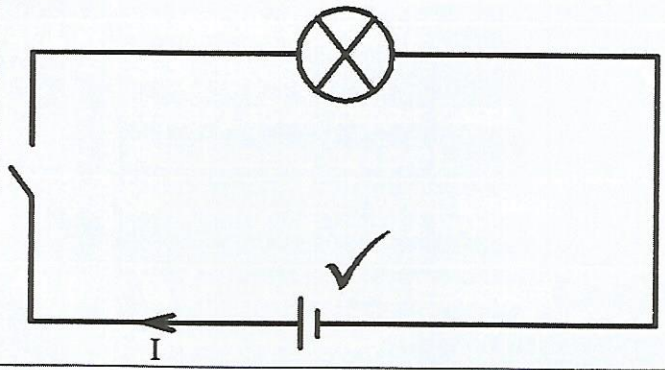
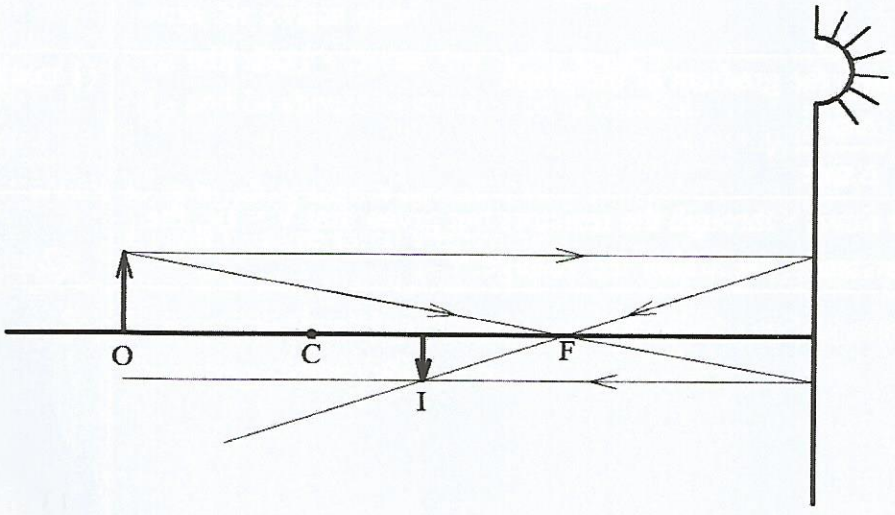
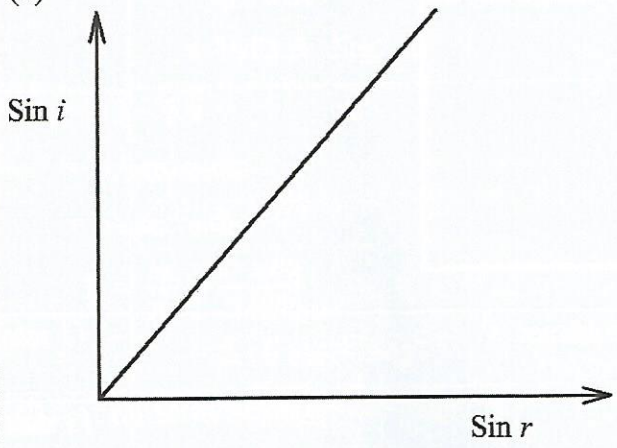
5.4.2 Physics Paper 2 (232/2)

SECTION A: (25 marks)

1.	The eye does not √ see the light since the holes are not √ in a straight line.	(2 marks)
2.	The cloth loses some electrons √ to the polythene rod gains electrons from the clothe.	(1 mark)
3.	– Crystal detectors - Aerial receiver – Solid state diodes - Radio receiver (*any one*)	(1 mark)
4.		(1 mark)
5.	Like poles repel while unlike poles attract. √	(1 mark)
6.		(3 marks)

