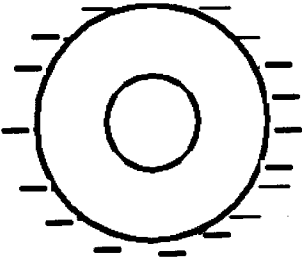
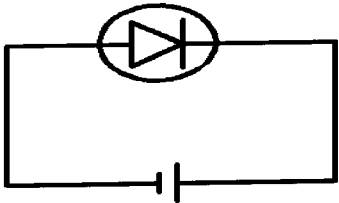
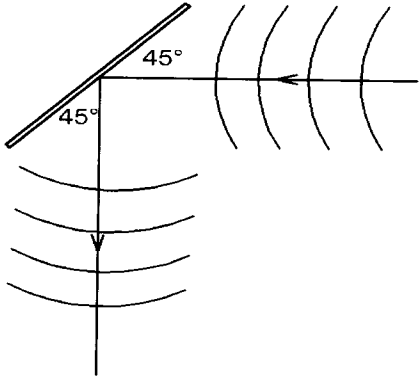
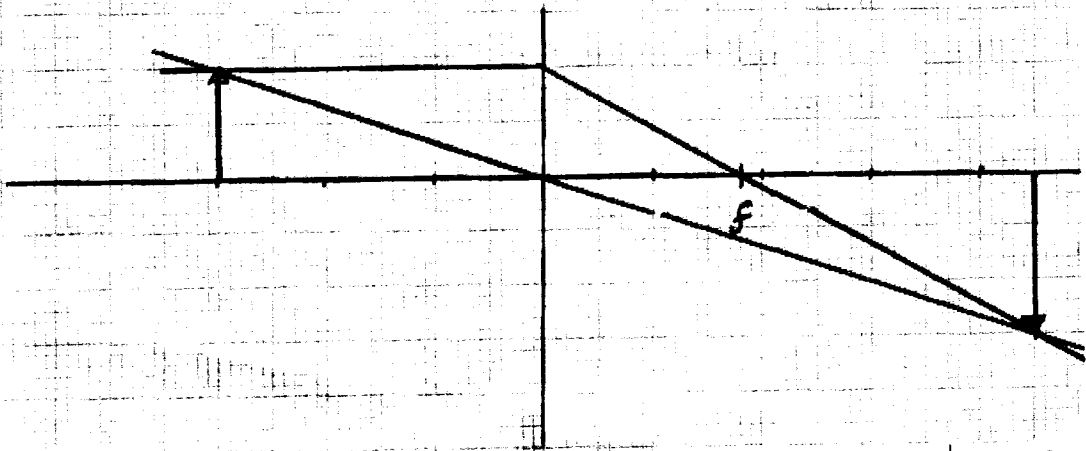


#### 4.6.2 Physics Paper 2 (232/2)

##### SECTION A: (25 marks)

1.	The image size increases ✓/ is magnified	(1 mark)
2.	a) Gold leaf ✓ b) Protect the surrounding of the metal rod and leaf from damage or drought ✓	(1 mark) (1 mark)
3.	– The e.m.f. across it's terminals ✓ – The relative density of the acid ✓	(2 marks)
4.	From the relation $v = \lambda f$ , the speed increases ✓ since the wavelength $\lambda$ increases but the frequency is constant because source is the same ✓	(2 marks)
5.	$\eta = \frac{1}{\sin c} \checkmark$ $= \frac{1}{\sin 42^\circ} \checkmark$ $= \frac{1}{0.669} \checkmark$ $= 1.495 \checkmark$	(3 marks)
6.	B ✓ The two cells in series provide ✓ a higher electromotive force/potential difference	(2 marks)
7.	 A diagram of a bar magnet represented by two concentric circles. The outer circle has short horizontal lines radiating outwards from its circumference, representing magnetic field lines.	(1 mark)
8.	There is greater ✓ magnetic force at the ends due to increased ✓ field lines at the ends of the bar magnet than at the center of the bar magnet	(2 marks)
9.	 A circuit diagram showing a rectangular loop. At the bottom is a battery symbol (two parallel lines of unequal length). At the top is a diode symbol (a circle with a triangle pointing right and a vertical line across it).	(2 marks)

