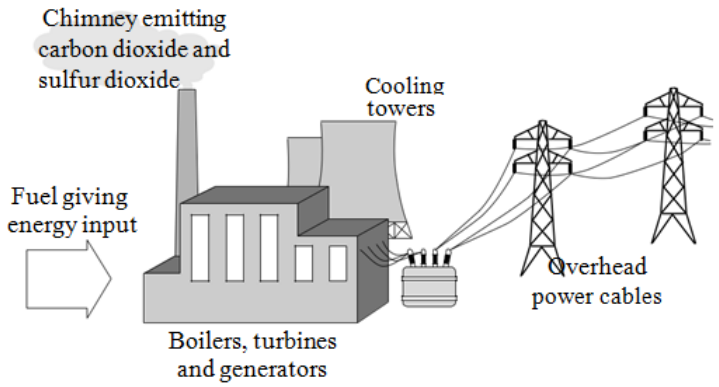
Energy Sources and the trends in their Uses 1 MCQS

Q:1 The diagram shows a power station.



A)What type of power station is this?

1)coal-burning

2)gas-burning

3)geothermal

4)nuclear

B)Which part transforms kinetic energy into electrical energy?

1)boiler

2)cooling tower

3)generator

4)turbine

C)After steam has passed through the turbines, it is passed upwards through the cooling towers.

Here, the steam condenses to form water vapour.

What types of pollution are caused by the cooling towers?

1)chemical and noise

2)noise and thermal

3)thermal and visual

4)visual and chemical

D) A fossil-fuel power station is going to be built in a part of the country that does not have a power station.

Which one of the following is not an advantage to the local economy?

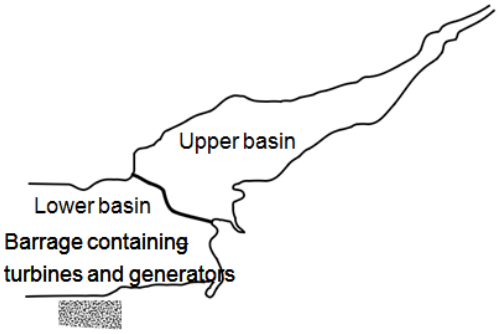
1)Carbon dioxide from the power station can be used in local commercial greenhouses.

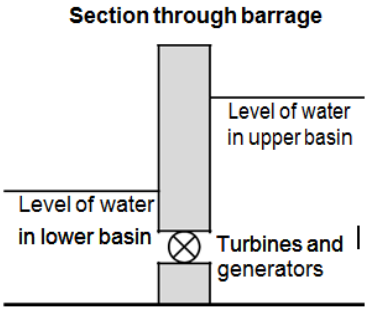
2)More jobs will be created.

3)The power station will be connected to the National Grid.

4)Waste heat can be used in nearby buildings.

Q:2 The diagram shows a tidal barrage used to generate electricity. Before the barrage was built, the mudflats on the estuary were repeatedly covered with sea water as the tide came in and went out again.





A) As water moves from the lower basin into the upper basin, it gains mainly . . .

1)electrical energy.

2)gravitational potential energy.

3)sound energy.

4)thermal energy.

B) Which is the main energy transformation as water flows from the upper basin through the turbine?

1)electrical energy to gravitational potential energy

2)electrical energy to kinetic energy

3)gravitational potential energy to kinetic energy

4)kinetic energy to gravitational potential energy

C) Compared with a coal-fired power station with a similar generating capacity, a tidal barrage usually . . .

1)costs more to build.

2)has a more concentrated energy supply.

3)has higher fuel costs.

4)has a more constant energy output.

D) One disadvantage of this tidal barrage is that . . .

1)it cannot be used in summer.

2)it has high decommissioning costs.

3)its output depends on the weather.

4)large areas forming habitats for wildlife will be lost.

Q:3 An electricity company plans to build a new power station and it is in the process of consulting local people.

The decisions are not straightforward because various points need to be considered.

