UGANDA CERTIFICATE OF EDUCATION

END OF TERM ONE EXAMINATIOS 2018

PHYSICS

PAPER TWO

535/2

2 hours 15 minutes

INSTRUCTIONS

- Answer only five questions
- Start each question on a fresh page
- Any additional questions attempted will score no marks

Where required the constants below may be useful

Acceleration due to gravity, $g = 10\ ms^{-2}$

Specific Heat capacity of water $= 4200\ JKg^{-1}K^{-1}$

Specific heat capacity of aluminium $= 1100\ JKg^{-1}K^{-1}$

QN.	MARKS
TOTAL	

1. (a) What is meant by the term mutual induction as applied to transformers? (2 marks)

(b) i. With the aid of a well-labeled diagram, explain how a transformer steps up voltage. (4 marks)

ii. State any three (3) causes of energy losses in a transformer. How is each of the energy loss mentioned above minimized? (3 marks)

(c) i. A power station generator produces an e.m.f of 33000V at a frequency of 50 Hz. The domestic supply is approximately 250V, 50Hz. Explain how the output of the power station can be modified for use in the home. (2 marks)

iii. The primary coil of a transformer is connected to the 240 V a.c mains. If the transformer is 60% efficient with the primary current as 3A and the secondary current 5A, calculate the output voltage. (3 marks)

(d) Give any one advantage of transmitting power at

i. very high voltage (1 mark)

ii. alternating voltage (1 mark)

2. (a) i. The specific heat capacity of aluminium is 1100JKg^{-1}K^{-1}. What does this statement mean? (1 mark)

ii. Give any two reasons why water is used to cool car engines. (2 marks)

(b) 0.040kg of water at 65^{o}C is poured into 0.060kg of cold water at 12^{o}C which is contained in an aluminium calorimeter of mass 0.050kg. If T is the final steady temperature attained by the mixture, find

i. the expression for the quantity of heat lost by the water at 65^{o}C. (1 ½ marks)

ii. the expression for the total heat absorbed by the calorimeter and water. (2 ½ marks)

iii. the value of T. (1 mark)

(c) Describe an experiment to determine the specific latent heat of fusion of ice by method of mixtures. (4 marks)

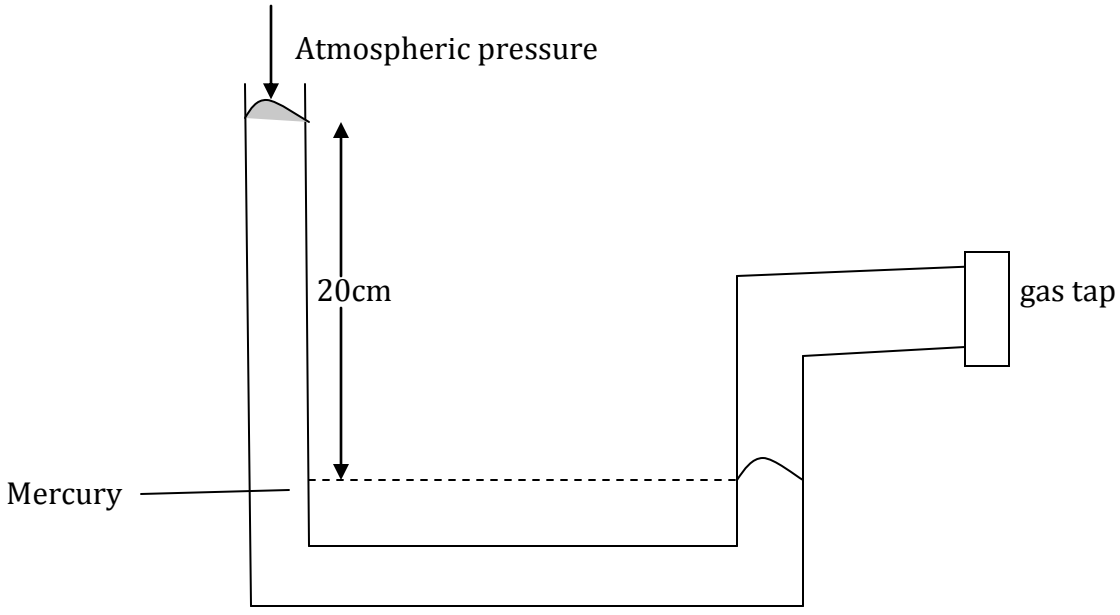
(d) i. What is meant by the term thermometric property? (1 mark)

ii. State any three thermometric properties. (3 marks)

3. (a) Define the term pressure and state its S.I unit. (2 marks)

