

FORM FOUR JOINT EVALUATION - 2017

MARKING SCHEME

232/2

PHYSICS PAPER 2*(THEORY)*

MARCH/APRIL

2 Hours

*Kenya Certificate of Secondary Education***PHYSICS**

Paper 2

2 hours

INSTRUCTIONS TO CANDIDATES

1. Write your name and index number in the space provided at the top of this page.
2. This paper has two section **A** and section **B**.
3. Answer all the questions in the two sections.
4. Working of numerical questions must be clearly shown.
5. Marks may be given for correct working even if the answer is wrong
6. Mathematical tables or scientific calculators may be used.

FOR OFFICIAL USE ONLY

SECTION	QUESTION	MAX SCORE	STUDENT'S SCORE
A	1 – 14	25	
B	15	12	
	16	12	
	17	12	
	18	09	
	19	10	
GRAND TOTAL		80	

This paper consists of 4 printed pages.

SECTION A (25 MARKS)

Answer all the questions in the spaces provided

1. **Figure 1** shows a ray of light XY striking the mirror CD held at an angle of 108° to mirror DE.

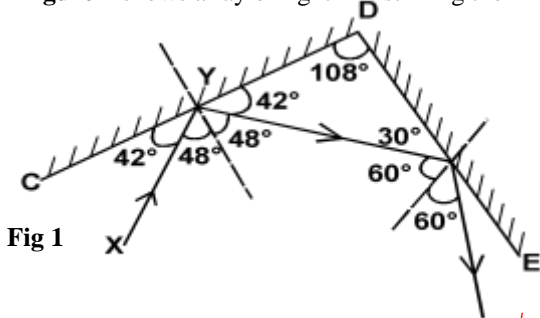
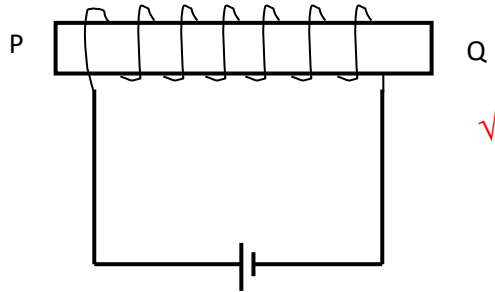


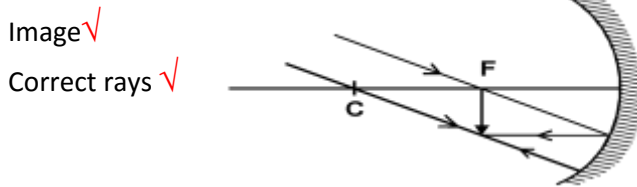
Fig 1

- Correct direction of two reflected rays ✓
- Final angle of reflection = 60° ✓

2. - $i \geq C$ ✓ OR
 - Light must be travelling from the denser to rarer medium
- 3.



4. A-microwaves ✓ C- X-rays ✓
- 5.



- 6.

$$V_S = \frac{N_S}{N_P} \times V_P = \frac{1000}{10} \times 12 = 1200V$$

7. (i) P = Main Ring Circuit ; ✓ (ii) X = Neutral wire ; ✓ Z = Earth wire ; ✓

8. $V = 2d/t$ ✓ $d = 166.5m$ ✓

9. $Q = I^2Rt$ ✓ $Q = 12.5^2 \times 100 \times 3600$ ✓ $Q = 5.625 \times 10^7 \text{ J}$ ✓

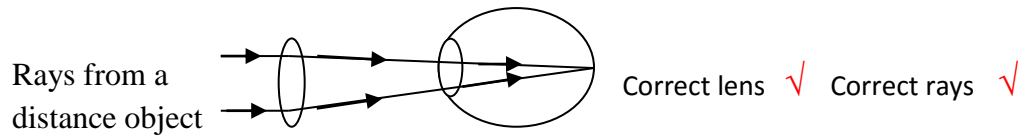
10. $F = 1/T$ ✓ $F = 0.0167 \text{ Hz}$ ✓

11. Carbon rod (or graphite) ✓

12. This due to an electric wind set up by the high concentration of charge at the sharp point. Air is ionized and like charges repel ✓

