***535/2 PHYSICS***
*Paper 2*
***JAN./FEB. 2021***

*2hours 15minutes*

# *KAMSSA* JOINT MOCK EXAMINATIONS

## UGANDA CERTIFICATE OF EDUCATION
## PHYSICS

## **Paper 2**

2hours 15minutes

**INSTRUCTIONS TO CANDIDATES**

- Answer **any five** questions.
- Any additional question(s) answered will **not** be marked.
- Mathematical tables and silent non programmable calculators may be used.
- These values of physical quantities may be useful to you.

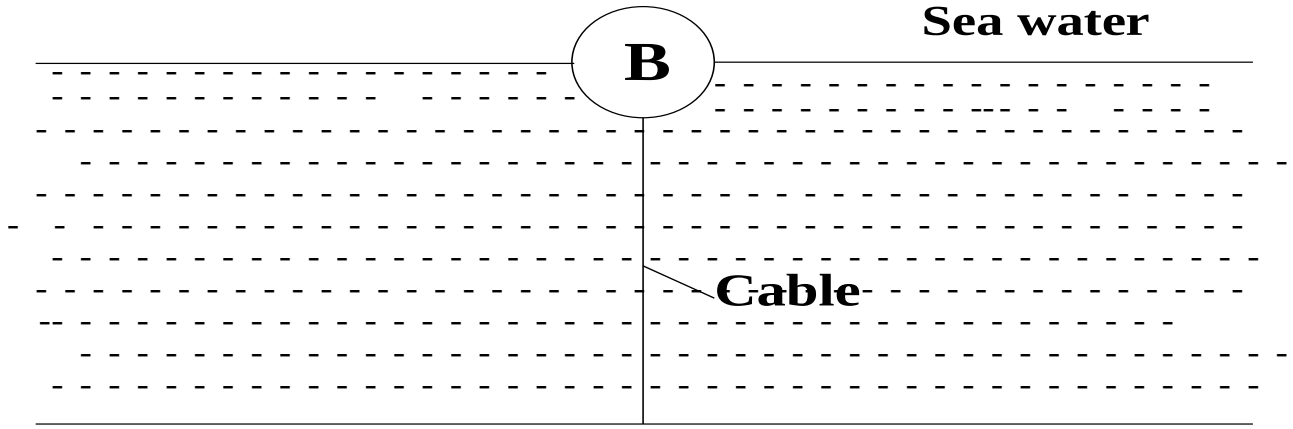
- Acceleration due to gravity = $10ms^{-2}$
- Specific heat capacity of water = $4200JKg^{-1}K^{-1}$
- Specific heat capacity of copper = $400Jkg^{-1}K^{-1}$
- Specific latent heat of fusion of ice = $3.4 \times 10^{5}Jkg^{-1}$
- Speed of sound in air = $330ms^{-2}$
- Velocity of electromagnetic wave = $3.0 \times 10^{8}ms^{-1}$

1a(i) State the Archimedes principle. (01 mark)

(ii) Describe a simple experiment to verify Archimedes principle. (4marks)

(b) A body of weight **0.52N** in air weighs only **0.32N** when totally immersed in water while its weight when immersed in another liquid is **0.36N**. What is the density of the second liquid if the density of water is **1000kgm$^{-3}$**? (8marks)

(c) the figure below shows a body **B** of volume **40liters** and mass **10kg**. it is held in a position in sea water of density **1.04gcm$^{-3}$** by a light cable fixed to the bottom so that $\frac{3}{4}$ of the volume of the body is below the surface of the sea water. (03marks)



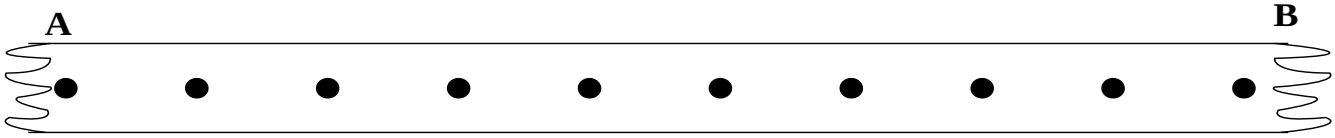

(i) Name the three forces that keep the body in equilibrium and state the direction in which each acts.

