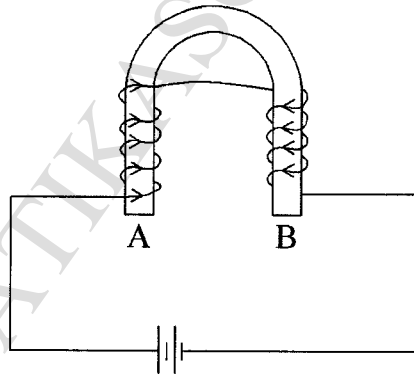


3.6.2 Physics Paper 2 (232/2)

SECTION A: (25 marks)

Answer *all* the questions in this section in the spaces provided.

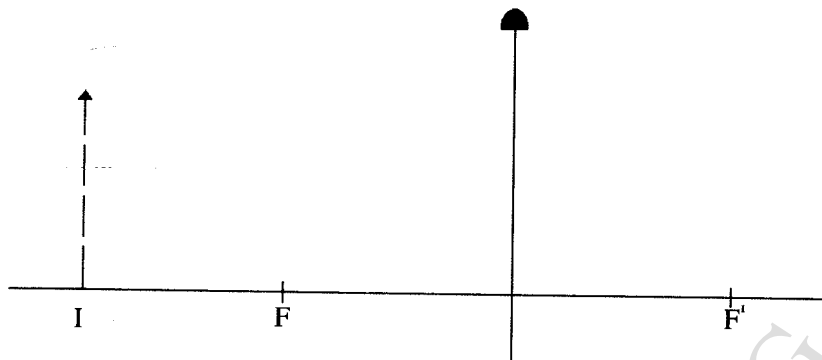
1. State any **two** uses of microwaves. (2 marks)
2. In a laboratory there are four metals – *tin, nickel, copper and cobalt*. Of these metals, name the metals that are;
  - (a) magnetic, (1 mark)
  - (b) non-magnetic. (1 mark)
3. State **one** use of echoes. (1 mark)
4. State what is meant by *polarisation* in simple cells. (1 mark)
5. State **two** advantages of using convex mirrors to monitor movements in a large supermarket. (2 marks)
6. **Figure 1** shows an insulated wire wound on a U-shaped iron core connected to a battery.



**Figure 1**

- Determine the polarity of A. (1 mark)
7. Explain how the *greenhouse* gets warm. (2 marks)
8. Draw a circuit diagram to show a *p-n* junction diode in the forward biased mode. (1 mark)

9. **Figure 2** shows a virtual image I formed by a convex lens.

