PHYSICS PAPER 2

ANSWERS

KCSE 2012

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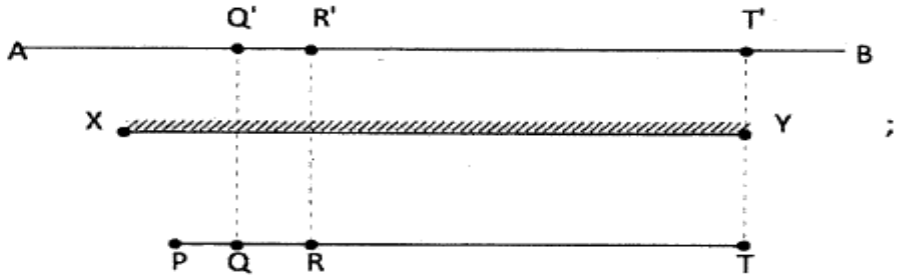
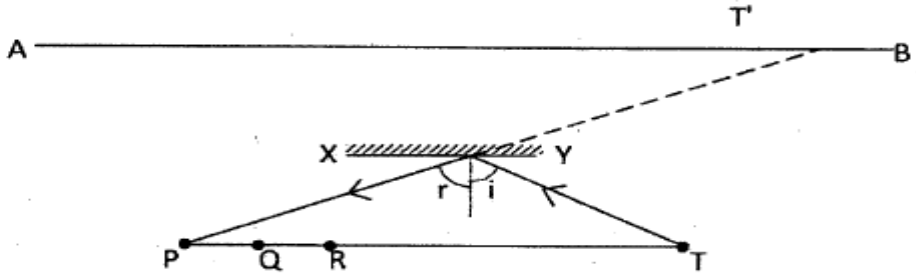
1. (a)



(1 mark)

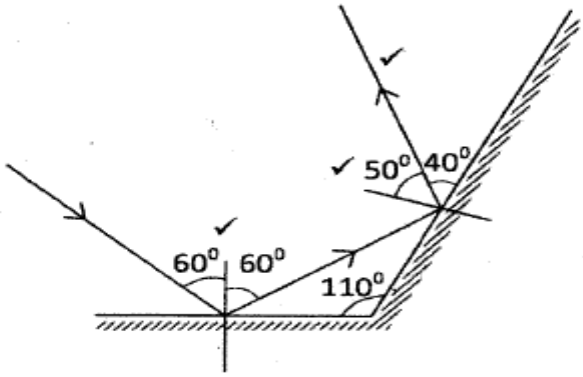
(b) T and R; (1 mark)

(c)



- Reflected ray from T and R moves towards P; (1 mark)

2.



✓- 1st reflection
✓- 2nd reflection
✓- 50⁰ (correct angle)

(3 marks)

3. $V + V + \frac{V}{2} = \frac{5V}{2}$

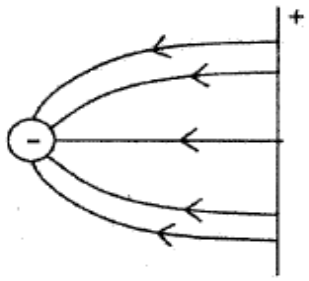
$\frac{5V}{2} = 15\ V\checkmark$

$V = 6V$

$\therefore\ \frac{V}{2} = \frac{6}{2} = 3V\checkmark$

(2 marks)

4.



Check correct direction of field lines. (2 marks)

5. Refractive index = $\frac{\text{real depth}}{\text{apparent depth}}$ √

$= \frac{40}{30}$ √

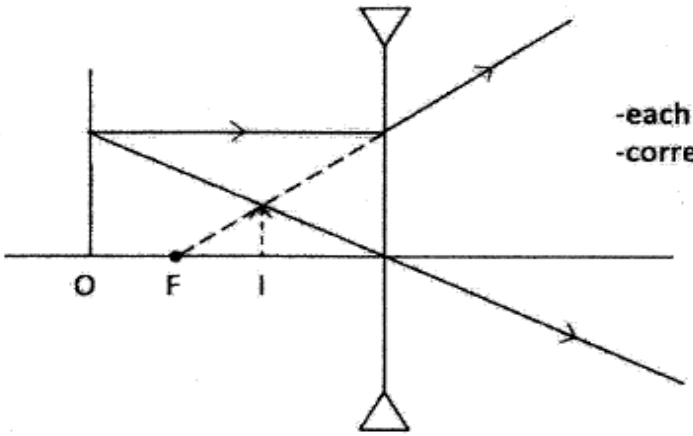
$= 1.33$ √ (3 marks)