(ii) Determine the tension in the case. (3marks)

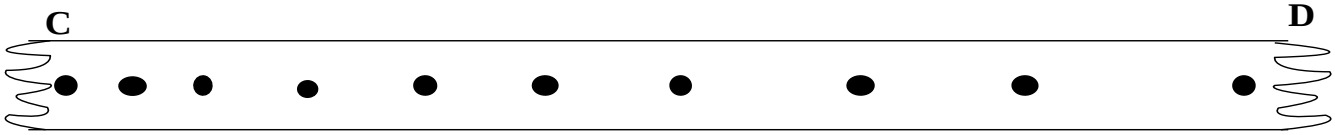
2(a) Distinguish between velocity and speed. (2marks)

(b) The diagram below represents tapes of a ticker timer.
Describe the motion in each case. (2marks

**(i)**




**(ii)**




(c) In **b(ii)** if the frequency of the ticker timer is **50Hz**, calculate the acceleration of the tape (03marks)

(d) Explain the following observations.

(i) Grace uses more energy to climb up than to run a horizontal ground. (3marks)

(ii) A goal keeper draws hands backwards when catching a football. (3marks)

(e) A girl of mass **40kg** run up a flight of **20** stairs each of **20cm** in **4** seconds. Calculate the average power. (3marks)

3(a) Define virtual image(**s**) with ray diagrams in plane and concave mirrors. (2marks)

(b) With aid of a labeled diagram, describe a simple experiment to determine the focal length of a converging lens. (4marks)

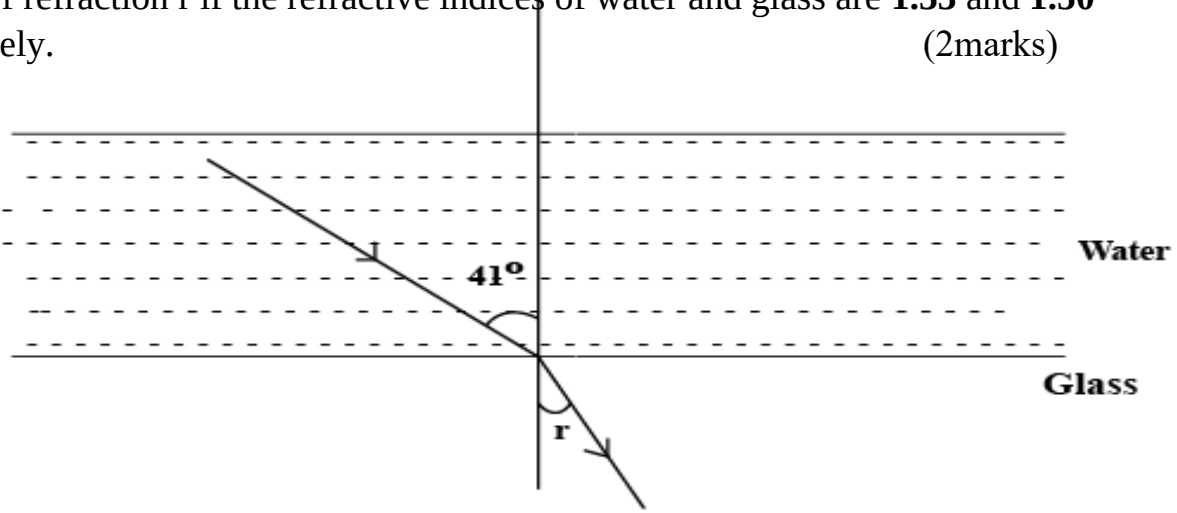
(c) (i) What is meant by accommodation. (01mark)

(ii) State the eye defects and their corrections. (2marks)

(iii) Distinguish with relevant diagrams between critical angle and total internal reflection. (2marks)

(iv) Describe briefly the formation of a mirage. (3marks)

(d) A ray of light is incident on a water-glass boundary at an angle of **$41^0$**. Calculate the angle of refraction r if the refractive indices of water and glass are **1.33** and **1.50** respectively. (2marks)




4.(a) Distinguish between period and frequency of a wave. *(*2marks*)*

(b) Why does sound travel faster in solids than in gases. (3marks)

(c) Micro waves with a frequency of **$9.0 \times 10^6$Hz**, travel from a remote control to television set. What is the wave length of the micro wave? *(3marks)*

(d)(i) Explain why open pipes are preferred to closed ones when producing differentnotes. *(4marks)*

