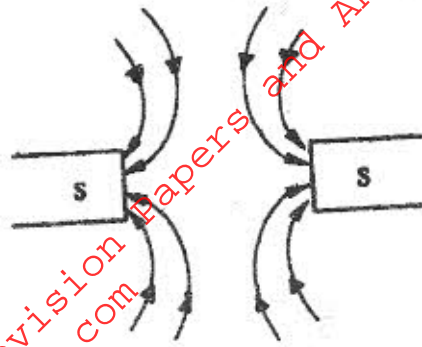# PHYSICS PAPER 232/2 2006
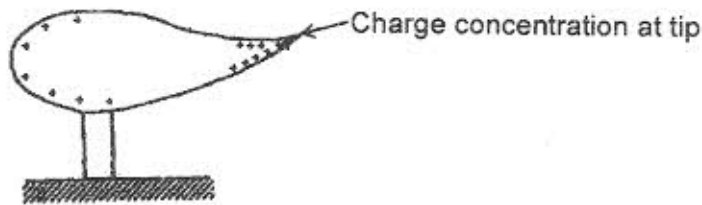## MARKING SCHEME

1.

(1 mark)

2. Magnification $= \dfrac{\text{Image dist}}{\text{Object dist}} = \dfrac{\text{ht of image}}{\text{height of object}}$;

$$= \frac{10}{600} = \frac{16}{h} ;$$

$h = 9.6m$

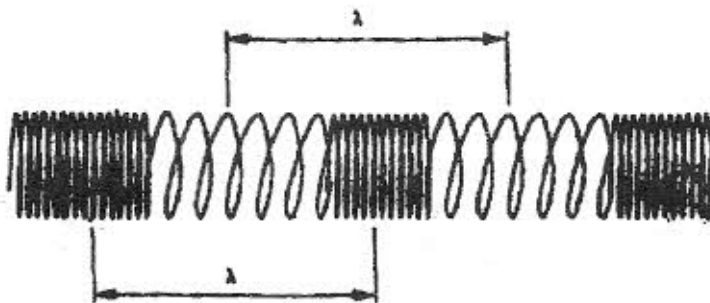(3 marks)

3

—Charge concentration at tip

(1 mark)

4. To allow escape of gases (H_2 and O_2) from battery.   (1 mark)
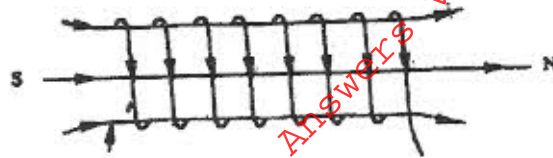
5. (i) Longitudinal Wave
   (ii) Length of the spring, from one point to a similar point of vibration.
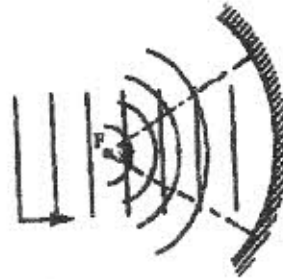

(2 marks)

117

6.

(1 mark)

7.

Reflected waves are curved. Either: Converging circular reflected waves. Converging to F; or two perpendicular lines from the surface of one of the curves meeting at F   (2 marks)

8.   Distance moved by sound waves = 2x;
     2x = speed × time

$$x = \frac{330 \times 1.8}{2};$$

     = 297m   (3 marks)

9.   ■ Constant temperature
   ■ No mechanical strain   (1 mark)

10.   Work function of a metal is the minimum energy required to set free (release) an electron from the surface of the metal   (1 mark)

11.   Threshold frequency K.E. of electron = 0 hence velocity of the electron would be zero; (No motion). Thus photo electric effect cannot be observed.   (2 marks)

12.   Straight beam from gun to screen OR no gravitational effect on the beam.   (1 mark)

13.

Tube

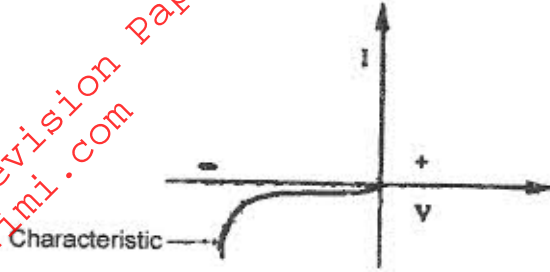magnetic field

Electron path
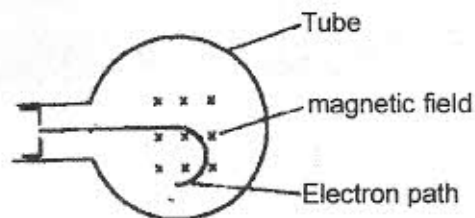
(1 mark)

14. Resulting X-rays have shorter wave length/hard/high frequency because electrons have higher K.E.

(2 marks)

15. $a = 234 + 4 = 238$
$b = 92 - 2 = 90$

(2 marks)

16.

