Effeciency and Reducing Unwanted Energy Sources 1 MS

QUESTION 1

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	any one from: • coal • oil • (natural) gas	do not accept fossil fuels accept diesel accept biofuel or a named biofuel eg wood / straw accept household / industrial waste owtte	1
a)ii)	0.3	accept 30% if 2 marks not awarded then: allow 1 mark for 30 (without %) allow 1 mark for 0.3 with a unit or % allow 1 mark for identification of energy input and output eg. 20 sq input and 6 sq output or 4 sq input and 1.2 sq output or 40 sq input and 12 sq output even if subsequent working incorrect allow 1 mark for correct expression of 1.2 over 4 or 12 over 40 or 6 over 20 (squares)	2
a)iii)	Nuclear fission	accept fision provided it is not fusion	1
b)i)	small proportion of energy / power is wasted or transfers most / more / a lot of energy power usefully	accept little / less energy / power / heat is wasted do not accept it wastes no energy / power	1
b)ii)	it decreases the current / uses low current or it increases the voltage / potential	 accept pd for potential difference	1

	difference or uses high voltage / potential difference smaller the current the smaller the energy loss	accept power / heat for energy	1
c)i)	as a control	accept to make a comparison do not accept fair test on its own	1
c)ii)	so people know how much data the link was based on or people can judge the significance / reliability of the link	accept idea that larger numbers are better do not accept significance / reliability on its own ignore reference to accuracy	1
c)iii)	other possible factors may be responsible or have not been investigated named factor eg environment / genetic		1 1
c)iv)	first box ticked plus reason or second box plus reason	acceptable reason such as so people know there may be a risk as soon as possible / so that other scientists can use findings acceptable reason such as no point to worry / confuse / panic people (until the research has been confirmed) accept idea that it may lead to wrong	1
Total marks			12

QUESTION 2

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	light electrical	correct order only	1 1
b)i)	0.2 or	accept 20 % for both marks allow 1 mark for correct substitution	2

	1/5	answer of 0.2 % or 20 gains 1 mark ignore units	
b)ii)	wasted	accept transformed to heat / other forms accept transferred to the air / surroundings sound = neutral	1
Total marks			5

QUESTION 3

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	0.75	allow 1 mark for correct transformation and substitution ie 0.15 × 5	1
a)ii)	2	accept 1.5 ÷ their (a)(i) correctly calculated	1
b)	any one from: • seasonal changes • cloud cover	accept specific changes in conditions eg shorter hours of daylight in winter accept idea of change must be stated or unambiguously implied eg demand for water will not (always) match supply of solar energy do not accept figures are average on its own do not accept solar panels are in the shade	2
Total marks			4

QUESTION 4

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	light (energy)	this answer only	1
a)ii)	raises its temperature	accept warms / heats it accept air molecules / particles	1

		gain energy / move faster do not accept heat do not accept pollution	
a)iii)	20 % or 0.2	efficiency = useful energy out (100%)/total energy in allow 1 mark for correct substitution ie 4/20 provided that no subsequent step is shown 20 without % scores 1 mark, 20 or 0.2 with a unit scores 1 mark	2
a)iv)	mercury can be recovered / reused / recycled or mercury (vapour) does not get into the atmosphere / environment / air	accept to stop mercury poisoning the land / getting into the food chain / water supply accept poisonous gas for mercury (vapour) do not accept general poisoning cause harm to the environment is insufficient	1
b)	A smaller		1
Total marks			6

QUESTION 5

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	1.6 (W)	efficiency = useful power out*(100%) total power in allow 1 mark for correct substitution ie 0.2 / 20 = output 100 8	2
a)ii)	32 (%) / 0.32	efficiency = useful power out (100%)	1

	or their (a)(i) ÷ 5 correctly calculated	total power in ignore any units	
b)	two output arrows narrower arrow labelled light or useful (energy / output / power) and wider arrow labelled waste (energy / output / power)	one arrow should be wider - judged by eye only scores if first mark awarded accept heat ignore numerical values	1 1
c)i)	any two from: comparison over same period of time of relative numbers of bulbs required eg over 50 000 hours 5 CFL's required to 1 LED link number of bulbs to cost eg 5 CFL's cheaper than 1 LED over the same period of time LEDs cost less to operate (than CFLs)	accept an LED lasts 5 times longer an answer in terms of over a period of 50 000 hours CFLs cost £15.50 (to buy), LED costs £29.85 (to buy) so CFLs are cheaper scores both marks an answer in terms of the cost per hour (of lifetime) being cheaper for CFL scores 1 mark if then correctly calculated scores both marks	2
c)ii)	any one from: price of LED bulbs will drop less electricity needs to be generated less CO2 produced fewer chips needed (for each LED bulb) fewer bulbs required (for same brightness / light) less energy wasted	do not accept they become cheaper accept we will use less electricity do not accept electricity for energy	1 1
Total marks			8