

**535/2**

**PHYSICS THEORY**

**Paper 2**

**Aug. 2019**

2 1/2 hours

**JINJA JOINT EXAMINATIONS BOARD**

**Uganda Certificate of Education**

**MOCK EXAMINATIONS 2019**

PHYSICS

(**Paper 2**)

2 hours 15 minutes

**INSTRUCTIONS TO CANDIDATES:**

*Answer any* **five** *questions*.

*Any additional question(s) answered will* **not** *be marked*

*Mathematical tables and silent non-programmable calculators maybe used.*

*These values of physical quantities may be useful to you.*

*Acceleration due gravity, g =* 10 m s -2

*Specific heat capacity of water =* 4200 J kg -1 K -1

*Specific heat capacity of ice =* 2100 J kg -1 K -1.

*Specific latent heat of vaporization of water* = 2,260,000 J kg -1

*Specific latent heat of fusion of water* = 340,000 J kg -1

*Speed of sound in air =* 330 m s -1

*Density of water =* 1000 kg m -3

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1. a i) What do you understand by the term a machine. (01 mark)

ii) Define the term efficiency as applied to a machine. (01 mark)

b i) Sketch a block and tackle system of velocity ratio 3. (02 marks)

ii) How far will the load move if the effort moves by 2.4. (02 marks)

iii) What effort will just raise a load of 960N if the mechanical advantage is 2.4 (02 marks)

c) An object of height 4 cm is placed 5 cm a way from a pinhole camera. The screen is 7 cm from the pinhole.

(i) Draw a scale ray diagram to show the formation of the image by the pinhole camera. (04 marks)

ii) What is the nature of the image? (01 mark)

iii) Find the magnification of the image. (01 mark)

(iv) Explain what happens to the image if the pinhole is made larger. (02 marks)

2. a (i) Define the term of moment of force. (01 mark)

ii) Describe an experiment you would carry out to determine the mass of a meter rule using a known mass and a knife edge only. (06 marks)

R2

B

A

500N

50 cm

R1

b)

The figure shows a uniform bar AB of length 2m and weight 50N supported at the ends A and B. A load of weight 500N is suspended at the 50 cm mark from A.

Calculate the reaction forces R1 and R2 at the supports. (05 marks)

c) i) Explain what is meant by unstable equilibrium. (02 marks)

ii) State two ways of increasing the stability of a body. (02 marks)

3. a) What is an equation of state of a gas. (01 mark)

b) i) with the aid of a sketch graph, describe how absolute zero of temperature is defined. (02 marks)

ii) A volume of 2500cm3 of hydrogen gas is collected at 670c and a pressure of 730 mmHg. Calculate the volume of the gas at s.t.p (04 marks)

c) Describe with the aid of a labeled diagram an experiment to investigate the variation of volume of a fixed mass of gas with temperature at constant pressure. (06 marks)

d) The same quantity of heat was supplied to 5kg of sea water and 12kg of methylated spirit. The temperature rise was 3.00c and 2.00c respectively. Find the ratio of the specific heat capacity of sea water to that of methylated spirit. (03 marks)

4. a) i) What is an echo? (01 mark)

ii) State the conditions required for a stationary wave to be formed. (02 marks)

b) List the factors on which the frequency of a wave in a vibrating string depends. (03 marks)

c) Describe an experiment to measure the speed of sound in air using a resonance tube. (05 marks)

d) A child stands on one side of two cliffs and makes a loud sound. If she hears the first echo after 4.0 s and the second echo after 6.0 s, find the distance between the two cliffs. (05 marks)

5. a) Define the joule. (01 mark)

b) i) What is meant by linear momentum. (01 mark)

ii) State the law of conservation of linear momentum. (01 mark)

c) A bullet of mass 20g is fired into a block of wood of mass 400g lying on a smooth horizontal surface. If the bullet and wood move together with a speed of 20ms-1, calculate:

i) The speed with which the bullet hits the wood. (04 marks)

ii) The kinetic energy lost. (06 marks)

d) State the energy changes involved in (c) above. (03 marks)

6. a) Sketch a diagram of a cathode ray oscilloscope and label on it the main features. (05 marks)

b) i) Describe briefly the principle of operation of the cathode ray oscilloscope.

(04 marks)

ii) How is the bright spot formed on the screen. (01 marks)

c) Use diagrams to show what is observed on the screen of a CRO when;

i) the CRO is switched is switched on and no signal is applied to the Y-plates and time base is off. (01 mark)

ii) The time base is switched on and no signal is applied to the Y- plate.

(01 mark)

iii) An alternating signal is applied to the Y-plates while the time base is off. (01 marks)

d) Give three uses of the CRO. (03 marks)

7. a) Outline a simple experiment, to measure the internal resistance of a cell.

(04 marks)

b) 10V

|  |
| --- |
| R3 = 2.6Ω  R2 =4Ω |

R1 = 6Ω

A battery of emf 10v and negligible internal resistance is connected to resistors R1, R2 and R3, of resistances 6Ω, 4Ω and 2.6Ω respectively as shown. Calculate;

1. The effective resistance of the circuit. (03 marks)
2. The rate of conversion of electrical energy into heat in R3 (03 marks)

c) State any three causes of energy losses in a transformer, suggesting how each can be reduced in a practical transformer. (03 marks)

d) Explain the advantage of transmitting electrical power at high voltage. (3 marks)

8. a) i) What is a magnetic field? (01 mark)

(ii) State the law of magnetism. (01 mark)

1. Explain with the aid of a labeled diagram, how a steel bar can be magnetized by single touch method. (04 marks)

(c) With the aid of a labeled diagram, explain how a simple ac generator works. (06marks)

(d) (i) what is meant by radioactivity? (01 mark)

(ii) A radioactive material takes 50hours for 93.75% of its mass to decay. Find its halflife. (03marks)