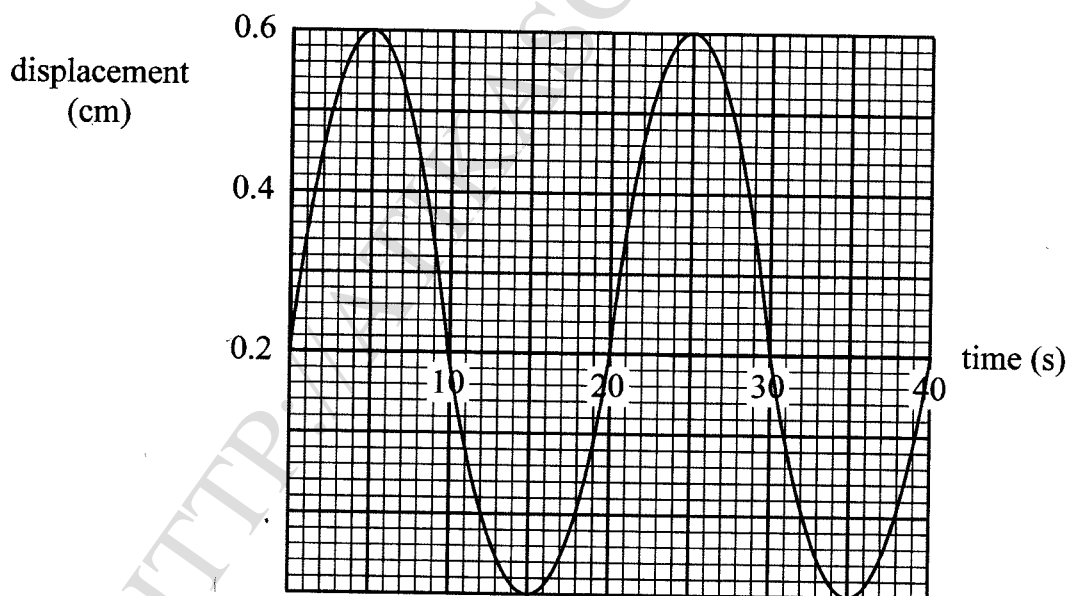


**Figure 2**

Draw a ray diagram to locate the object.

(3 marks)

10. Write an equation to show how an element  ${}^A_ZX$  decay to element Y by emitting a beta particle. (1 mark)
11. Explain what is observed when an uncharged sphere is brought close to a positively charged electroscope. (3 marks)
12. **Figure 3** shows a transverse wave.

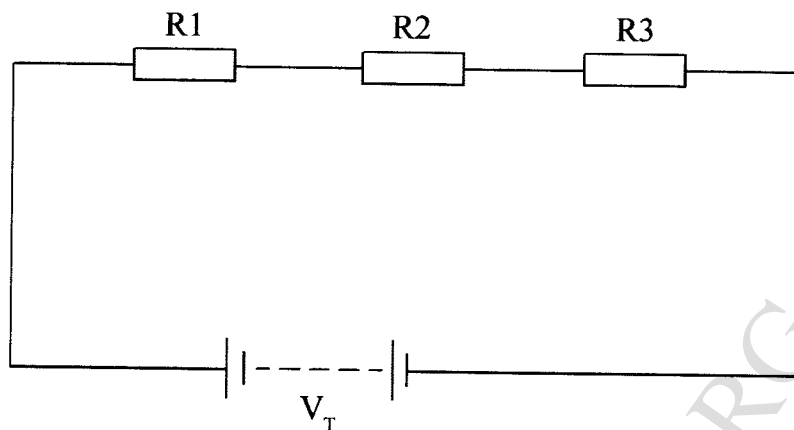


**Figure 3**

Determine the frequency of the wave.

(2 marks)

13. **Figure 4** shows three resistors connected in series.



**Figure 4**

Using Ohm's law, show that the effective resistance is given by the expression:  
 $R_T = R_1 + R_2 + R_3$

(3 marks)

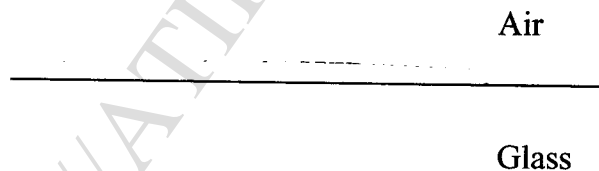
14. State how heating is achieved in a resistance wire.

(1 mark)

**SECTION B: (55 marks)**

*Answer all the questions in this section in the spaces provided.*

15. (a) **Figure 5** shows the interface between glass and air.

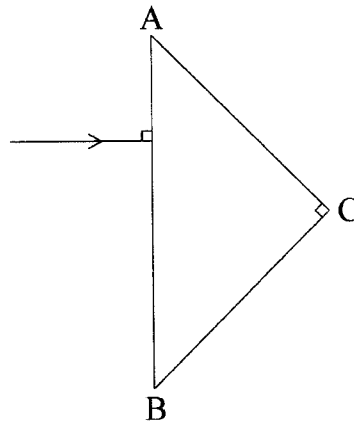


**Figure 5**

Draw on the figure a ray diagram to illustrate the critical angle.

