535/2
PHYSICS
PAPER 2
July/August 2022
TIME: 2¼ HOURS

KAYUNGA SECONDARY SCHOOLS HEAD TEACHERS AND PRINCIPALS ASSOCIATION (KASSHPA)
UGANDA CERTIFICATE OF EDUCATION
JOINT MOCK EXAMS 2022
UGANDA CERTIFICATE OF EDUCATION
PHYSICS
PAPER 2
2HOURS 15MINUTES

INSTRUCTIONS TO CANDIDATES

- Answer five questions
- Any additional question(s) answered will not be marked
- Silient non-programmable calculators may be used

These values of physical quantities may be useful to you;

Acceleration due to gravity	$= 10ms^{-2}$
Specific heat capacity of water	$= 4200Jkg^{-1}k^{-1}$
Specific heat capacity of copper	$= 400Jkg^{-1}k^{-1}$
Specific latent heat of Fusion of water	$= 34000Jkg^{-1}$
Speed of sound in air	$= 330ms^{-1}$
Density of water	$= 1000kgm^{-3}$

1. (a)(i) What is meant by the term momentum? (01mark)
   (ii) State the law of conservation of momentum. (01mark)
   (b) A bullet of mass 30g is fired in to a block of mass 600g lying on a smooth horizontal surface. If the bullet and the wood move together with speed of $30ms^{-1}$, Calculate the;
   (i) Speed with which the bullet hits the wood. (04marks)
   (ii) Kinetic energy lost. (04marks)
   (c) Define moment of a force. (01mark)
   (d) Describe an experiment to determine the mass of a uniform meter rule using the principle of moments. (05marks)
2. (a)(i) State Hooke's law of elasticity. (01mark)
   (ii) Describe an experiment to verify Hooke's law using a spring. (05marks)
   (b)(i) What is meant by the term elasticity? (01mark)
   (ii) A spring produces an extension of 6mm when a load of 6N is hanged from its free end. What load would cause the same spring to stretch by 16mm? (03marks)
   (c) What is meant by pressure? (01mark)
   (d) Explain why one feel more pain when pricked with a needle than when pricked with a nail (05marks)
3. (a) Define the following terms as applied to wave motion.
   (i) Frequency (01mark)
   (ii)Wave length (01mark)
   (b) State the factors which affect the frequency of a vibrating string. (03marks)
   (c) Describe an experiment to demonstrate resonance in a closed pipe.(04marks)
   (d) With the aid of sketch diagrams, explain the effect of size of a gap on diffraction of waves. (03marks)
   (e) An experimenter standing between high walls produces sound by hitting two pieces of wood. If the first echo is heard after 3.0 seconds and the second 2.0 seconds later, find the distance between the walls. (04marks)
4. (a) Define the following
   (i) Hard magnetic materials.
   (01mark)
   (ii)Soft magnetic materials. (01mark)
   (b)(i) Describe the electrical method of magnetizing a steel bar. (04marks)
   (ii) State any two ways of demagnetizing a bar magnet. (1mark)
   (c) Explain what happens when a magnet is dipped in iron fillings. (02marks)
   (d)(i) State two causes of energy losses in transformer
   (02marks)
   (ii) How are these losses reduced in a practical transformer? (02marks)
   (e) A transformer of efficiency 80% is connected to a 240V a.c supply to operate a heater of resistance 240Ω. If the current flowing in the primary coil is 5A, calculate the potential difference across the heater. (03marks)

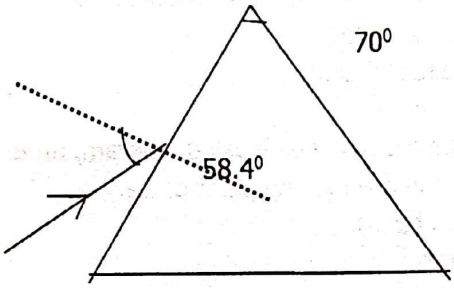
5. (a) State the laws of reflection of light. (02marks)

(b) Describe a simple experiment to demonstrate the principle of reversibility of light. (05marks)

(c) An object is released from a height of 10m above a plane mirror. Find the distance the object must drop through in order to be 5m away from its image. (02marks)

(d) Define the term absolute refractive index. (01mark)

(e)(i)A ray of blue light strikes one side of the prism of refractive index 1.52 at an angle of 58.4 as shown below.



Given that the ray emerges out on the other side of the prism. Calculate the angle of emergence (04marks)

(ii)Explain what happens if the above ray is of white light. (02marks)

6. (a) Define the following terms.

(i) Atomic number (01mark)

(ii) Isotopes (01mark)

(b) The following nuclear reaction takes place when a neutron bombards a Sulphur atom

$$^{34}_{16}S + {}^{1}_{0}n \longrightarrow {}^{a}_{b}X$$

(i)Describe the composition of nuclide, X formed. (02marks)

(ii)The nuclide, X decays by emission of an alpha particle and gamma ray. Find the changes in mass number and atomic number of the nuclide. (02marks)

(iii)State two properties of alpha particles. (01mark)

(c) The half-life of a radioactive material is 5years. What fraction of the material decays after 15years? (03marks)

(d) Describe briefly the principles of operation of a cathode ray oscilloscope. (03marks)

(e) Explain briefly how the intensity and penetration of power of X-rays can be increased in an X-ray tube. (03marks)

7. (a)(i) Define the term conduction. (01mark)

(ii)With the aid of a diagram, describe an experiment to show that water is a poor conductor of heat.
(04marks)

(iii)Explain why a cement floor feels cold to bare on a cold day yet carpet in the same room feels comfortable warm. (03marks)

(b)(i) State Charle's law. (01mark)

(ii)At a pressure of 1 atmosphere, a mass of a gas has a volume of $5cm^3$ and a temperature of 102^0C. What will be the new volume if the temperature is lowered to 27^0C and pressure rose to 2 atmospheres? (03marks)

(c)(i) Define Latent Heat of fusion.
(01mark)

(ii) Describe with the aid of a well labeled diagram, an experiment to show the effect of increase in pressure on the melting point of ice. (03marks)

8. (a) Define the following terms.

(i)Potential difference (01mark)

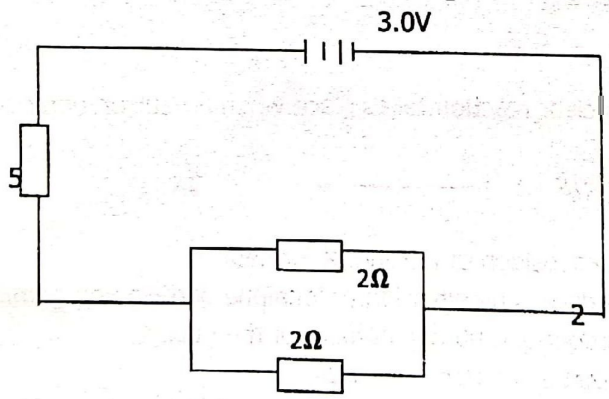
(ii)Internal resistance (01mark)

(b) Explain the difference between a voltmeter and an ammeter in terms of their,

(i) Construction
(02marks)

(ii) Use.
(02marks)

(c) A battery of e.m.f and negligible internal resistance in connected across three resistors of 5Ω, 2Ω and 2Ω as shown in the figure below.



Calculate the;

(i) Current supplied by the battery
(04marks)

(ii)Power dissipated in the 5Ω resistor. (03marks)

(d) Explain why a wire heats up when a current is passed through it. (03marks)

END