Energy Sources and their Trends in Uses MS 2

QUESTION 1

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	solar and wind	both required for mark either order	1
a)ii)	37%	accept their two sources in a(i) correctly added as an error carried forward (ecf)	1
b)	A		1
c)	gas is non-renewable	do not accept they are not all renewable statements such as gas produces CO2 is neutral	1
Total marks			4

QUESTION 2

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	correct data point identified (4, 0.96)		1
a)ii)	a decrease in		1
b)i)	no / less atmospheric pollution	accept specific examples eg no CO2 / greenhouse gases produced accept no harmful gases / fumes accept reduced pollution from transportation (of coal) accept does not contribute to global warming it / they refers to solar cells do not accept no / less pollution does not harm the environment is insufficient it is a renewable energy source is insufficient	1
b)ii)	increase		1
b)iii)	less / no electricity generated (because) lower light intensity	these marks can score even if (b)(iii) is wrong	1 1

	(hitting solar panel / cell) or so decreases money paid / gained (from selling electricity)	 accept energy for electricity accept reduced power / voltage output allow less light / sun (hitting solar panel / cell)	
Total marks			7

QUESTION 3

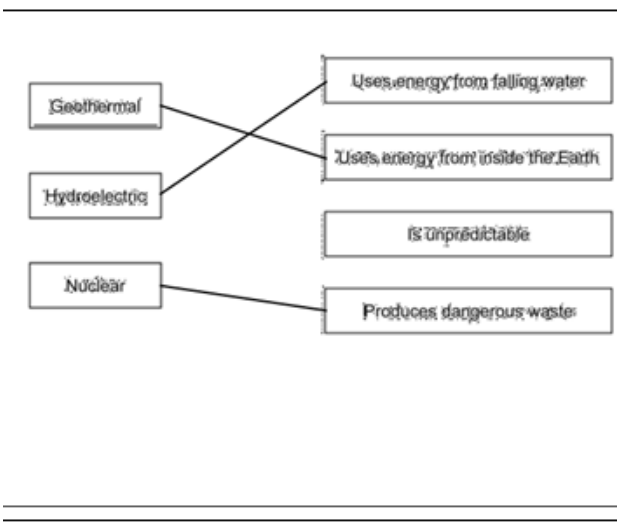
QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	concentrated source of energy that is able to generate continuously the energy from (nuclear) fission is used to heat water to steam to turn turbine linked to a generator	answers must be in terms of nuclear fuels idea of a small mass of fuel able to generate a lot of electricity accept it is reliable or can control / increase / decrease electricity generation idea of available all of the time / not dependent on the weather ignore reference to pollutant gases	1 1 1 1
b)	carbon dioxide is not released (into the atmosphere) but is (caught and) stored (in huge natural containers)		1 1
Total marks			6

QUESTION 4

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	any one from: produces no (air / atmospheric) pollution energy (source) is free	accept named pollutant eg CO2 accept no harmful gases accept produces no emissions accept does not add to global warming	1

		environmentally friendly is insufficient accept no fuel costs accept the wind / it is free	
a)ii)	any one from: waves tides falling water solar geothermal biofuel / biomass	accept hydroelectric do not accept water (flow) accept Sun / sunlight accept solar panels / cells accept a named biofuel	1
b)i)	3000 (kilowatts)	accept 3 megawatts / MW 3000 000 watts / W	1
b)ii)	(average) wind speed below 6 m/s	answers giving a wind speed greater than 3 but less than 6 m/s gain both marks allow 1 mark for calculating the output as 500 kW (maximum) and allow 1 mark for wind speed too low or wind not strong enough do not accept wind above 25 m/s do not accept the turbines are frozen	2
b)iii)	A small amount of nuclear fuel generates a large amount of electricity. Nuclear power stations do not depend on the weather to generate electricity.	both required	1
Total marks			6

QUESTION 5

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
		allow **1** mark for each correct line if more than one line goes from an energy source then all lines from that energy source are wrong	3
Total marks			3

QUESTION 6

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	any three from: •gas can be switched on (and off) quickly but nuclear cannot • gas can be used to meet surges in demand • gas can contribute to / meet the base load • nuclear provides base load Or nuclear is used to generate all of the time	gas has a short start-up time alone is insufficient accept specific times from graph, anything from 1700 to 2200	3

b)

0 marks	Level 1 (1-2 marks)	Level 2 (3-4 marks)	Level 3 (5-6 marks)
No relevant content.	There is a brief description of one advantage **or** disadvantage of using either biogas or wind **or** makes a conclusion with a reason.	There is a description of some advantages **and / or** disadvantages for biogas **and / or** wind **or** there is a direct comparison between the two systems **and** at least one advantage / disadvantage **or** a detailed evaluation of one system only with a conclusion.	There is a clear and detailed comparison of the two systems. There must be a clear conclusion of which system would be best with at least one comparative reason given for the choice made.

examples of the points made in the response	accept works all of the time accept once only when waste burns it produces carbon dioxide is insufficient
Biogas	
•renewable	
•energy resource is free	
•reliable energy source	accept once only
•does not depend on the weather	accept pollutant gases for carbon dioxide accept does not pollute air
•uses up (animal) waste products	produces visual or noise pollution is insufficient
•concentrated energy source	harmful gases is insufficient
•cheaper (to buy and install)	
•shorter payback-time (than wind)	
•adds carbon dioxide to the atmosphere	
•contributes to the greenhouse effect or contributes to global warming	
•no transport cost for fuels	
Wind turbine	

	•renewable •energy resource is free •not reliable •depends on the weather / wind •will be times when not enough electricity generated for the farm's needs •dilute energy source •longer payback-time (than biogas) •more expensive (to buy and install) •does not produce any carbon dioxide		
Total marks			9

QUESTION 7

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	any one from: • energy / source is constant • energy / source does not rely on uncontrollable factors • can generate all of the time	accept a specific example, eg the weather will not run out is insufficient	1
b)	(dismantle and) remove radioactive waste / materials / fuel	accept nuclear for radioactive knock down / shut down is insufficient	1
c)	any two from: • reduce use of fossil fuelled power stations • use more nuclear power • use (more) renewable energy sources • make power stations more efficient • (use) carbon capture (technology)	accept specific fossil fuel accept use less fossil fuel accept build new nuclear power stations accept a named renewable energy source do not accept natural for renewable do not accept use less non-	2

		renewable (energy) sources	
d)	(by increasing the voltage) the current is reduced this reduces the energy / power loss (from the cable) and this increases the efficiency (of transmission)	accept reduces amount of waste energy accept heat for energy do not accept stops energy loss	1 1 1
Total marks			7