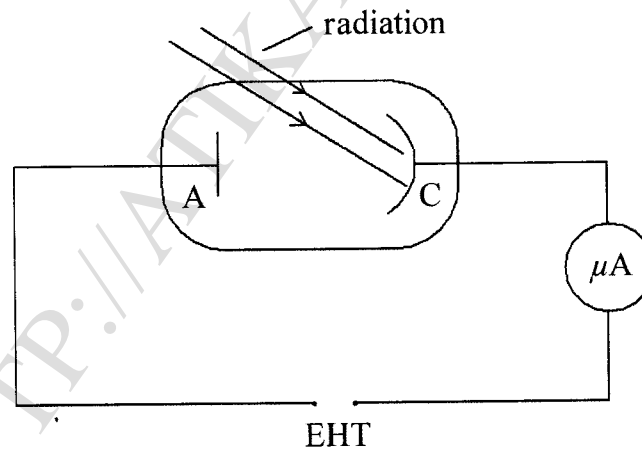
(3 marks)

- (b) **Figure 6** shows a ray of light incident at right angles to face AB of a right angled glass prism of refractive index 1.62.



**Figure 6**

- (i) Determine the critical angle of the material. (3 marks)
- (ii) Complete the ray diagram to show the path of light until it leaves the prism. (2 marks)
- (c) State any **two** applications of prisms. (2 marks)
16. (a) **Figure 7** shows a set up that may be used to observe photoelectric effect. A radiation is incident on the cathode. It is observed that the microammeter registers a current.



**Figure 7**

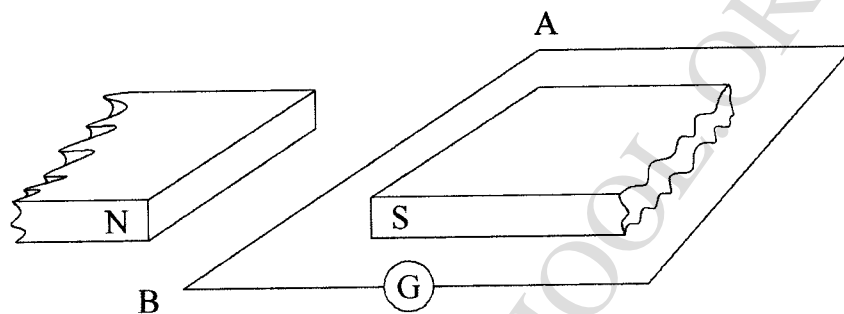
- (i) Explain how the current is produced. (2 marks)
- (ii) State with a reason what must be done for a higher current to be registered. (2 marks)
- (iii) It was observed that for a certain incident radiation, no current was registered. Explain this observation. (2 marks)

- (b) A monochromatic light of wavelength  $4.50 \times 10^{-7} \text{ m}$  is incident on a metal surface of threshold frequency  $5.5 \times 10^{14} \text{ Hz}$ . (Speed of light  $c$  is  $3.0 \times 10^8 \text{ ms}^{-1}$  and planks constant  $h$  is  $6.63 \times 10^{-34} \text{ Js}$ ).

Determine

- (i) the work function of the metal surface, (3 marks)
- (ii) average kinetic energy of the emitted photoelectrons. (4 marks)

17. (a) **Figure 8** shows a conductor AB connected to a galvanometer and placed between two permanent magnets.

