

UCE PREPARATORY PHYSICS QUESTIONS 2017

535/2 SET 4

TIME: 2HOURS 15 MINUTES

INSTRUCTIONS

- ❖ Attempt **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 = $4200\text{Jkg}^{-1}\text{K}^{-1}$

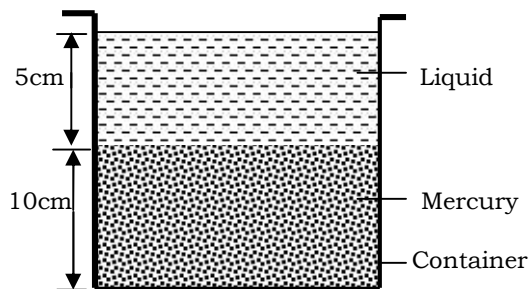
Specific heat capacity of copper = $400\text{Jkg}^{-1}\text{K}^{-1}$

Specific heat capacity of ice = $2100\text{Jkg}^{-1}\text{K}^{-1}$

Density of water = 1000kgm^{-3}

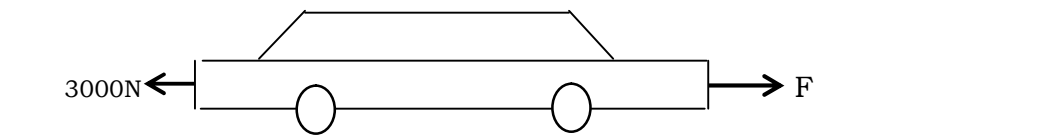
1. (a) (i) Define atmospheric pressure (01mark)
(ii) With the aid of diagram, explain the action of a siphon (05marks)

(b)



Two immersed liquids, are placed in a container as shown.
If the density of the liquid is 900kgm^{-3} and that of mercury is 13600kgm^{-3} , find the total pressure exerted at the bottom of the container. (Atmospheric pressure is $1.0 \times 10^5\text{pa}$) (05marks)

- (c) (i) Distinguish between kinetic and potential energy (02marks)
(ii) A car moves with a uniform speed through a distance of 40m and the net resistance force acting on the car is 3000N as shown in the figure below.



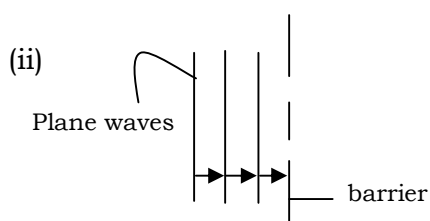
Calculate the work done by the driving force (03marks)

2. (a) (i) State the principle of moments? (01marks)
 (ii) Describe an experiment to verify the principle of moments (05marks)
- (iii) A uniform beam **AB** of length 6m and weight 20N balances horizontally when a load of 10N is suspended at **A**. find the position of the pivot from **B** (04marks)
- (b) (i) State Archimedes' principle (01mark)
 (ii) Describe an experiment to verify Archimedes' principle (05marks)
3. (a) (i) State Charles' law (01mark)
 (ii) Describe an experiment to verify Charles' law. (06marks)
- (b) (i) What is meant by the term absolute zero. (01mark)
- (ii) A gas occupies a volume of 3littres at 27⁰C. Find the volume the gas will occupy at -33⁰C (03marks)
- (c) (i) What is a saturated vapour? (01mark)
 (ii) Distinguish between a vapour and a gas. (01mark)
- (d) Balloon is inflated and then left in the hot sun. Explain what is likely to be observed. (03marks)
4. (a) (i) With the aid of a diagram explain magnetic keepers. (03marks)
- (ii) Sketch the magnetic fields for a bar magnet placed in the earth's magnetic field with its North pole facing geographical North and its south pole facing geographical south. (03marks)
- (b) (i) What is a moving coil galvanometer? (01mark)
 (ii) A galvanometer as a coil of a resistance 20 Ω and gives a full scale deflection when a current of 50mA passes through it. Describe how the galvanometer is converted into an ammeter that can measure current up to 2A. (05marks)
- (c) Distinguish between ferromagnetic and paramagnetic materials (02marks)
- (d) Sketch the electric fields around two vertical identical wires carrying same magnitude of currents in the same direction and state what happens to the wires. (03marks)
5. (a) (i) with the aid of a diagram describe the working of an X-ray tube (05marks)
 (ii) Distinguish between hard and soft X-rays (02marks)
 (iii) Describe how X-rays may be used to reveal flaws in cast metal (03marks)
- (b) (i) Explain what is meant by isotopes of an element. (01mark)
 (ii) Describe the composition of the nuclide $^{14}_6\text{C}$ (02marks)

(iii) Describe **one** precaution taken when handling radioactive materials. (01mark)

(c) The nuclide ${}^{60}_{27}\text{Co}$ decays by emitting a beta particle to nickel (Ni) which then emits a gamma proton. What is the mass number and atomic number of the final nuclide? (02marks)

6. (a) (i) Define the terms constructive and destructive interference. (02marks)



Plane waves are incident on a barrier with two narrow openings as shown. Sketch a diagram to show how the waves interfere after passing through the openings (04marks)

(b) (i) Why is sound referred to as a longitudinal wave. (02marks)

(ii) Explain any **two** factors that affect the speed of sound in air. (04marks)

(c) (i) what are ultra-Sonics? (01mark)

(ii) Explain why sound is clearer at night than during the day. (03marks)

7. (a) (i) Define the terms dispersion and deviation. (02marks)

(ii) Draw a diagram showing dispersion of light by a prism. (03marks)

(b) (i) Define primary and secondary colours, giving **two** examples of each. (04marks)

(ii) Explain why an object appears coloured (02marks)

(c) (i) Draw a well labeled diagram of a complete electromagnetic spectrum. (03marks)

(ii) Name any **two** properties of electromagnetic waves. (02marks)

8. (a) (i) Distinguish between conductors and insulators giving **one** example of each. (02marks)

(ii) Describe how a gold leaf electroscope is used to investigate the insulating abilities of an uncharged glass rod and uncharged copper rod. (04marks)

(b) An electroscope has a small positive charge deposited on it. Describe and explain what is observed when a body that has a big negative charge is brought slowly from far until it is near the cap of electroscope. (04marks)

(c) (i) Describe the components of a fully charged lead acid battery. (03marks)

(ii) State **two** advantages of a Nife cell over the lead acid cell. (02marks)

END