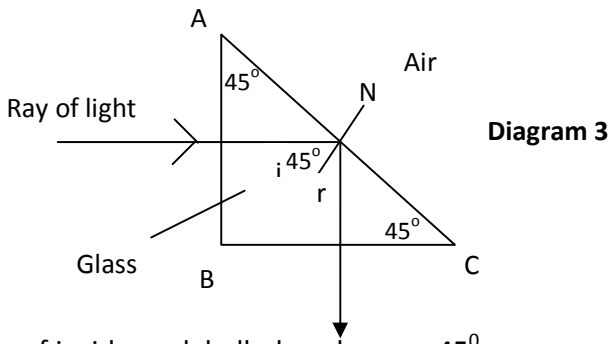
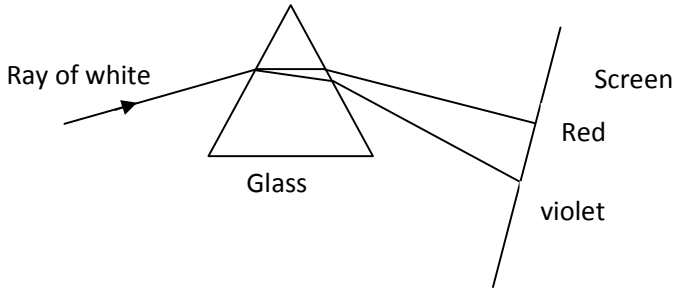
Marking scheme : Sample SEC papers: Paper 2B

		Answer	Mark
1.	(a)	← (from 20^0 to 12^0)	1 mark
	(b) (i)	air is a bad conductor of heat	1 mark
	(ii)	No, convection cannot take place	1 mark
		The polymer foam traps the air and does not allow it to flow (hot air upwards, cold air downwards)	1 mark
	(iii)	Radiation conduction	1 mark 1 mark
	(iv)	The insulation will keep the heat from entering the room from outside The room will be kept cool in summer	1 mark 1 mark
	(c) (i)	Thermometer A	1 mark
	(ii)	Matt black surface	1 mark
	(iii)	So that it give off heat quickly As black makes the engine a better emitter of heat	1 mark 1 mark
	(iv)	White is a bad absorber of heat / good reflector of heat And so heat absorbed from roof by radiation is slow	1 mark 1 mark
	(v)	Large roofs are painted silver Back of fridges is painted black to make loss of heat/cooling faster Any other plausible suggestion	1 mark 1 mark
	(d) (i)	0.6kg	1 mark
	(ii)	$45 - 20 = 25^0$C	1 mark
	(iii)	$Q = m\ c\ \Delta\theta = 0.6 \times 800 \times 25$ (correct eqn. & values) = 12,000J (correct answer)	1 mark 1 mark
			20 marks
2.			
	(a) (i)	 **Diagram 3** Angle of incidence labelled as shown = 45^0	1 mark
	(ii)	Ray is incident on face BC perpendicularly and passes through BC undeviated (continues straight on as shown in diagram)	1 mark
	(iii)	Angle of incidence r^0 as shown in diagram above	1 mark
	(iv)	Angle of reflection is 45^0 Since 45^0 is greater than the critical angle (42^0) total internal	1 mark 1 mark

		reflection takes place	
	(v)	Reflection Larger/greater Medium Energy communications	1 mark 1 mark 1 mark 1 mark 1 mark
	(vi)	Yes Because due to total internal reflection, light can travel round bends	1 mark 1 mark
	(vii)	It does not use electricity and thus is environmentally friendly/does not pollute. (Any other plausible advantage)	1 mark
	(viii)	$V = f\lambda$ $f = 5 \times 10^{8}/5.05 \times 10^{-7}$ $f = 5.95 \times 10^{14}$Hz (correct value)	 1 mark 1 mark
	(b)(i)	 red and violet at each end as indicated	1 mark 1 mark
	(ii)	Dispersion	1 mark
	(iii)	When white light passes through water droplets, the light is refracted With refraction the different colours are separated and the rainbow is obtained	1 mark 1 mark
			20 marks
3.			
	(a) (i)	Conductors insulators	1 mark 1 mark
	(ii)	Earth	1 mark
	(iii)	Wire A – neutral Wire B – Earth Wire C – Live	1 mark 1 mark 1 mark
	(b) (i)	The Earth wire It is missing because the plastic casing provides enough protection from shock.	1 mark 1 mark
	(ii)	1kwhr = 3,600,000J Energy used by radio = Pt = 100 x 6 x 60 x 60 (hrs converted into seconds) = 2,160,000J No. of kWhr = 2,160,000/3,600,000 = 0.6 kWhr	 1 mark 1 mark 1 mark
	(iii)	1 Kw hr = 15c	

		0.6kWhr = 15 x 0.6 = 9c (correct answer)	1 mark 1 mark
	(c) (i)	Transformer	1 mark
	(ii)	P = VI, I = P/V = 48/12 = 4A (correct answer)	1 mark 1 mark
	(iii)	5A	1 mark
	(iv)	When the current is high, the fuse melts and cuts off the current to the circuit.	1 mark
	(v)	A thicker wire has a low resistance and will take longer to melt and will melt at a greater current.	1 mark 1 mark
			20 marks
4.			
	(a) (i)	The electromagnet will attract only the iron bolts. Bolts will be picked up while the aluminium nuts are left behind.	1 mark 1 mark
	(ii)	ammeter solenoid iron core rheostat battery	1 mark 1 mark 1 mark 1 mark 1 mark
	(b) (i)	The value of the rheostat is varied. The current in the circuit is noted. The number of items attracted is noted for the different current values.	1 mark 1 mark 1 mark
	(ii)	Repeated observations Care is taken that the items are always placed at the same distance from the solenoid. (one mark for any plausible precaution put forward)	1 mark 1 mark
	(c) (i)	Field Lines Solenoid current	1 mark 1 mark 1 mark 1 mark
	(ii)	Use stronger magnets Make solenoid with more turns OR Move solenoid closer to the turbine	1 mark 1 mark
	(iii)	1.5 litres/s produce 5mA 7.5 litres/s produce ? = 5 X 7.5/1.5 = 25 mA (correct value)	 1 mark 1 mark
			20 marks
5.			
	(a) (i)	24 hours	1 mark
	(ii)	365 days	1 mark
	(iii)	Mercury Because it is closest to the sun / goes fastest around the sun	1 mark 1 mark

	(iv)	There is a gravitational force of attraction between any two masses (planets and sun) Since the sun is much larger and heavier than planets, the planets orbit round sun rather than the other way round.	1 mark 1 mark
	(v)	Pluto is no more a planer because it does not dominate its neighbourhood	1 mark
	(vi)	Milky Way Galaxy	1 mark
	(b) (i)	Moons	1 mark
	(ii)	Gravitational force	1 mark
	(iii)	Colder Jupiter is much further away from the Sun than Earth	1 mark 1 mark
	(c) (i)	A galaxy consists of a number of solar systems grouped together	1 mark
	(ii)	They enable scientists is see far away objects clearer/larger than their eyes can	1 mark
	(iii)	Yes They both use waves from the electromagnetic spectrum (light and radio waves)	1 mark 1 mark
	(iv)	Photos are clearer as they are not effected by the atmosphere.	1 mark
	(d) (i)	Yes This means that Jupiter is very far away from Earth	1 mark 1 mark
	(ii)	It is the distance that light can travel in one year.	1 mark