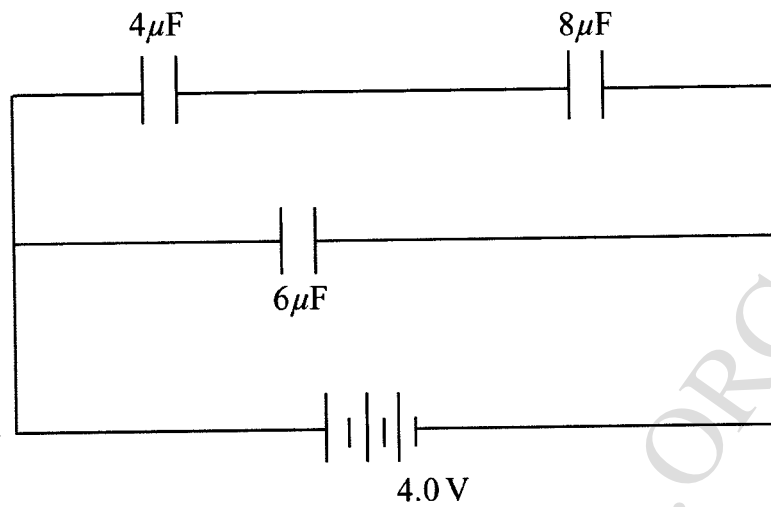


**Figure 8**

- (i) Conductor AB is moved perpendicular to the magnetic field. State and explain the observation made on the galvanometer. (3 marks)
- (ii) State the effect of moving the conductor faster. (1 mark)
- (b) A transformer is used to step down 240 V to 12 V for use in an electric appliance operating at 0.5 A. If the primary coil has 600 turns, determine the;
- (i) number of turns in the secondary coil, (3 marks)
- (ii) current in the primary coil. (3 marks)
18. (a) State **two** factors that affect the capacitance of a parallel plate capacitor. (2 marks)



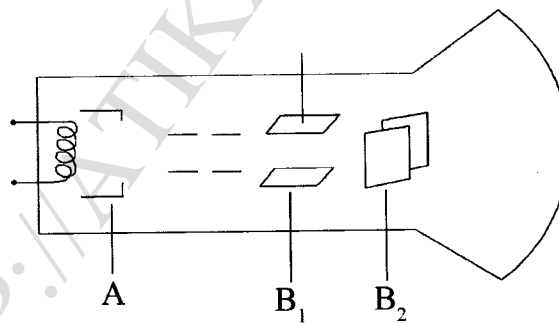
- (b) **Figure 9** shows an electric circuit in which three capacitors are connected across a power supply. (2 marks)



**Figure 9**

Determine the;

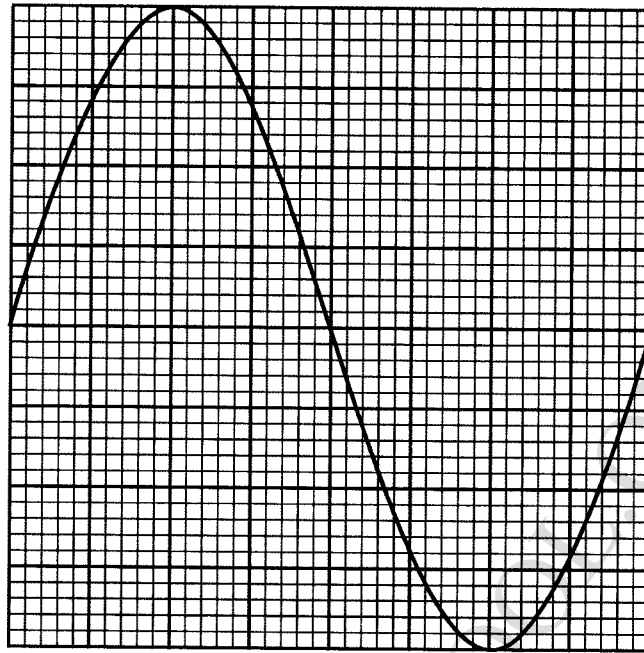
- (i) total capacitance, (4 marks)
- (ii) quantity of charge stored on the  $8\mu\text{F}$  capacitor. (3 marks)
19. (a) **Figure 10** shows a block diagram of a cathode ray oscilloscope (CRO).



**Figure 10**

- (i) State the names of the parts labelled  $B_1$  and  $B_2$ . (2 marks)
- (ii) State and explain the function of the part marked A. (3 marks)

- (b) **Figure 11** shows a trace of a signal observed on the screen of a CRO. The time-base setting is  $20 \text{ mscm}^{-1}$ .



**Figure 11**

- Determine the frequency of the signal. (4 marks)
- (c) Explain why tungsten is used as a target in an x-ray tube. (2 marks)