A Every type of energy source for a power station is unreliable in some circumstances.

Which energy source is unreliable on a day-to-day basis?

1)coal

2)oil

3)uranium

4)wind

B Every type of power station makes some contribution to global warming.

Which type of power station makes the least contribution?

1) a coal-fired power station

2)a gas-fired power station

3) a nuclear power station

4) an oil-fired power station

C Every type of power station changes the local environment in some way. Which type of power station involves the damming of an upland river valley?

1) a geothermal power station

2)a hydroelectric power station

3)a tidal barrage

4)a wind farm

D Which type of power station can also be used to store energy from surplus electricity?

1) a coal-fired power station

2)a gas-fired power station

3) a hydroelectric power station

4)a nuclear power station

Q:4 This statement was made during a recent television news programme.

Environmentalists expressed concern today about possible increases in acid rain if the Government goes ahead with its plans for more power stations.

"If the world needs more power stations, they should be wind farms, tidal barrages or geothermal," a spokesperson said.

A The gas mainly responsible for producing acid rain is . . .

1) natural gas.

2)nitrogen.

3)oxygen.

4) Sulfur dioxide.

B The source of energy for geothermal power stations is . . .

1)combustion.

2)decay of radioactive elements.

3)movement of air.

4)movement of water.

C Which is the main advantage of a tidal barrage over a wind farm?

1)More power is produced at times of high demand.

2)More power is produced in winter than in summer.

3)There are no environmental impacts.

4)The outputs for each day can be predicted.

D 700 000 kilowatts of power are produced when 100 tonnes of coal are burned in one hour. How quickly must the coal be burned to produce 7 000 000 kilowatts?

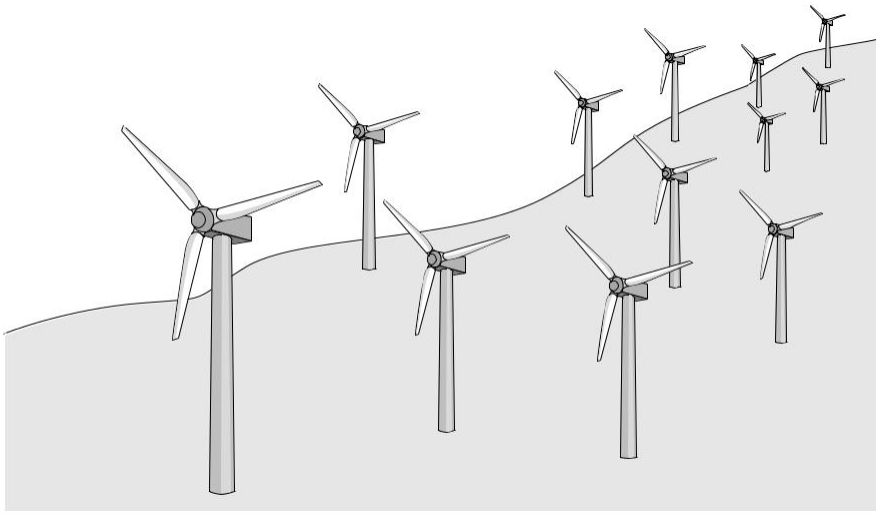
1)10 tonnes/hour

2)70 tonnes/hour

3)100 tonnes/hour

4)1000 tonnes/hour

Q:5 The drawing shows part of a wind farm which will supply electricity to a small town.



A Which type of energy is transformed from the wind to generate electricity?

1)elastic potential

2)gravitational potential

3)kinetic

4)sound

B Where would you least expect to find a wind farm?

