KENYA NATIONAL EXAMINATION COUNCIL

KCSE 2007

PHYSICS
PAPER 2
MARKING SCHEME

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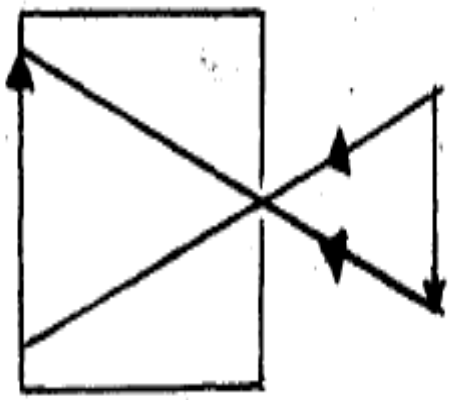
24.5.2 Physics Paper 2 (232/2)

1.



(2 marks)

2.

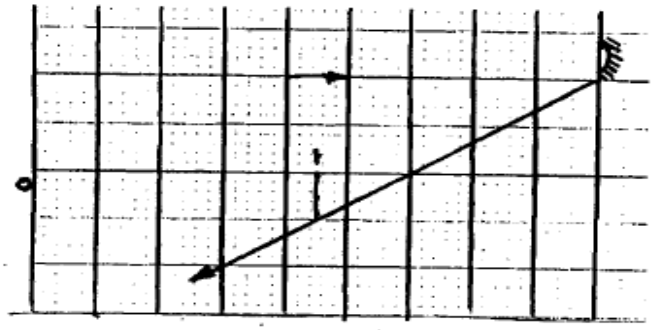
- Alkaline cell lasts longer than lead acid cell.
- Alkaline cell is more rugged than lead acid cell.
- Alkaline cell is lighter than lead-acid cell.

(1 mark)

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

(1 mark)

4. (a)



(2 marks)

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

(1 mark)

5.

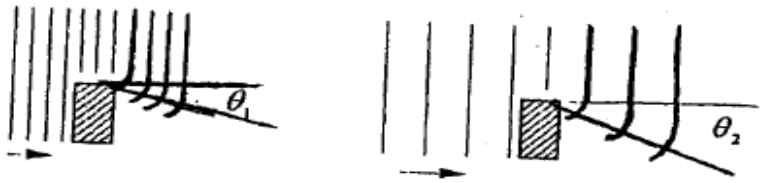
$$T = \frac{0.007s}{3}$$

$$f = \frac{1}{T} = \frac{3}{0.007}$$

$$= 429H_z$$

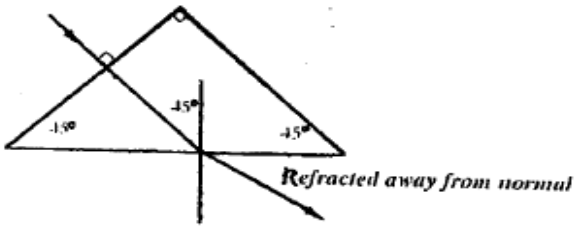
(3 marks)

6.



(1 mark)

7.



(1 mark)

8.

$$I = \frac{1.5}{R + r}$$

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

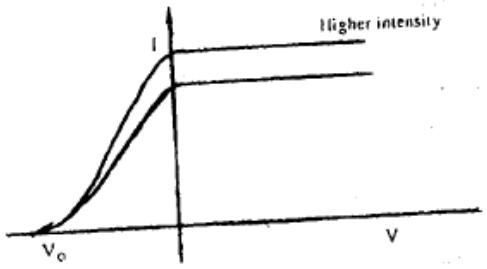
$r = 1.5\Omega$ ***(3 marks)***

9. $R_1 = \frac{V^2}{P}, \qquad R_2 = \frac{V^2}{8P}$

$$\frac{R_1}{R_2} = \frac{V^2}{P} \times \frac{8P}{V_2}$$
$$= 8$$ ***(3 marks)***

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

11.

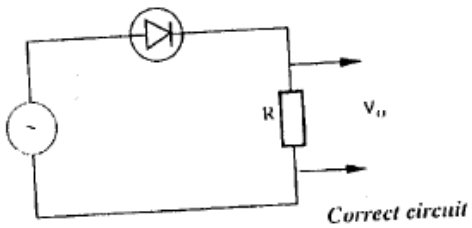


(1 mark)

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.



