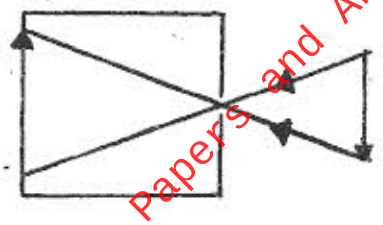
# PHYSICS PAPER 232/2 2007
## MARKING SCHEME



1.



*(2 marks)*

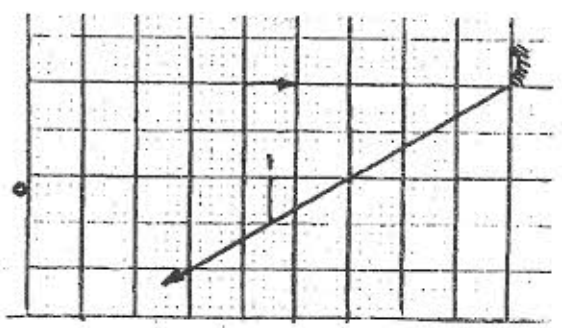
2.
- Alkaline cell lasts longer than lead acid cell.
- Alkaline cell is more rugged than lead acid cell
- Alkaline cell is lighter than lead-acid cell

*(1 mark)*

3. **X:** is north
**Y:** is north

*(1 mark)*

4. (a)



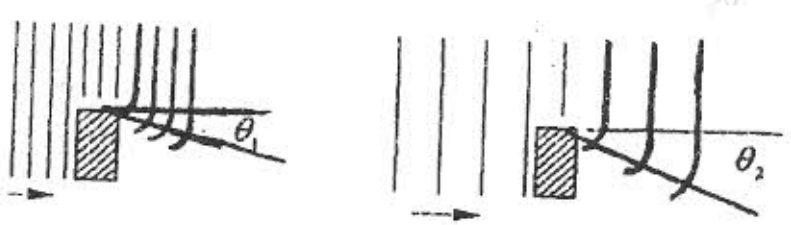
*(2 marks)*

(b) $f = 3 \times 5 = 15cm$ *(1 mark)*

5.
$$T = \frac{0.007s}{3}$$
$$f = \frac{1}{T} = \frac{3}{0.007}$$
$$= 429H_z$$

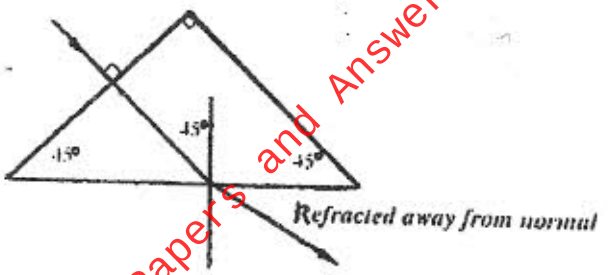
*(3 marks)*

6.




*(1 mark)*

7.




*(1 mark)*

8. $I = \dfrac{1.5}{R + r}$

$0.13 = \dfrac{1.5}{10 + r}$

$r = 1.5\Omega$ *(3 marks)*

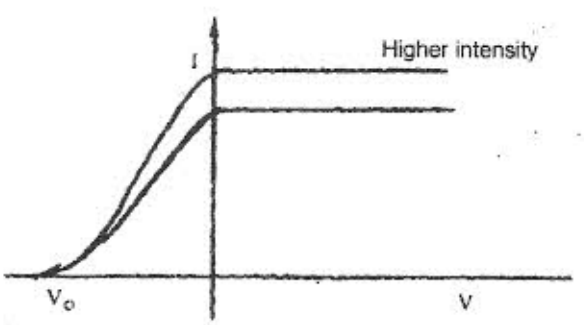
9. $R_1 = \dfrac{V^2}{P}, \quad R_2 = \dfrac{V^2}{8P}$

$\dfrac{R_1}{R_2} = \dfrac{V^2}{P} \times \dfrac{8P}{V_2}$

$= 8$ *(3 marks)*

10. The process of the eye lens being adjusted to foucs objects at various distances (1 mark)

11.

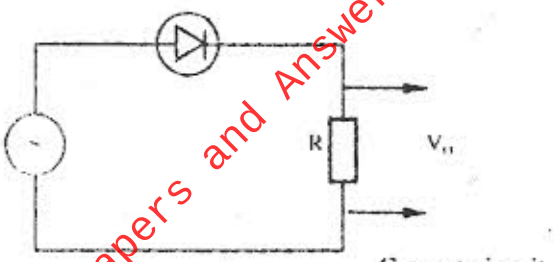



*(1 mark)*

12. The higher the intensity implies greater number of electrons and hence higher saturation current *(1 mark)*

13. a = 234, b = 82 *(2 marks)*

14.




