marks)**

(b) A body of mass 50 $kg$ is moved from a town around the equatorial region to a town around the polar region. Explain what will happen to:

i) The mass **(1mark)**

ii) The weight **(2 marks)**

iii) If the body is now taken to a planet whose acceleration due to gravity is $1/6^{th}$ the acceleration due to gravity on the earth's surface, what will be its weight on that planet?

**( 2 marks)**

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2. (a) State Newton's first law of Motion. **(2 marks)**

(b)

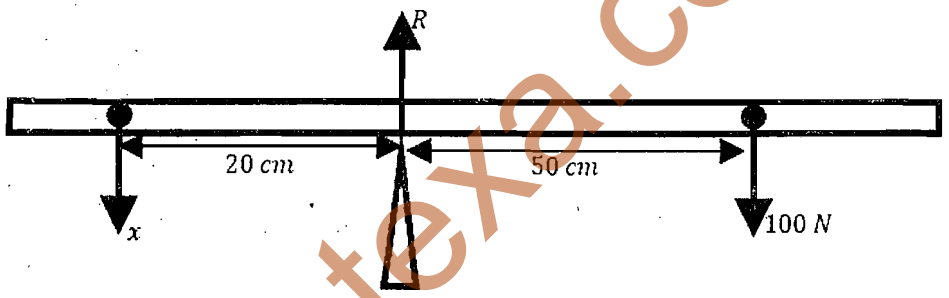


*Figure* 1

The figure above shows a uniform bar on a support acted upon by two forces, one of magnitude 100 $N$ and the other represented by the letter $x$

(i)State the conditions necessary for the bar to be in equilibrium. **(2 marks)**

(ii) Calculate the value of $x$ **(2 marks)**

(iii) What is the value of $R$ **(2 marks)**

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3. (a) State the Law of Conservation of Energy **(2 marks)**

(b) The diagram below shows a pulley system used to lift a bag of cement on a building site.

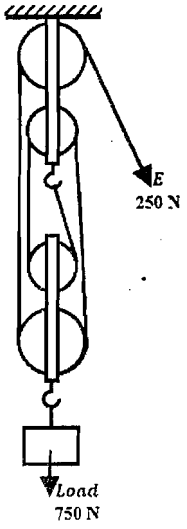

*Figure 2*

(i) What is the velocity ratio of the pulley system? **(1mark)**

(ii) Calculate the mechanical advantage of the pulley system. **(2 marks)**

(iii) Calculate the efficiency of the pulley system as a machine. **(2 marks)**

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4. (a) State two characteristics of magnetic field lines. **(2 marks)**

(b) When Current is passed through a straight conductor, magnetism is induced.

(i) Sketch the magnetic field pattern with current into page, showing clearly the magnetic field pattern. **(2 marks)**

(ii) Name one rule that can be used to determine the direction of field lines. **(1 mark)**

5. (a) Polythene rod rubbed with a piece of dry cloth is seen to attract tiny pieces of papers.

(i) State what happens to polythene. **(1 mark)**

(ii) Explain the origin and the sign of charge on polythene. **(2marks)**

(b) Describe how equal and opposite charges can be induced on two conductors in closed contact.

**(4 marks)**

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6. (a) Define temperature and state its SI unit **(2 marks)**

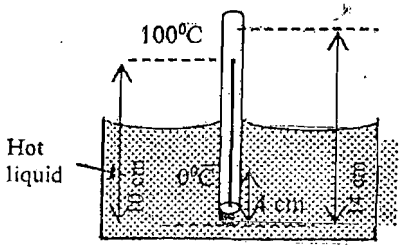

Figure 2

*Section 2 (1 ½ hours)*

*Answer ALL questions, choosing one question from each pair of alternatives*

**Answer either 7 (a), (b) and (c) OR 7 (d), (e) and (f)**

**EITHER: 7 (a), (b), and (c)**

7. (a) (i) Define density and state its units of measurement **(2 marks)**

(ii) Describe an experiment to measure the density of a stone (irregular solid). Your description should include:

- An experimental setup
- The data collected
- The use of data to determine the density
- Any precaution taken **(7 marks)**

(iii) Explain why aluminium is used in building the body of aircraft. **(3 marks)**

(b) (i) Define pressure and state its unit of measurement **(2 marks)**

A pressure of 4.5 Pa is exerted on an object of contact area 1.5 $m^2$.