(2 marks)

15. (a) The ratio of the pd across the ends of a 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) Resistance = $\frac{V}{I}$ = inverse of slope

$$= \frac{(0.74 - 070)V}{(80 - 50)mA}$$
$$= \frac{0.40V}{30x10^{-3}A}$$
$$= 1.33\Omega$$ ***(3 marks)***

- ***Lens***: concentrates/ converts/ focuses the light from the lamp on the smoke particle causing them to be observable. ***(2 marks)***
- ***Microscope***: magnifies/ enlarges the smoke particles so that they are visible. ***(2 marks)***

(b)

- Smoke particles move randomly.
- Air molecules bombard the smoke particles.
- Air molecules are in continuous random motion/ haphazard/ zigzag/ drunken motion. ***(3 marks)***

(c) The speed of motion of smoke particles will be observed to be higher/move faster/speed increases random motion increases/motion increases. ***(1 mark)***

16. (a) A body at rest or in motion at uniform velocity tends to stay in that state unless acted on by an unbalanced force. ***(1 mark)***

(b) (i)

$$\text{Slope } s = \frac{\Delta U^2}{\Delta d}$$

$$s = \frac{98.75 - 0}{16 - 0}$$

$$= 6.172$$

(3 marks)

(ii) $20k = s = 6.172$

$$k = \frac{6.172}{20}$$

$$= 0.3085$$

(2 marks)

(iii)

- Increase in roughness increases k and vice versa.
- Decrease in roughness decreases k. ***(1 mark)***

(c) Applying equation

$$v^2 - u^2 = 2as$$

$$v^2 - 0 = 2 \times 1.2 \times 400$$

$$v = \sqrt{2 \times 1.2 \times 400}$$

Momentum $p = mv$

$$= 800 \times \sqrt{2 \times 1.2 \times 400}$$

$$= 24800 Kgms^{-1}$$

(4 marks)

17. (a) Quantity of heat required to change completely into vapour 1 kg of a substance at its normal boiling point without change of temperature/ Quantity of heat needed to change unit mass of substance from liquid to vapour without change in temperature/constant temperature. ***(1 mark)***

(b) (i) So that it vaporises readily /evaporates easily. ***(1 mark)***

(ii) In the freezing compartment the pressure in the volatile liquid is ***lowered suddenly by increasing the diameter*** of the tube causing vaporization. In the cooling finns, the pressure ***is increased by the compressed pump*** and ***heat lost to the outside*** causing condensation. ***(2 marks)***

(iii) When the volatile liquid evaporates, it takes away heat of vaporization from the freezing

(iii) From the graph, current flowing when pd is 0.70V is 60 mA
Pd across R = 6.0 – 0.7 = 5.3V

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

$= 88.3\ \Omega$ ***(3 marks)***

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

$R = 12\ \Omega$

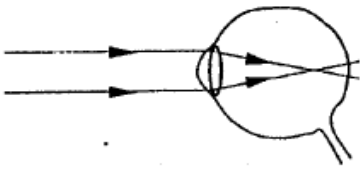
Total resistance $= 10 + 12 = 22\Omega$ ***(2 marks)***

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

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

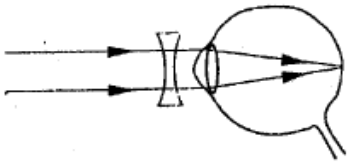
$= 0.95V$ ***(2 marks)***

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

$u = 80 - v$

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

$$v = 240 - 3v$$
$$v = 60cm$$ ***(3 marks)***

(ii) From above u = 20cm

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

f = 15cm ***(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 diaphragan 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 (theremionic 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 x 5
= 20V

(2 marks)

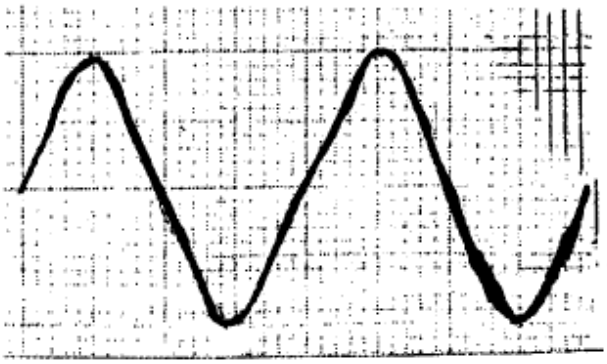
(ii) 2 wavelength = 16cm
T = $8 \times 20 \times 10^{-3}$
= 0.16s

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

$= 6.25\ H_z$

(3 marks)

(iii)



(2 marks)