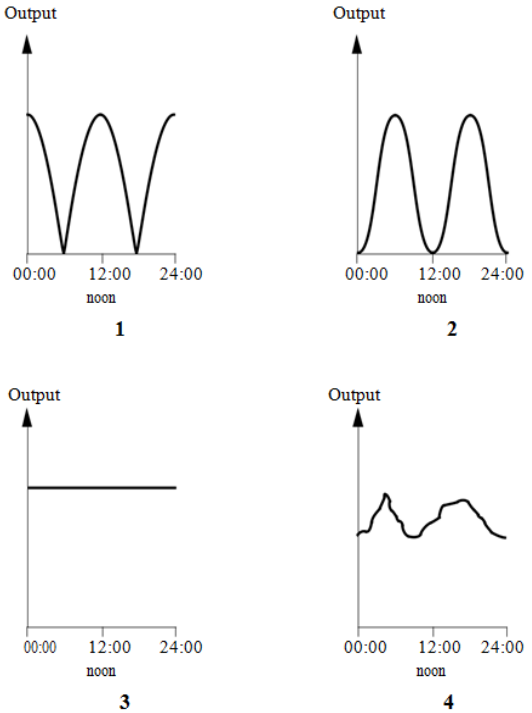
1)in a town

2)offshore – out at sea

3)on a coastal cliff

4)on the top of a hill

C Which graph is most likely to show the output from a wind farm over one day?



D There are 10 000 homes in the town. The average electrical power input into each home is

0.5 kW. The average useful power output of the wind farm is 5 MW.

Why is this insufficient to meet the needs of the town?

1)0.5 kW × 10 000 is more than 5 MW.

2)5 MW is less than 0.5 kW × 10 000.

3)Supply and demand will often not coincide.

4)The wind farm wastes energy because it is noisy.

Q:6 This question is about the changes in the sources of energy used to generate electricity in the UK between 1960 and 2000.

The table gives information on the percentage of electrical energy produced from various energy sources.

Year	Coal %	Oil %	Natural gas %	Nuclear %	Hydroelectric power %	Other renewable %
1960	74.0	25.4	0	0	0.6	0
1980	36.7	37.0	21.6	4.1	0.6	0
2000	17.2	37.7	33.7	10.5	0.2	0.7

A In 2000, what was the total percentage of energy produced by sources that did not put carbon dioxide into the atmosphere?

1)0.8

2)10.5

3)11.2

4)11.4

B Which statement about the percentage of energy produced from coal is correct?

1)The percentage has gone down by about 30 % every 20 years.

2)The percentage has remained steady throughout that period.

3)The percentage was approximately halved every 20 years.

4)The percentage is now about half of what it was in 1960.

C The Government may decide to increase the percentage of electricity supplied by nuclear power stations.

Which one of the following is a valid argument against the use of nuclear power stations?

1)For maximum efficiency, they have to be in almost constant use.

2)They have high decommissioning costs.

3)They have high fuel costs.

4)They produce gases that pollute the atmosphere.

D A policy for the future that would result in the smallest contribution to possible global warming is one that made more use of . . .

1)coal, oil and natural gas.

2)oil, natural gas and nuclear energy.

3)natural gas, nuclear energy and hydroelectric power.

4)nuclear energy, hydroelectric power and other renewables.

Q:7 This question is about energy sources.

A Look at this list of energy sources for power stations.

Biomass Coal Falling water (hydroelectric) Nuclear

Hydroelectric is the odd one out because it is . . .

1)the only renewable energy source.

2)the only non-renewable energy source.

3)the only energy source that is not used to produce steam.

4)the only energy source that is used to produce steam.

B Which one of the following lists contains only one energy source that costs nothing?

1)biomass, gas, solar, tidal

2)geothermal, hydroelectric, wave, wind

3)coal, hydroelectric, solar, wave

4)coal, gas, nuclear, wind

C Which of the sequences shows what happens in a fossil fuel power station?

1) electricity → generator → steam → turbine

2) steam → generator → turbine → electricity

3) steam → turbine → generator → electricity

4) electricity → generator → steam → generator

D At present, gas-fired power stations emit fewer harmful gases than coal-fired power stations.

Britain's gas reserves are running out. Gas for power stations is imported from Europe.

The government has decided to build a new coal-fired power station.

What is the most likely reason for this?