(ii) Calculate the force applied on the object. **(2 marks)**

**(2 marks)**

(c) (i) Define elastic limit of a material **(1 mark)**

(ii) Sketch a force-extension graph using the same axes for rubber and copper. Indicate on the graph the elastic limit for each material. **(3 marks)**

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**OR 7 (d), (e) and (f)**

7.(d) (i) Define specific heat capacity and state its units of measurement. **(2 marks)**

(ii) Describe an experiment to measure the specific heat capacity of a liquid. Your Description should include:

- An experimental setup

(iii) Calculate the slope (2 marks)

(iv) Use the slope to get the value of g (2 marks)

(c) A trolley X of mass 3 $kg$ moving with velocity 15 m $s^{-1}$ moving to the right collides with a stationary trolley Y of mass 4 $kg$. After collision X continues to the left with a velocity of 10 $m\,s^{-1}$.

(i) State the law of conservation of momentum (2 marks)

(ii) Calculate the velocity of Y after collision indicating its direction (3 marks)

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

8. (d) (i) Define focal length and state its unit of measurement **(2 marks)**

(ii) State the laws of reflection (2 marks)

(e) In an experiment to investigate Snell's law. A ray was incident on one face of rectangular glass block at different angles which were measured using a protractor. The corresponding angles of refraction were also measured. The data collected is as shown below.

| | | | | | | |
|---|---|---|---|---|---|---|
| Sin i | 0.34 | 0.50 | 0.64 | 0.75 | 0.87 | 0.98 |
| Sin r | 0.22 | 0.36 | 0.42 | 0.50 | 0.57 | 0.66 |

(i) State Snell's law of refraction **(2 marks)**

(ii) Plot a graph if sin $i$ ( y-axis) against sin $r$ (x-axis) **(5 marks)**

(iii) Calculate the slope of the graph **(2 marks)**

(iv) Explain what will happen to the ray if it touches the incident face at an angle of about 60°. **(2 marks)**

(f) A stone at the bottom of a river is seen to be 100 cm below water by a boy hoping to use it as a stepping stone to cross to the other side of the river. On stepping on the stone, the water he thought will be at knee level came up to waist level. The refractive index of water is 1.33.

(i) Define refraction (2 marks)

(ii) How deep is the river? (2 marks)

(iii) Give one daily occurrence of refraction other than that mentioned above. **(1 mark)**

**Answer either 9 (a), (b) and (c) OR 9 (d), (e) and (f)**

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

9. (a) Define the following and state their S.I. units of measurement.
   (i) Heat. **(2 marks)**
   (ii) Temperature. **(2 marks)**
   (iii) State two features on a clinical thermometer that makes it different from a normal liquid – in –glass thermometer. **(2 marks)**

   (b) (i) Distinguish between heat capacity and specific heat capacity. **(2 marks)**
   (ii) 500 g of water were heated using an electric heater rated 1000 W for 2 minutes. If the specific heat capacity of water is $4200\ J\ kg^{-1}\ K^{-1}$. Calculate the temperature change **(4 marks)**
   (iii) State one use of water due to its high specific heat capacity. **(1 marks)**

   (c) (i) Define thermal expansion. **(2 marks)**
   (ii) Explain how a bimetallic strip works in an electric iron to switch it on and off. **(3 marks)**
   (iii) Explain why a metal spoon, left beside a flame for a few minutes becomes so hot to touch. **(2 marks)**

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

9. (d) Define the following:
   (i) Radioactivity. **(2 marks)**
   (ii) Half -life. **(2 marks)**
   (iii) State two differences between n-type and p-type semiconductors. **(2 marks)**

   (e) (i) Distinguish between fusion and fission. **(2 marks)**
   In a radioactive fission reaction, a nuclide $^{238}_{92}X$ undergoes two α-decays and two β-decays to form a daughter nuclide
   (ii) Write a balanced equation for this reaction. **(4 marks)**
   (iii) State one use of a named radioisotope. **(1 mark)**

   (f) (i) Define background radiation. **(2 marks)**
   (ii) State and explain the nature of tracks produced by alpha particles in a cloud chamber. **(3 marks)**
   (iii) State two safety precautions to take in handling radioactive materials. **(2 marks)**