(b) i. With the aid of a well labeled diagram, describe how a force pump works. (5 marks)

ii. The diagram below shows a U-tube manometer connected to a gas supply



If the atmospheric pressure acting on the open end of the tube is 1.0336x10^{5} Nm^{-2}. Calculate the pressure of the gas. (3 marks)

(c) i. Define the term centre of gravity of a body. (1 mark)

ii. State any two factors affecting the stability of a body. (2 marks)

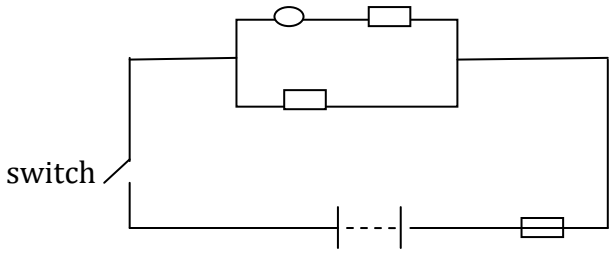
(d) Calculate the volume of block of expanded polystyrene of mass 400g if its density is 16 kgm^{-3}. (3 marks)

4. (a) Define the term sound. (1 mark)
   (b) i. Describe an experiment to determine the speed of sound in air by resonance method. (5 marks)
   ii. A resonance tube is partially immersed in water and a tuning fork of frequency 256 Hz is sounded above it. The tube is gradually raised and resonance first occurs when the length of the air column is 31.25cm. Calculate the speed of sound in air. (3 marks)
   (c) i. Distinguish between nodes and antinodes as applied to stationary waves. (2 marks)
   ii. Give two conditions for a stationary wave to be formed. (2 marks)
   (d) Explain why an open pipe is preferred to a closed pipe in producing sound. (3 marks)

5. (a) i. State Archimedes' principle. (1 mark)
   ii. Describe an experiment to verify Archimedes' principle. (5 marks)
   iii. A solid of density 350 kgm^{-3} floats in a liquid of unknown density with 7/8 of its total volume submerged, calculate the density of the liquid. (3 marks)
   (b) i. State the principle of conservation of energy. (1 mark)
   ii. State the energy transformations that take place when a ball at a height above falls to the ground. (2 marks)
   (c) A ball of mass 0.80kg falls from a height of 15m above the ground. If the ball loses 80J and bounces to a new height, calculate the maximum speed attained by the ball when it **just** bounces. (4 marks)

6. (a) i. What is a primary color? (1 mark)
   ii. State any two primary colors you know. (2 marks)
   (b) With the aid of a labeled diagram, explain the term dispersion as applied to a glass prism. (3 marks)
   (c) i. Define the term principle focus of a converging lens. (1 mark)
   ii. Using a well labeled diagram, how a convex lens can be used as a magnifying glass. (2 marks)
   (d) An object 2 cm tall is placed perpendicular to the principal axis of the convex lens at a distance of 3cm in front of a convex lens of focal length 4cm. by graphical construction of ray diagrams, determine the: (1 ½ marks)
   i. size of the image formed. (1 mark)
   ii. Position of the image formed. (1 mark)
   iii. Nature of the image formed (1 mark)
   iv. Magnification (½ marks)

7. (a) i. state Ohm's law. (1 mark)
ii. Describe an experiment to verify ohm's law. (4 marks)
(b) i. Define the term electromotive force (e.m.f) of a cell. (1 mark)
ii. List any two sources of e.m.f. (2 marks)
(c) The diagram below shows resistors of 12Ω, 8Ω and 0.45Ω are connected to a switch, an ammeter and a battery of e.m.f 2.25V and internal resistance o.75Ω



Find the ammeter reading when the switch is closed. (5 marks)
(d) State any two defects of a simple cell and how each defect can be minimized. (2 marks)

8. (a) Define the following terms as applied to nuclides.
i. Half life (1 mark)
ii. Isotopes (1 mark)

(b) State what happens to the nucleus of an atom when it decays by emission of

i. alpha particle (1 mark)

ii. beta particle (1 mark)

(c) i. What are x-rays? (1 mark)

ii. State any two differences between soft x-rays and hard x-rays. (2 marks)

iii. Briefly explain how x-rays are used to detect broken bones (fractures). (3 marks)

(d) A radioactive sample of original mass 12.8 grams requires 38.0 hours for 12.0 grams of the sample to decay. Find ;

i. the mass of the sample that remains un-decayed after this time. (1 mark)

ii. the half-life of the sample. (2 marks)

(e) State any two precautions taken when dealing with radio-isotopes. (2 marks)

END

THERE IS ALWAYS ROOM AT THE TOP, KEEP PUSHING THE LIMITS!