535/2
PHYSICS
Paper 2
July / Aug. 2019
2 hours 15 minutes

UTEB- JOINT MOCK EXAMINATIONS 2019

Uganda Certificate of Education

PHYSICS

Paper 2

2 hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

Attempt **five** questions.

Where necessary use the following constants;

Acceleration due to gravity, g	=	10 ms^{-2}
Speed of light in air	=	3.0×10^8 ms^{-1}
Speed of sound in air	=	330 ms^{-1}
Specific heat capacity of water	=	4200 $Jkg^{-1}k^{-1}$
Specific latent heat of vaporization of water	=	2.3×10^6 Jkg^{-1}
Specific latent heat of fusion of ice	=	3.4×10^5 Jkg^{-1}

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SECTION A

1. (a) State Newton's first and second laws of motion. **(02 marks)**

   (b) Briefly describe an experiment to determine the coefficient of static friction on a flat horizontal surface. **(04 marks)**

   (c) A stone is projected horizontally at $30ms^{-1}$ from a point 45 metres above the ground. Calculate;

   (i) Time taken to reach the ground. **(02 marks)**

   (ii) Horizontal distance covered. **(02 marks)**

   (iii) Vertical speed with which it strikes the ground. **(02 marks)**

   (d) (i) Define a watt. **(01 mark)**

   (ii) A particle moves at a steady speed of $20ms^{-1}$ when a force of 2×10^3N is applied on it. Calculate the power developed. **(02 marks)**

   (iii) State any **two** examples of renewable energy sources. **(01 mark)**

2. (a) Define the terms;

   (i) Surface tension

   (ii) Capillarity **(02 marks)**

   (b) Briefly describe how a steel needle and bloating paper can be used to show the effect of soap on the surface tension of water. **(05 marks)**

   (c) A steel razorblade of weight 0.1N floats on water. Determine the mass of displaced water if the resultant upward force due to surface tension is 0.024N. **(03 marks)**

   (d) (i) Briefly describe how concrete can be reinforced. **(04 marks)**

   (ii) Give two ways in which the strength of a material can be altered without any structural change in the material. **(02 marks)**

3. (a) (i) Define the term principal focus as applied to concave mirrors. **(01 mark)**

   (ii) State one use of convex mirrors. **(01 mark)**

   (b) A convex lens of focal length 20cm forms an inverted image 5cm tall and 60cm from it. Using a scale diagram find the position and size of the object. **(05 marks)**

   (c) With aid of a labeled diagram, explain how dispersion of white light occurs in a glass prism. **(05 marks)**

(d) (i) What is observed if a blue dress with red spots is viewed in yellow light? **(02 marks)**

(ii) Explain your observation in 3(d) (i) above. **(02 marks)**

4. (a) Differentiate between transverse and longitudinal waves. **(02 marks)**

(b) Draw a diagram to show how plane water waves are reflected from a convex reflector in a ripple tank. **(02 marks)**

(c) (i) What is an echo? **(01 mark)**

(ii) Describe briefly how the speed of sound in air may be determined using the echo method. **(05 marks)**

(d) Explain the importance of reverberation in cinema halls. **(03 marks)**

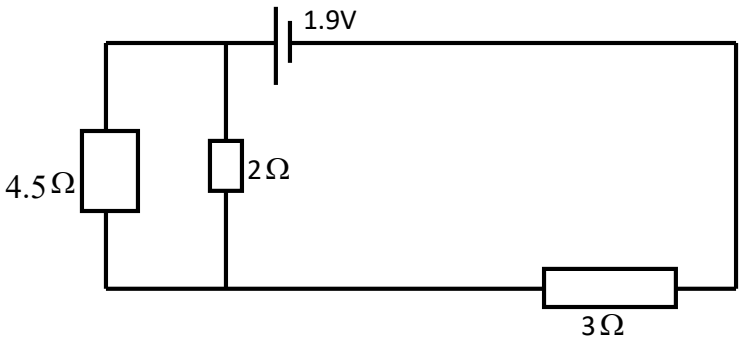
(e) Determine the first overtone of a closed pipe of length 60cm. **(03 marks)**

5. (a) Distinguish between electromotive force and potential difference. **(02 marks)**

(b) State two limitations of ohm's law.

(c) With the aid of a circuit diagram, describe how the internal resistance of a cell can be determined. **(05 marks)**

(d) Resistors of 2Ω, 4.5Ω and 3Ω are connected as shown below across a battery of emf 1.9V and negligible internal resistance.



Calculate the;

(i) Effective resistance of the circuit. **(03 marks)**

(ii) Power dissipated by the cell. **(02 marks)**

6. (a) (i) Distinguish between conduction and convection with respect to heat transfer. **(02 marks)**

(ii) With aid of a labeled diagram, describe how a thermos flask keeps cold liquids cold and hot liquids hot. **(05 marks)**

Turn Over

(b) (i) Define the specific heat capacity of a substance. **(01 mark)**

(ii) A copper calorimeter of heat capacity $20JK^{-1}$ contains 100g of water at 30^oC. If 20g of ice at 0^oC is dropped into the water and stirred, calculate the final temperature of the mixture. **(05 marks)**

(c) Explain why ice melts faster when a sportsman skates on it. **(03 marks)**

7. (a) (i) Define the term magnetization. **(01 mark)**

(ii) With the aid of a labeled diagram, describe how a piece of steel can be magnetized using an electrical current. **(04 marks)**

(b) With the aid of a labeled diagram, briefly explain the action of a step up transformer. **(05 marks)**

(c) A 360W, 12V dc device is adapted to use a mains supply of 200V ac. Determine;

(i) The efficiency of the transformer used if the current through the mains supply is 2A. **(03 marks)**

(ii) The number of turns in the primary coil if that in the secondary coil is 50. **(02 marks)**

(d) Give two ways of increasing the efficiency of the transformer. **(02 marks)**

8. (a) What are Cathode rays? **(01 mark)**

(b) With reference to a Cathode ray, oscilloscope, describe;

(i) the function of the time – base. **(02 marks)**

(ii) how the brightness of the spot is regulated. **(02 marks)**

(c) With the aid of a labeled;

(i) Diagram, describe how X – rays are produced in an X – ray tube. **(05 marks)**

(ii) Explain why soft and not hard X-rays are used to take photographs of internal parts of a patient in hospitals. **(03 marks)**

(d) (i) What is radioactivity? **(01 mark)**

(ii) Describe the use of radioactivity to locate leakages in underground pipes **(02 marks)**

End