6. β and γ rays; (1 mark)

7. L - south pole; (1 mark)

8. UV light ejects electrons by photo electric;
emission reducing the negative charges; (2 marks)

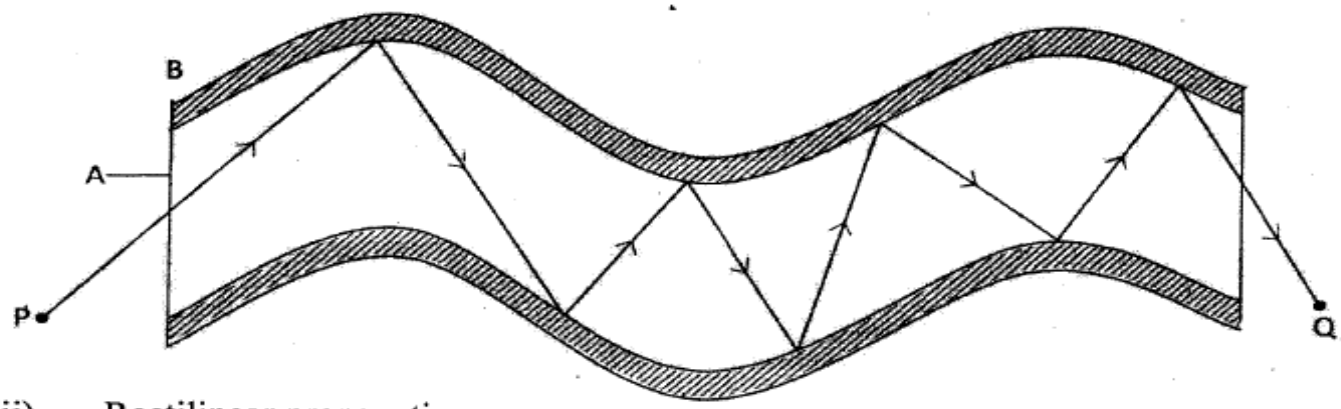
9.



-each array- ✓✓
-correct virtual diminished image ✓

(3 marks)

10. (i)



(ii) Rectilinear propagation.

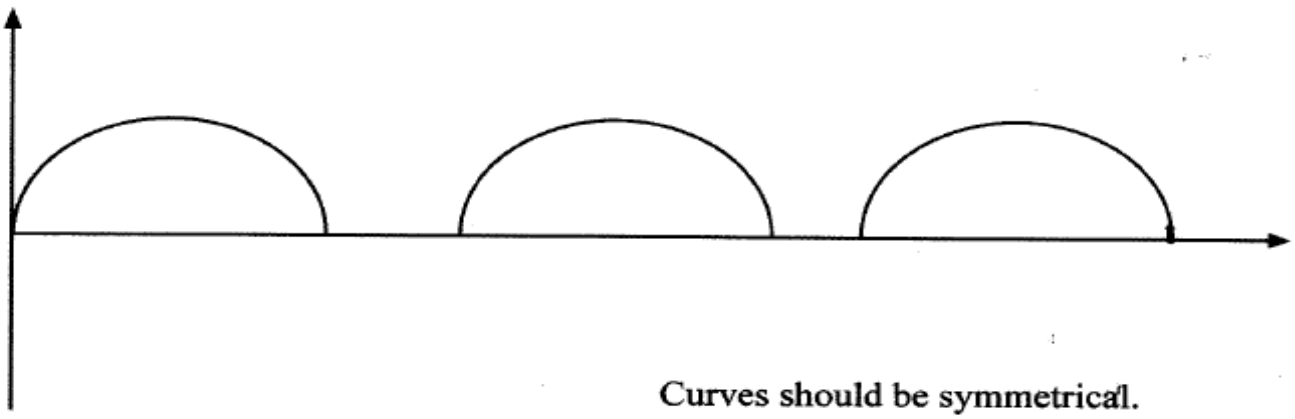
F; correct direction (1 mark)

11.

(1 mark)

12. Alternating current can be stepped up, or enhances reduced power losses; (1 mark)

13.