(ii) Describe an experiment to demonstrate resonance of sound. *(4marks)*

5. a(i) With the aid of a diagram describe how an **a.c** generator works. (5marks)

(ii) Draw a graph showing the variation of current with time for an **a.c** generator.(1mark)

b(i) With the aid of a diagram explain how the output above can be converted to a direct current. (4marks)

(ii) Sketch the graph of current versus time for **b(i)** above. (1mark)

(c)A transformer whose secondary and primary coils have 60 and 120 turns respectively (5mks) has it's secondary coil connected to a 3.0Ω resistor.If the primary is connected to 240V a.c . supply and the transformer is 80 efficient . Calculate the current flowing in the primary circuit.

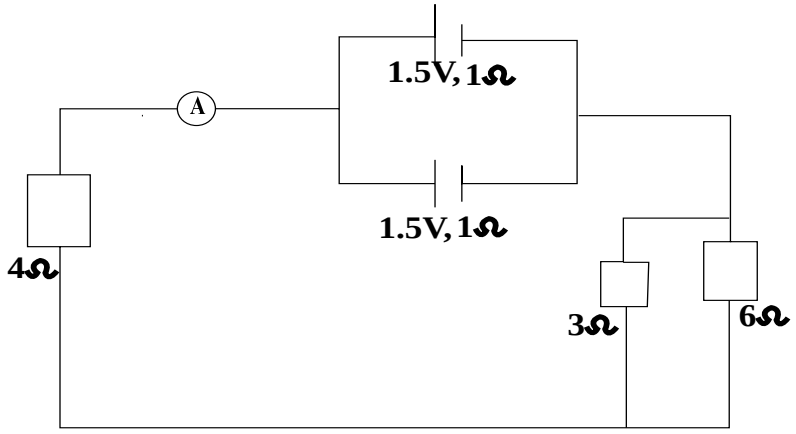
6a(i) State the law of electro statistics. *(*1mark)

(ii) Explain what happens to an insulator when it is rubbed by another insulator of different material. ***(3*marks)**

b(i) Define electrostatic induction. *(*1mark)

(ii) With diagrams, explain how two metal spheres can be both charged positively by induction. *(4marks)*

(c)




The figure shows two cells of ***e.m.f*** **1.5V** and internal resistance **1Ω** each connected to a circuit of resistance **3Ω** and **6Ω**

(i) What is the reading of the ammeter **A**.? *(*3marks)
(ii) Calculate the power dissipated in the **4Ω** resistor. *(*2marks*)*

(d) State two ways of increasing the strength of an electro magnet. *(*2marks)

7 (a) Define convection, radiation and conduction.( 3marks)

(b) Explain the following observations;

(i) A woolen carpet feels warmer to a bare foot than a bare cement. (2marks)
(ii) House ventilators are placed on the upper side of a room. (2marks)

.(c) An electric heater of **50W** is used to heat a metal block of mass **5kg** in **10** minutes, a temperature rise of $\mathbf{12^0 c}$ is produced. Calculate; (4marks)
(i) The quantity of heat produced.
(ii) The specific heat capacity of the metal.

d(i) What is saturated vapor. (1mark)

(iii) Explain why the boiling point of a liquid depends on altitude. (2marks)

(e) A piece of metal of mass **400g** falls from a height of **80m**. Assuming that when it lands on the ground surface, the whole of its energy is converted into heat, calculate the rise in temperature of the metal. (2marks)
**(specific heat capacity of metal =150Jkg$^{-1}$k$^{-1}$)**

8(a) What are cathode rays. *(*1mark)
(b) (i) draw a labeled diagram to show the main features of a cathode ray tube. *(*2marks)
(ii) Describe briefly how cathode rays are produced in a cathode ray tube. *(*2marks)
(iii) State two uses of a cathode ray oscilloscope. *(*1mark)
(c)(i) A radioisotope $\mathbf{^{216}_{84}}\boldsymbol{P}$, decays by emission of **β**-particle to an element **R** by emission of an **α**-particle. Write the Equation for these nuclear reactions. *(2marks)*
(ii) An element **X** has a half-life of **15**seconds. At the beginning there were **3.2 X 10$^{10}$** atoms of element **X** present that are radioactive. How many atoms will still be? radioactive after **2** minutes. (4marks)
(d) Describe how **X-rays** are produced in an **X-ray** tube. (4marks)

***END***