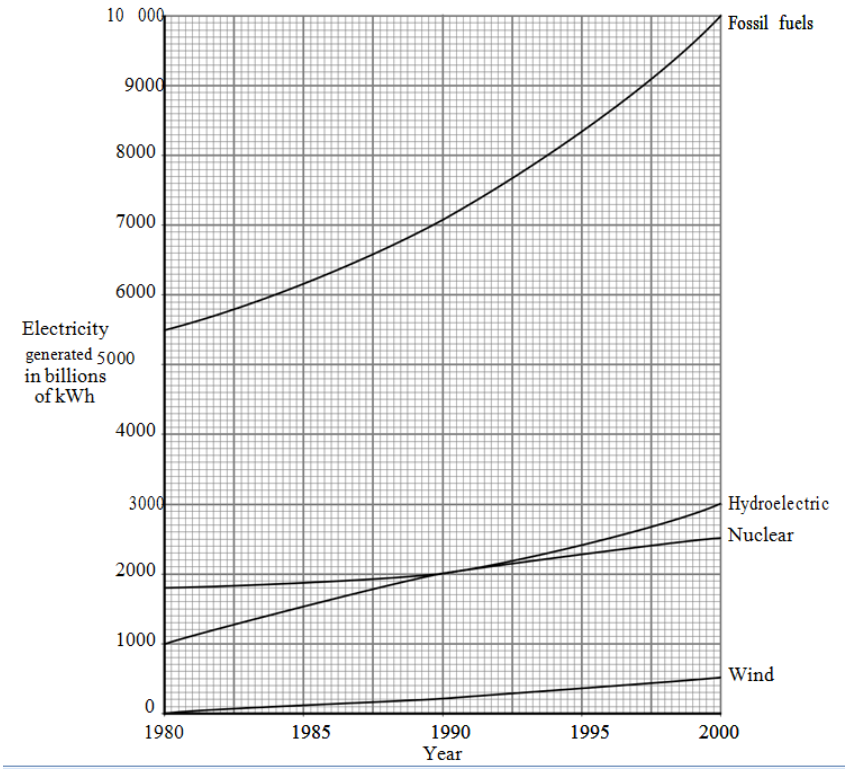
1)Britain's coal reserves will never run out.

2)It is easier to transport coal than gas.

3)Britain would not have to rely so much on imported gas.

4)The government intends to stop all fossil fuel use by 2020.

Q:8 The graph shows how much electricity has been generated worldwide from four different energy sources, from 1980 to 2000.



A Which source has shown the smallest increase in electricity generation between 1990 and 2000?

1)fossil fuels

2)falling water (hydroelectric)

3)nuclear

4)wind

B In 2000, about what percentage of the total electricity was generated by hydroelectricity, nuclear and wind?

1)38 %

2)42 %

3)55 %

4)60 %

C By 2030, the amount of electricity generated from hydroelectricity, nuclear and wind is likely to be 5 times greater than in 1990.

In 2030, the amount of electricity generated from these three sources, in billions of kWh, will be . . .

1)10 500.

2)11 000.

3)20 500.

4)21 000.

D Some energy sources can be used to drive turbines directly.

Which two energy sources cannot be used to drive turbines directly?

1)nuclear and fossil fuel

2)hydroelectric and fossil fuel

3)nuclear and wind

4)hydroelectric and nuclear

Q:9 In the south of Spain, there is an electricity generator which is powered by the Sun.

Mirrors reflect the Sun's radiation onto a container of water at the top of a tower.

The water is changed to steam.

The steam is used to turn a generator.

A The main source of energy for this generator is . . .

1)infra red.

2)light.

3)microwave.

4)ultraviolet.

B Which row in the table gives a correct advantage and disadvantage for this generator?

	Advantage	Disadvantage
1	It cannot be used continuously over a 24-hour period.	It has low running costs.
2	It has low running costs.	It produces atmospheric pollution.
3	It produces no atmospheric pollution.	It uses non-renewable energy.
4	It uses renewable energy.	It cannot be used continuously over a 24-hour period.