7.	– Gives a stronger magnet (High concentration of magnetic flux). √ – Easily demagnetized/ magnetized. √	(2 marks)
8.	(a) Air pressure/ density is higher √ at sea level than on high mountain. (b) - The waves should have the same amplitude - The waves should be out of phase - Moving in opposite directions (*any one*)	(1 mark) (1 mark)
9.	$S = \frac{d}{t}$ √ $= \frac{2 \times 300}{1.8}$ √ $= 333.3\ m/s$ √	(3 marks)
10.	(a)  	(1 mark)
	(b) By obtaining the gradient of the graph $n = \frac{\Delta \sin i}{\Delta \sin r}$ √	(1 mark)
11.	Same current flows √ through the resistors but given that V = IR, the higher the resistance, the higher the voltage. √	(2 marks)
12.	$P = \frac{V^2}{R}$ √ $= \frac{240^2}{3000}$ √ $= 19.2\ \Omega$ √	(3 marks)
13.	– Upright √ – Virtual √ – Diminished – Always between lens and principal focus (*any two*)	(2 marks)

SECTION B: 55 Marks

14.	(a) The direction of the induced current is such that it opposes the change producing it. √	(1mark)
	(b) (i) Galvanometer deflects √ momentarily. (ii) There is no deflection √ (iii) Galvanometer deflects in the opposite direction. √	(1mark) (1mark) (1mark)
	(c) More deflection √ due to more induced current √ because of the higher rate of change of flux) √	(3 marks)
	(d) - Hysteresis √ - Eddy currents √ - Heating effect/ copper losses - Flux leakage (*any two*)	(2 marks)
15.	(a) Supplies current √ to the sockets.	(1 mark)
	(b) (i) - S_1 is connected √ to the neutral - S_3 is not necessary √ - L_2 and L_3 are in series (ii) - Switch S_1 should be √ in live wire (Lamp is still live even with the switch open) - S_3 will short √ circuit the mains supply. - L_2 and L_3 should be connected in parallel. (iii) L_1 is brighter than √ L_2 and L_3 L_2 and L_3 have same √ brightness (iv) L_1 is on full √ voltage from the mains while L_2 and L_3 share the voltage from √ the mains.	(2 marks) (2 marks) (2 marks) (2 marks)

16.	(a) (i) - UV dislodges electrons from plate B √. - Electrons are attracted to plate A connected √ to the positive terminal of the cell. - This causes the current to flow hence √ deflection (ii) - Galvanometer √ deflects more since more electrons are dislodged from plate B hence √ more current flows.	(3 marks) (2 marks)
	(b) (i) - Increasing the √ heater current this increases the production √ of electrons hence more x-rays. (ii) (I) $\lambda = 1 \times 2 = 2$ cm √ (II) $f = \frac{1}{T} = \frac{1}{(8.5 \times 10^{-3} \times 2)}$ √ $= 58.82$ Hz √ (iii) (I) Grid: - Controls the √ number of electrons reaching the screen. - Controls brightness of the spot on the screen. (II) Filament: - Heats the √ cathode to produce electrons.	(2 marks) (1mark) (3 marks) (1 mark) (1mark)
17.	(a) - Burning of skin √ - Causes of cancer (*any one*)	(1 mark)
	(b) (i) Half life is 4.5 s (ii) 3 half lives (*show working on graph*)	(1mark) (2 marks)
	(c) (i) Improves the conductivity of the semi conductor (ii) Doping an intrinsic √ semiconductor with atoms of group V elements, four electrons will bond with the four √ electrons of intrinsic semiconductor. The remaining √ electron is donated for conduction. (iii) - Both G_1 and G_2 √ deflect but G_2 has a greater deflection than G_1 √ - D_2 is reverse biased while D_1 is forward √ biased hence conducts some of the main current √ but G_2 carries the total current.	(1mark) (3 marks) (4 marks)

18.	(a) - Resistance √ decreases with increase in the applied voltage because the size of the depletion layer reduces √ allowing more current to flow.	(2 marks)
	(b) (i) - Initially the lamp does not light √ but when bright light falls on the LDR, the lamp lights.√ - When light falls on LDR, its resistance decreases hence current flows causing √ the lamp to light.	(3 marks)
	(ii) $R_T = 1000 + 500 = 2500\,\Omega$ √ $I_T = \frac{V_T}{R_T} = \frac{12}{2500} = 4.8\times10^{-3}\,A$ √ $V = IR$ $= 1500 \times 4.8 \times 10^{-3}$ $= 7.2\,V$ √	(3 marks)
	(c) Smoothens the output signal √	(1 mark)
	(d) $Q = CV$ √ $= \frac{10\times2.5}{10+2.5}\times12$ √ $= 24\ \mu C$ √	(3 marks)