

Name:.....Index No:.....

535/2

PHYSICS

PAPER 2

June 2015

2¼ Hours

MWALIMU EXAMINATIONS BUREAU
UCE PRE-MOCK RESOURCE EXAMINATIONS 2015

S.4 PHYSICS

Paper 2

2 Hours 15 Minutes

INSTRUCTIONS TO CANDIDATES.

- *Attempt any five questions.*
- *Mathematical tables, slide rulers and silent non-programmable calculators may be used.*
- *These values of physical quantities may be useful to you.*
- *Acceleration due to gravity = 10ms^{-2}*
- *Speed of light = $3.0 \times 10^8\text{ms}^{-1}$*

1. (a) (i) Define momentum. (1mrk)
- (ii) A car of mass 1200kg traveling at 90kmhr^{-1} collides with a stationary lorry of mass 2400kg. Given that the two vehicles move together after collision. Calculate the percentage loss in the kinetic energy. (4mrks)
- (b) Describe an experiment to show how force applied to the spring varies with extension. (5mrks)
- (c) (i) Distinguish between stress and strain. (2mrks)
- (ii) A wire 1.2m long and diameter 2mm is suspended with a 10kg mass on one end. If the wire is extended by 0.8mm, calculate the stress in the wire. (4mrks)
2. (a) Define:-
- (i) Moment of a force and give its units. (2mrks)
- (ii) Resultant force. (1mrk)
- (b) A uniform wooden rod PQ, 2.0m long and weighing 9kg rest on two sharp edge supports A and B placed 10cm and 15cm from the end P and Q respectively. A 150N weight hang 20cm from the end P and 100N hang 10cm from Q. Calculate the forces acting at the supports A and B. (5mrks)
- (c) (i) Define velocity ratio as applied to machines. (1mrks)
- (ii) Draw a diagram of a single string pulley system having velocity ratio of 5. (2mrks)
- (d) Describe an experiment to verify the Archimedes' principle. (5mrks)
3. (a) (i) Define surface tension. (1mrk)
- (ii) Describe an experiment to measure the thickness of an oil molecule. (5mrks)
- (b) (i) State Charles' law. (1mrk)

- (ii) 100cm^3 of an ideal gas are collected at 20°C and 750mm of mercury pressure. Calculate its volume at standard temperature and pressure (s.t.p) (4mrks)
- (c) (i) State two factors on which specific heat capacity depends. (2mrks)
- (ii) Explain how the lower fixed point of an uncalibrated thermometer can be obtained. (3mrks)
4. (a) (i) Define a Transverse wave. (1mrk)
- (ii) Distinguish between a crest and a trough. (2mrks)
- (b) (i) Explain how the circular wave fronts can be produced from the ripple tank. (3mrks)
- (ii) A vibrator in a ripple tank vibrates at a frequency of 5Hz . If the distance between 10 successive crests is 54cm , calculate the wave velocity. (4mrks)
- (c) State two properties of electromagnetic waves. (1mrk)
- (d) (i) Describe an experiment to show that sound waves require a material medium. (4mrks)
- (ii) Mention one application of the ultrasonic sound. (1mrk)
5. (a) Define;
- (i) Radioactivity. (1mrk)
- (ii) Isotope. (1mrk)
- (b) State the difference between the properties of alpha and beta particles. (2mrks)
- (c) (i) What is nuclear fission? (1mrk)
- (ii) A radioactive nuclide ${}_{88}^{216}\text{X}$ emits an alpha particle and turns into another nuclide Y. Write a balanced nuclear equation for the reaction. (2mrks)

- (iii) Of the 64g sample of radioactive substance, 62g of it decayed in 125 days. Calculate the half-life of the element. (3mrks)
- (d) (i) With aid of labeled diagram describe the action of the cathode ray oscilloscope. (5mrks)
- (ii) State one industrial application of the X – rays. (1mrk)
6. (a) (i) Describe the mode of operation of the D.C. motor. (4mrks)
- (ii) Sketch a graph of potential difference against current for Ohmic conductors. (2mrks)