13. Due to electric wind ✓

14. (a) $\frac{0.6}{2} = 0.3$ ✓ $f = 20 - 0.3 = 19.7 \text{ cm}$ ✓ (b) (i) Long sightedness (hypermetropia) ✓
(ii)



(c)(i) at $\frac{1}{u}$ intercept, $\frac{1}{f} = \frac{1}{v} = 0.3$ ✓ $f = 3.33 \text{ m}$ ✓

(ii) $P = \frac{1}{f} = \frac{1}{3.33}$ ✓
 $= 0.30 \text{ D}$ ✓

(d) $m = \frac{v}{u} \Rightarrow v = 3u$ ✓ $f = \frac{uv}{u+v} = \frac{1200}{80}$ ✓
 $u + v = 80 \text{ cm}$ $= 15 \text{ cm}$ ✓

15. (a) Opposition offered by a conductor to the flow of electric current. ✓

(b) (i) $\frac{1}{R} = \frac{1}{6} + \frac{1}{3} = \frac{1+2}{6} = \frac{3}{6}$
 $R = 2 \Omega$ ✓

$R_{\text{total}} = 2 + 8 = 10 \Omega$ ✓

(ii) $I = \frac{V}{R} = \frac{4}{3} = 1.33 \text{ A}$ ✓

(iii) $I = \frac{4}{10} = 0.4$ ✓
 $V = IR = 0.4 \times 8 = 3.2 \text{ V}$ ✓

(c) $E = IR + 1r$

$E = 0.5 \times 2 + 0.5r$ (i) ✓

$E = 0.25 \times 5 + 0.25r$ (ii) ✓

$r = 1 \Omega$ ✓

16. (a) The leaf falls ✓¹; the sharp pin discharges the electroscope by concentration of charges at sharp points. ✓ (Charges concentrate at a sharp points causing discharge).

(b) (i) Series $\frac{1}{C_{S1}} = \frac{1}{C_1} + \frac{1}{C_2}$ $\frac{1}{C_{S2}} = \frac{1}{C_1} + \frac{1}{C_2}$
 $= \frac{1}{2} + \frac{1}{2}$ $= \frac{1}{3} + \frac{1}{3}$

$C_{S1} = 1 \mu\text{F}$; ✓ $C_{S2} = \frac{3}{2} \mu\text{F}$; ✓

Parallel $C_T = C_1 + C_2$
 $= 1 + 1.5 = 2.5 \mu\text{F}$ ✓

- (ii) $Q = CV$; \checkmark $= 2.5 \times 10^{-6} \text{F} \times 3.0 \text{V}$; \checkmark $= 7.5 \times 10^{-6} \text{C}$; \checkmark
- (iii) $W = \frac{1}{2} CV^2$ \checkmark $= \frac{1}{2} \times 7.5 \times 10^{-6} \mu\text{F} \times (3.0 \text{V})^2$ \checkmark $= 3.375 \times 10^{-5} \text{Joules}$. \checkmark
- c) Reducing the area of plates. \checkmark
OR Increasing the distance d (separation distance)

17. (a)(i) Dispersion of white light. \checkmark
- (ii) X – Red \checkmark
Y – Violet \checkmark
- (iii) Red has the lowest frequency / longest wavelength hence it is least deviated \checkmark while violet has the highest frequency / short wavelength hence it is most deviated. \checkmark
- (iv) Acts as a point source of light. \checkmark
- b)
$$n_g = \frac{\sin 90^\circ}{\sin 42^\circ} \checkmark$$

$$n_g = \frac{1}{0.669} \checkmark$$

$$= 1.494 \checkmark$$

18.

- (a) Soft iron \checkmark
- (b) The current flows through the solenoid and it is magnetized \checkmark and attracts the soft iron armature \checkmark
- (c) The magnetized core attracts the soft iron armature. The pivot armature pushes the springy metal strip \checkmark which joins contact B and A. \checkmark
- (d)
- (i) The core
It loses its magnetism; \checkmark
- (ii) Soft iron armature.
Soft iron goes back to its original position thus switching off the current.; \checkmark
- (e) Give **one** other application of an electromagnet. \checkmark
Electric bell, telephone receiver, moving coil loudspeaker and circuit breaker. \checkmark
- (f) State two ways in which an electromagnet could be made more powerful.
Using a soft iron core, increasing the current \checkmark and
Increasing the number of turns;; \checkmark