*Correct circuit*

*(2 marks)*

15. (a) The ratio of the pd across the ends of metal conductor to the current passing through it is a constant. *(1 mark)*

(b) (i) It does not obey Ohm's law; because the current - voltage graph is not linear throughout. *(2 marks)*

(ii) $\text{Resistance} = \frac{V}{I} = \text{inverse of slope}$

$$= \frac{(0.74 - 0.70)\text{V}}{(80 - 50)\text{mA}}$$

$$= \frac{0.40\text{V}}{30 \times 10^{-3}\text{A}}$$

$$= 1.33\Omega$$

*(3 marks)*

(iii) From the graph, current flowing when pd is 0.70V is 60 mA

Pd across R = 6.0 – 0.7 = 5.3V

$$R = \frac{5.3\text{V}}{60\text{mA}}$$

$$= 88.3\Omega$$

*(3 marks)*

(c) (i) Parallel circuit $\frac{1}{30}+\frac{1}{20}=\frac{5}{60}$

$R = 12\Omega$

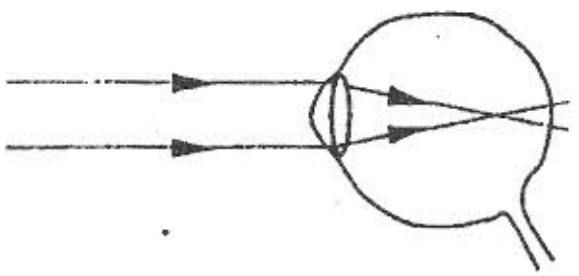
Total resistance = 10 + 12 = 22Ω *(2 marks)*

(ii) $I=\frac{V}{R}=\frac{2.1}{22}=0.095A$ *(1 mark)*

(iii) $V = IR = 10 \times \frac{2.1}{22}$

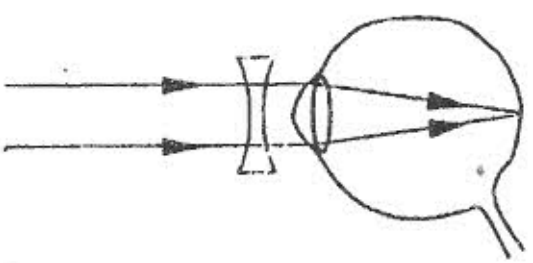
$= 0.95V$ *(2 marks)*

16. (a) (i)



*(1 mark)*

(ii)



*(2 marks)*

(b) (i) **A** - Diaphragm
**B** - Film *(2 marks)*

(ii) The distance between the lens is adjusted; so that the image is formed on the film *(2 marks)*

(iii)
- **Shutter:** opens for some given time to allow rays from the object to fall on the film creating the image impression.
- **A(Diaphragm):** controls intensity of light entering the camera
- **B(Film):** coated with light sensitive components which react with light to create the impression *(3 marks)*

(c) (i) magnification $= \frac{v}{u} = 3$

since $v + u = 80$

$u = 80 - v$

$\frac{v}{80 - v} = 3$

$v = 240 - 3v$

$v = 60$ cm *(3 marks)*

(ii) From above $u = 20$ cm

$\frac{1}{f} = \frac{1}{v} + \frac{1}{u} = \frac{1}{60} + \frac{1}{20}$

$f = 15$ cm *(2 marks)*

17. (a) The induced current flows in such a direction that its magnetic effect opposes the change producing it. *(1 mark)*

(b) (i) As the diaphragm vibrates, it causes the coil to move back and forth in the magnetic field cutting the field lines, thus causing a varying to be induced in the coil which causes a varying current to flow *(3 marks)*

(ii)
- Increasing number of turns in the coil
- Increasing the strength of the magnet

*(2 marks)*

(c) (i) $\frac{V_p}{V_s} = \frac{N_p}{N_s}$

$\frac{400}{V_s} = \frac{1200}{120}$

$V_s = 40V$ *(2 marks)*

(ii) $P_s = P_p = 600w$

$I_s = \frac{600}{40} = 15A$ *(2 marks)*

(iii) $I_p = \frac{600}{400} = 1.5A$ *(1 mark)*

18. (a) (i) **A** - Grid
**B** - Filament *(2 marks)*

(ii) Filament heats cathode
Electron boil off cathode (thermionic emission) *(2 marks)*

(iii) ■ Accelerating
■ Focusing *(2 marks)*

(iv) Across X - plates *(1 mark)*

(v) To reduce collisions with air molecules that could lead to ionization *(1 mark)*

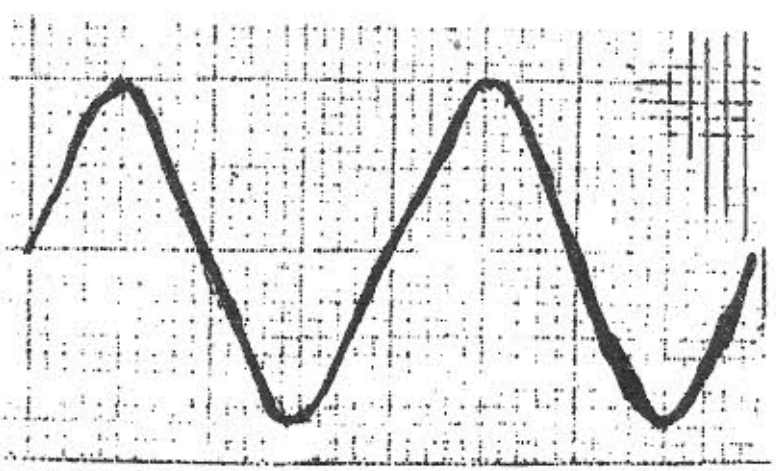
(b) (i) height = 4cm
peak value = $4 \times 5$
= 20V *(2 marks)*

(ii) 2 wave length = 16cm
T = $8 \times 20 \times 10^{-3}$
= 0.16s

$$f = \frac{1}{T} = \frac{1}{0.16}$$

= $6.25H_z$ *(3 marks)*

(iii)



*(2 marks)*