Characteristic ⟶

(1 mark)

17. (a) Charge Q on C_1 is given by
Charge $Q_1 = C_1 V$;
$= 0.3\mu F \times 4.5$;
$= 1.35 \mu C$;

(3 marks)

(b) $C_T = C_1 + C_2$;
$= (0.3 + 0.5)\mu F$
$= 0.8 \mu F$

(2 marks)
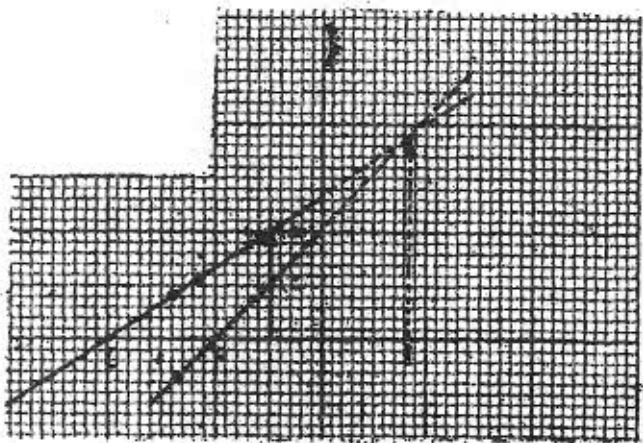
(c) (i) 4.5v

(1 mark)

(ii) Observed on voltmeter p.d drops to less than 4.5

(1 mark)

(iii) The drop of p.d. in C(ii) is because the charge on C_1 is distributed to C_2. Since values of C_1 and C_2 remain constant, when Q on C_1 reduces, then $Q = C_1 V$ implies V must reduce also, hence voltmeter reading reduced

(2 marks)

18. (a) (i)

(4 marks)

(ii) Image at 10cm from mirror (using scale)

(2 marks)

(iii) Magnification

$$\frac{\text{size of image}}{\text{size of object}} = \frac{4.0\ \text{cm}}{2.0\ \text{cm}} = 2$$

OR

$$\frac{\text{Image distance}}{\text{objct distance}} = \frac{2.0\ \text{cm}}{1.0\ \text{cm}} = 2$$

(2 marks)

(b) (i) I Image distance

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

$$\frac{1}{v} = \frac{1}{5} - \frac{1}{20} = \frac{3}{20}$$

$$v = \frac{20}{3} = 6.67\ \text{cm}$$

(3 marks)

II Magnification

$$= \frac{v}{u}; \quad \frac{6.67}{20} = 0.33;$$

(2 marks)

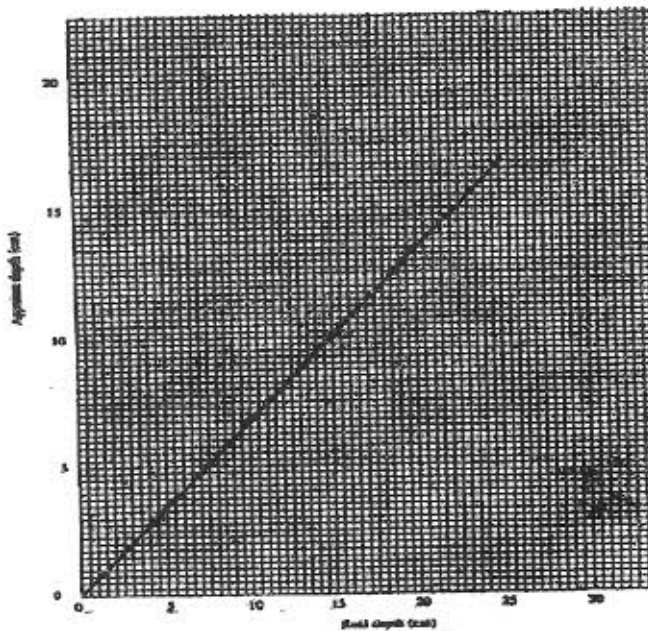(ii) Image characteristics: real, inverted, diminished, less bright (2 marks)

19. (a) Refr. Index $n = \dfrac{\sin i}{\sin r} \Big/ \dfrac{\text{Velocity in air}}{\text{Velocity in substance}}$

OR

$$n = \frac{\text{Real depth}}{\text{Apparent depth}}$$

(1 mark)

(b) (i)

(5 marks)

120

(ii) Slope of graph $= \dfrac{16}{24} = \dfrac{2}{3}$;

Re fr. index $n = \dfrac{Re\,al}{Apparent} = \dfrac{1}{slope}$;

$\dfrac{3}{2} = 1.5$

(4 marks)

(c) $n = \dfrac{\sin 90}{\sin \theta} \Rightarrow \sin \theta = \dfrac{1}{16}; \Rightarrow \theta = 38.7° =$ critical angle

(3 marks)

20. (a) (i) P = slip rings
Q = brushes

(2 marks)

(ii) 0 – 90 magnetic flux cut changes from high to low (decreasing);
90 – 180 magnetic flux change from low to high. (increasing);
At each peak 0 – 180 magnetic flux change is maximum through in different directions, (position of coil).

(3 marks)

(b) (i) $\dfrac{E_s}{E_p} = \dfrac{N_s}{N_p}; \Rightarrow E_s = 240 \times \dfrac{60}{1200} = 12$ volts;

(2 marks)

(ii) $P_p = P_s$ (Power) or $I_s V_s = I_p V_p$

$I_s = I_p \dfrac{V_p}{V_s} = 0.5 \times \dfrac{240}{12}; = 10A;$

(3 marks)

21. (a) (i) P = Ring circuit

(1 mark)

X = Neutral (point or terminal)
Y = Live (point or terminal)

(2 marks)

(ii) I Purpose of R - or Fuse; is a safety element in a circuit against excess current

(1 mark)

II R is connected to Y but not to X to ensure that when it breaks a circuit any gadget / appliance connected does not remain live.

(1 mark)

(iii) Earthing is necessary in such a circuit to guard against electric shocks (1 mark)

(b) Cost of electricity
1.5kw × 30h × 8ksh = Ksh.360/=

(2 marks)