

UNEB U.C.E PHYSICS (PAPER 2) 2010

1. (a) (i) State Newton's laws of motion.
(ii) Explain what happens to a person seated in a vehicle when it is suddenly brought to rest.
(b) Explain what happens to a parachutist who jumps from a high flying plane.
(c) Figure 1 shows a velocity -time graph for a vehicle in motion.

(i) Find the total distance the vehicle moved.
(ii) Calculate the retardation of the vehicle.
2. (a) State the following.
(i) Archimedes principle
(ii) The law of floatation
(b) A wooden sphere of mass 6 kg and volume 0.02m^3 floats on water. Calculate the
(i) Volume of the sphere below the surface of water
(ii) Density of the wood
(iii) Fraction of the volume of the sphere that would be submerged if it floats in a liquid of density 800kgm^{-3} .
(c) Explain why a cork stopper held below the surface of water rises when released.
(d) Describe an experiment to measure atmospheric pressure.
3. (a) Define the following
(i) Hard magnetic material
(ii) Soft magnetic material
(b) (i) Describe the electrical method of magnetizing a steel bar.
(ii) State any two ways of demagnetizing a bar magnet.
(c) Sketch the magnetic field pattern around a bar magnet with its S-pole pointing north in the earth's field.
(d) A stiff wire AB is held between opposite poles of two bar magnets and connected to a center-zero galvanometer as shown in figure 2.

The wire AB is kept vertical and moved horizontally along the line CD.

- (i) Explain what is observed on the galvanometer as the wire AB moves toward C and toward D.
 - (ii) Explain what would be observed if the wire was moved along LM.
- 4 (a) (i) What is meant by focal length of a lens?
(ii) Calculate the power of a concave lens focal length 20cm.

(b) An object of height 7.5 cm is placed at a distance of 15cm from a convex lens of focal length 20cm. by scale drawing determine the

(i) height of the image

(ii) image distance

(iii) Linear magnification.

(c) Describe an experiment to determine the focal length of a convex lens using an illuminated object and a plane mirror.

(d) What is the main difference between the operation of a lens camera and that of a human eye?

5. (a) (i) What is meant by the term diffusion?

(ii) Explain what is observed when smoke enclosed in an illuminated transparent cell is viewed through a microscope.

(iii) State what is observed in (a) (ii) when the cell is placed on ice blocks. Give a reason for your answer.

(b) (i) Describe an experiment to determine the thickness of an oil molecule.

(ii) state any assumptions made in (b) (i).

(c) (i) State Hooke's law.

(ii) When a boy of 50kg stands at the end of a spring board, it is depressed by 15cm. what would be the depression of the spring board when a man of 80kg stands at the end.

6. (a) What is meant by thermionic emission?

(b) (i) Name the three main components of a cathode ray oscilloscope (CRO)

(ii) Describe the functions of each component you have named in (b) (i)

(iii) Give two uses of a C.R.O

(c) State the conditions under which electrons can be used to generate X-rays.

(d) Give one use of x-rays

7. (a) (i) What is meant by electromotive force.

(ii) A dry cell supplies a current of 1.2A through two 2# resistors connected in parallel. When the resistors are connected in series, the current flowing in the circuit is 0.4A.

Find the electromotive force.

(b) An electric lamp is rated 12V, 24W.

(i) Explain what is meant by this statement.

(ii) How much current does the lamp draw when connected across a 12V supply?

(c) with the aid of a labelled diagram, describe how four semi-conductor diodes may be used for full wave rectification.

8. (a) Define the following as applied to wave motions:

(i) Frequency

(ii) Wave length

(b) what are transverse waves?

(c) A radio station transmits signals at a frequency of 103.7 MHz. find the wave length of the signals and state any assumption made.

(d) Draw a diagram to show the pattern for a straight water wave passing through a narrow slit.

- (e) Describe an experiment to demonstrate that sound waves require a material medium for their propagation.
- (f) Explain the sound waves travel through air.

END

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