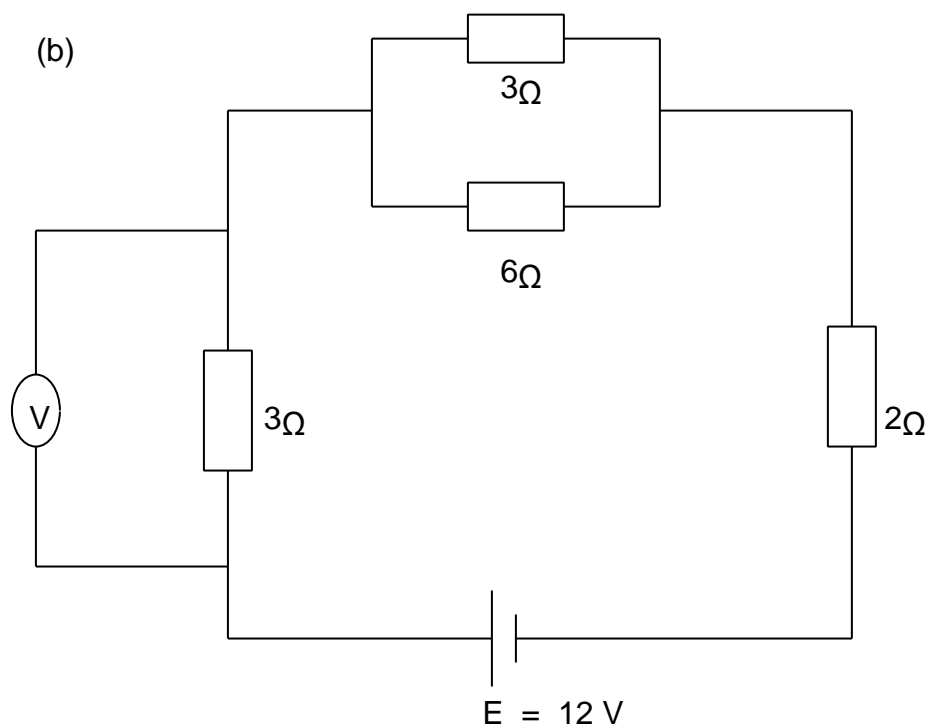


Fig. 1

Fig. 1 shows four resistors of resistance 2Ω , 3Ω , 3Ω and 6Ω connected to a cell of e.m.f $E = 12\text{V}$ and negligible internal resistance. Calculate the:-

- (i) total current in the circuit. (3mrks)
- (ii) power dissipated by the 3Ω resistor. (2mrks)

- (c) (i) Define a transformer. (1mrk)
- (ii) Describe briefly how a transformer increases the e.m.f before it is fed into power transmission lines. (3mrks)
- (d) State one cause of energy loss in practical transformers. (1mrk)
7. (a) (i) Define electric field. (1mrk)
- (ii) Draw a diagram to show lines of force due to two isolated positive charges. (2mrks)
- (b) Explain how a gold leaf electroscope can be used to determine the nature of charge on a body. (3mrks)
- (c) (i) Describe briefly the mode of operation of a wet cell. (3mrks)
- (ii) State one defect of a wet cell. (1mrk)
- (d) (i) Explain in terms of domain theory how the steel bar gets magnetized by single touch method. (3mrks)
- (ii) Calculate the cost of running four 240V 60w lamps and a cooker rated 240V, 3000W, if the appliances are used for 6 hours and the cost of a unit of electricity is 480/=.
8. (a) Distinguish between diffuse and regular reflections. (2mrks)
- (b) Why is a convex mirror preferred instead of a concave mirror as a driving mirror. (2mrks)
- (c) An object of height 2cm is placed 10cm in front of a convex mirror of focal length 10cm. By scale drawing find the position of the image and describe the image formed (5mrks)
- (d) (i) Define dispersion. (1mrk)
- (ii) Explain the appearance of a red shirt with blue spots when observed in green light. (2mrks)
- (e) Describe the mode of operation of a lens camera. (4mrks)

END