10.	$f = \frac{3 \times 10^8}{\lambda} \checkmark$ $= \frac{3 \times 10^8}{800} \checkmark$ $= 0.00375 \times 10^8 \text{ Hz}$ $= 3.75 \times 10^5 \text{ Hz} \checkmark$	(3 marks)
11.	<ul style="list-style-type: none"> <li>– Electrons are produced by thermionic emission✓</li> <li>– The electrons are accelerated by a high voltage✓</li> <li>– Electrons are suddenly stopped to produce x- rays✓</li> </ul>	(2 marks)
12.	To disconnect the circuit when excess current flows. ✓	(1 mark)
13.	 <p>✓-curved correctly ✓-angle of reflection</p> <p><b>SECTION B: 55 MARKS</b></p>	(2 marks)
14.	<p>(a)</p> <ul style="list-style-type: none"> <li>– Stepping up the voltage</li> <li>– Use of good conductor cables</li> </ul>	(1 mark)
	<p>(b)</p> <p>The electric cooker has a power output of 2500W, and operates at a potential 250V, ie <math>P=VI</math></p>	(1 mark)
	<p>(c )</p> <p>Total power = <math>1500 + 2500 + 500 + (60 \times 3)</math>  <math>= 4680 \text{ W} \checkmark</math></p> <p>Total current required = <math>\frac{4680}{240} = 19.5 \text{ A} \checkmark</math>  Hence fuse blows and disconnects the current when it exceeds 10 A✓ ie  all appliances can't be connected at the same time. ✓</p>	(4 marks)

	<p>(ii) <math>V = IR \checkmark</math></p> $I = \frac{P}{v}$ $= \frac{2500}{240}$ $R = 240 \div \left( \frac{2500}{240} \right) \checkmark$ $= \frac{240 \times 240}{2500}$ $= 23.04 \Omega \checkmark$	3 marks
15	<p>a) – Using the mirror focus a distant object onto the screen</p> <p>– Adjust the distance between the screen &amp; the mirror to obtain a sharp image</p> <p>– Measure the distance between the screen &amp; the mirror – this is the focal length of the mirror</p>	1 mark
	<p>(b) <math>\frac{1}{f} = \frac{1}{u} + \frac{1}{v} \checkmark</math> <span style="margin-left: 100px;"><math>\frac{1}{f} = \frac{4-5}{40} \checkmark</math></span></p> <p><math>\frac{1}{v} = \frac{1}{10} - \frac{1}{8} \checkmark</math> <span style="margin-left: 100px;"><math>v = -40 \checkmark</math></span></p>	(3 marks)
	<p>(c)</p> <p>(i)</p> 	3 marks
	<p>(ii) I) image height = 15</p> <p>II) image distance = 45 cm</p>	<p>2 marks</p> <p>2 marks</p>

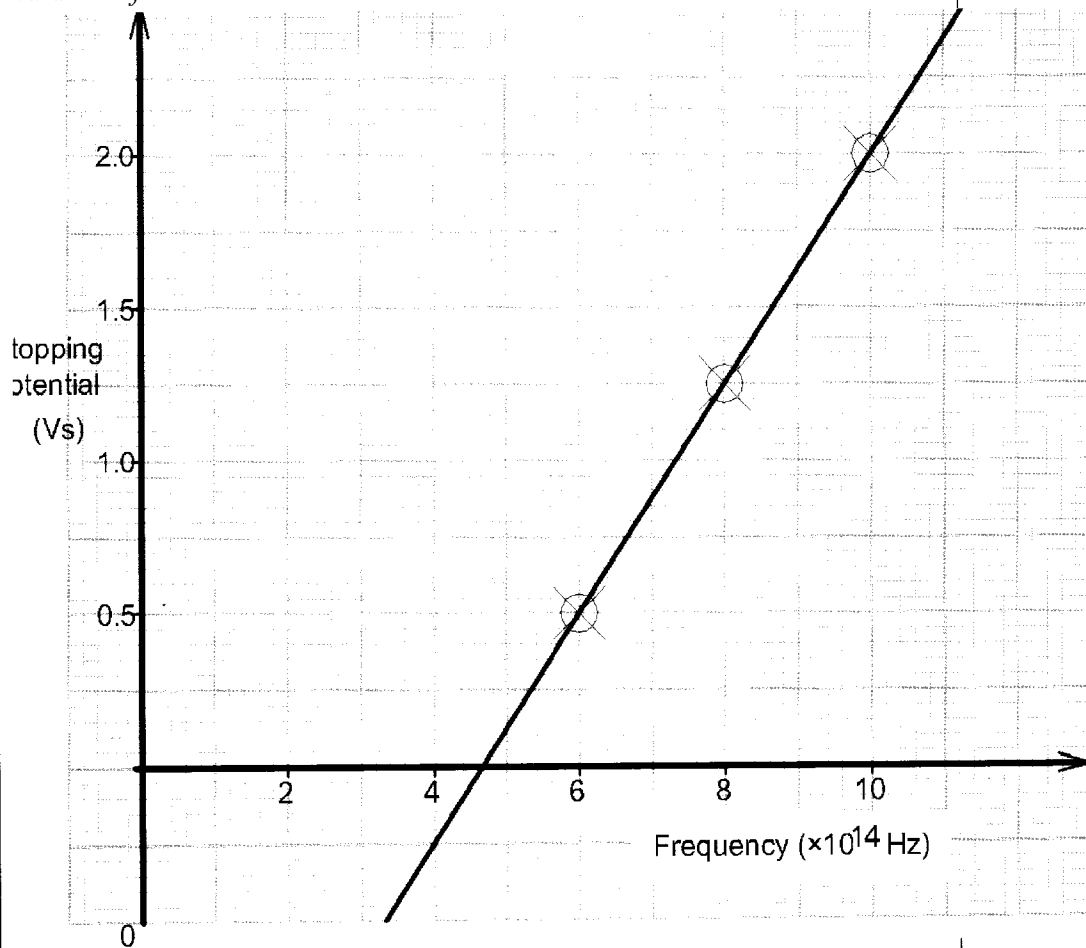
16	a) - Sterilization of surgical equipment✓ - Treatment of malignant growths✓	2 marks
	(b) $x = 4$ $y = 2$	2 marks
	(c) (i) <div data-bbox="349 515 868 840" data-label="Diagram"> <p>The diagram illustrates the deflection of three types of ionizing radiation by electric fields. A central source emits three rays. The top ray, labeled 'Beta', is deflected upwards towards a horizontal plate marked with a '+' sign. The middle ray, labeled 'γ Gamma', travels straight through without deflection. The bottom ray, labeled 'α Alpha', is deflected downwards towards a horizontal plate marked with a '-' sign.</p> </div>	3 marks
	(ii) (I) To shield the radiations from moving to the other directions ie direct them to one side✓ (II) To remove air particles & reduce collisions for clear vision of the effect of the field✓	1 mark 1 mark
	d (i) Gamma rays, X-rays, microwaves, radio waves	1 mark
	(ii) $64 \xrightarrow{24 \text{ day}} 32 \xrightarrow{48 \text{ day}} 16 \xrightarrow{72} 8 \checkmark$ → 3 half lives → 8g left ✓	2 marks
17	a) (i) <ul style="list-style-type: none"> <li>- The heating coil✓</li> <li>- Grid✓</li> <li>- The anodes✓</li> </ul> (ii) the cathode ray tube uses plates for deflection while a television tube uses coils✓	(3marks) 1 mark