Curves should be symmetrical. (1 mark)

SECTION B

14. (a) (i) amplitude = 5 cm√ (1 mark)

(ii) T = 20s√

$f = \frac{1}{T}$√

$f = \frac{1}{20} = 0.05\ H_2$√ (4 marks)

(iii) $V = \lambda f$ √

$\lambda = \frac{20}{0.05}$ √

= 400 m √ (3 marks)

(b) (i) Waves at Q are in phase √ so there is constructive interference. √ (2 marks)

(ii) Waves are out of phase hence destructive interference. √ (1 mark)

(iii) Interference pattern would disappear. √ (1 mark)

15. (a) (i) $V = IR$√

$10I = 1.5$√

$I = 0.15A$ √ (3 marks)

(ii) bulb $= 0.1A$√

$R \times 0.1 = 1.5$√

$R = 15\Omega$√ (2 marks)

(b) (i) the resistance of the bulb would increase;

(ii) Current is higher hence increases; temperature increased temperature results in increased resistance; (2 marks)

(c) Number of units $= (0.1 \times 10 + 0.06 \times 10 + 0.03 \times 10)$

$= 1.9$ units;

Cost $= 1.9 \times 40 \times 7$;

= Ksh 5.32; (3 marks)

16. (a) (i) Pointer deflects upto a certain;maximum value and then returns to zero; (2 marks)

(ii) There is a deflection in the opposite direction then back to zero; As Flux in A falls, flux in B also falls and causes induced e.m.f in the opposite directions; (2 marks)

(b) (i) Current in the primary is constantly changing its direction;
so that the resulting flux (which link coils) is constantly changing its direction. Therefore alternating e.m.f is induced in the secondary coil;
(2 marks)

(ii) $\frac{Vs}{Vp} = \frac{Ns}{Np}$;

$\frac{Vs}{240} = \frac{200}{1000}$;

$Vs = 48V$; (3 marks)

(iii) Efficiency $= \frac{\text{Power output}}{\text{Power input}} \times 100\%$;

$= \frac{IsVs}{IpVp} \times 100\%$

$= \frac{0.8 \times 48}{0.2 \times 240} \times 100\%$;

$= 80\%$; (3 marks)

17. (a) (i) The image diminishes (becomes smaller); (1 mark)

(ii) $m = 1 \Longrightarrow \frac{V}{u} = 1$;

$V = u = 40$ cm; (2 marks)

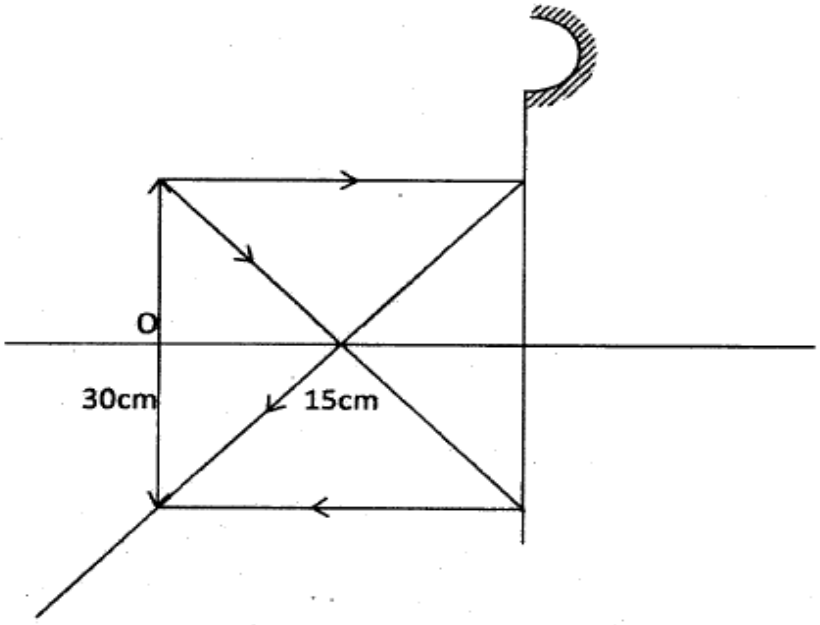
(iii) $u = 25$
$m = 4$;

$m = \frac{v}{u}$

$\frac{v}{25} = 4$;

$V = 100$ cm; (3 marks)

(b)



(3 marks)

(c) A bulb/lamp placed at principal focus will give a wide parallel beam; (1 mark)

18. (a) (i) To produce electrons; by thermionic emission; (2 marks)

(ii) To accelerate the electrons to give them enough K.E. to produce X-rays at the anode;; (2 marks)

(iii) To absorb stray X-rays, thus protecting the operator from those rays; (1 mark)

(b) Increases K.E. of electrons and hence causes X-rays of higher frequency; (1 mark)
OR
- X - ray are more penetrative
- X - rays of shorter wavelength.

(c) $E = hf$;
$= 6.63 \times 10^{-34} \times 7.5 \times 10^{14}$

$= 4.97 \times 10^{-19}$ J;

K.E $= 4.97 \times 10^{-19}$ 4.0×10^{-19};
$= 0.97 \times 10^{-19}$J; (4 marks)