b) (i)  $eV_s = hf - hf_0$  ✓

3marks

at  $V_s = 0$ ,  $hf = hf_0$  ✓

$f = f_0$  which is obtained by extrapolating the graph to obtain the value of  $f_0$  when  $V_s = 0 = 4.6$



(ii)  $V_s = \frac{hf}{e} - \frac{hf_0}{e}$

$$\frac{h}{e}(f - f_0)$$

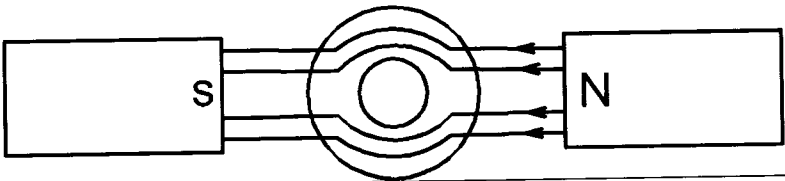
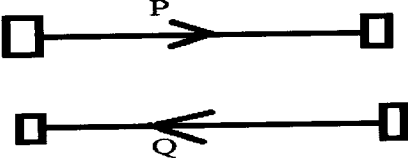
$$\therefore \frac{h}{e} = \text{gradient}$$

$$= \frac{1.25 - 0.5}{(8 - 6) \times 10^{14}} \text{ ✓ } = \frac{0.75}{2} \times 10^{-14}$$

$$= 0.375 \times 10^{-14} \quad \therefore h = 3.75 \times 10^{-15} \times 1.6 \times 10^{-19}$$

$$= 6.0 \times 10^{-34} \text{ Js}$$

( 3 marks)

	(iii) $W_o = hf_o \checkmark$ $= 6.0 \times 10^{-34} \times 4.3 \times 10^{14}$ $= 25.8 \times 10^{-24}$ $25.8 \times 10^{-23} J \checkmark$	(3 marks)
18	(a) 	(2 marks)
	b(i) 	(1 mark)
	(ii) the two conductors repel $\checkmark$	(1 mark)
	(iii) As the current flows a magnetic field develops around each conductor $\checkmark$ such that the direction of the fields such that the fields repel $\checkmark$ another pushing the conductors away from each other $\checkmark$	3 marks
	C (i) By laminating the core	(1 Mark)
	(ii) $\frac{N_s}{N_p} = \frac{V_p}{V_s}$ $\frac{N_s}{600} = \frac{24}{120}$ $N_s = 120 \text{ turns}$	(3 mark)