C The electricity is transferred to a nearby city using overhead cables.

At the power station, a transformer is used to . . .

1)increase the current, decrease the power and reduce energy losses.

2)increase the energy, increase the power and reduce energy losses.

3)increase the power, decrease the current and reduce energy losses.

4)increase the voltage, decrease the current and reduce energy losses.

The maximum output of the generator is 11 000 000 watts.

D A typical household needs 2 kW of electrical power.

If the solar generator is working at 60 % of its maximum output, the number of typical households that could be supplied is . . .

1)3 300

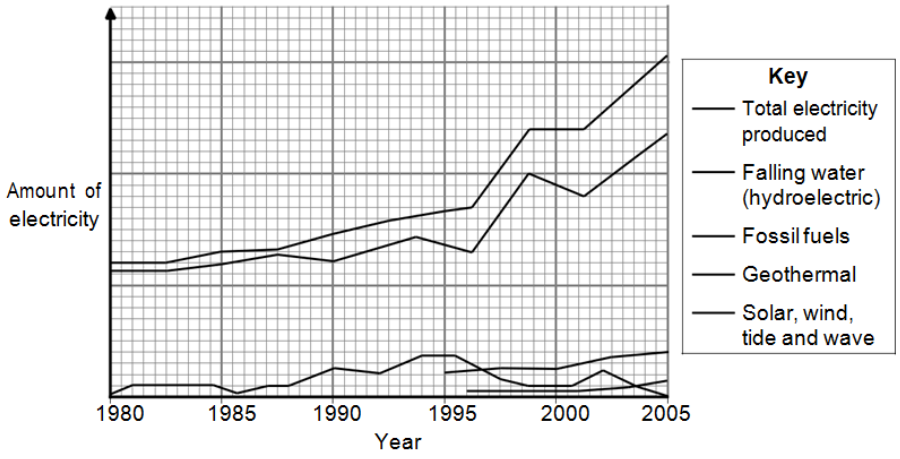
2)198 000

3)3 300 000

4)198 000 000

Q:10 Costa Rica is a country in Central America.

The graph shows how the sources used for generating electricity in Costa Rica have changed since 1980. It also shows how the total amount of electricity produced has changed.



A Which of the following has been the main energy source since 1980?

1)falling water (hydroelectric)

2)fossil fuels

3)geothermal

4)solar, wind, tide and wave

B Which energy source was first used in 1995?

1)falling water (hydroelectric)

2)fossil fuels

3)geothermal

4)solar, wind, tide and wave

C The graph shows . . .

1)a decrease in the total amount of electricity produced.

2)an increase in the total amount of electricity produced.

3)that the total amount of electricity produced has remained unchanged.

4)no clear trend in the total amount of electricity produced.

D We can conclude from the graph that in producing electricity, Costa Rica . . .

1)does not produce much polluting gas.

2)does not use renewable energy sources.

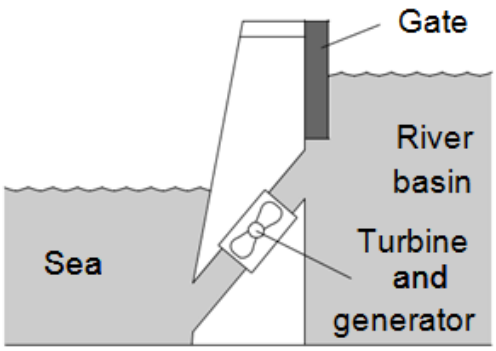
3)has very few mountains.

4)uses mainly fossil fuels

Q:11 It is estimated that the total energy available from the world's tides could provide about 5 % of the electricity generated worldwide.

One method of using the energy of tides is to build a barrage across a river.

The diagram shows a tidal barrage.



Tide going out

- As the tide rises, the gate is opened to let seawater into the river basin.
- At high tide the gate is closed, trapping water in the river basin.
- As the tide goes out, the gate is opened and water flows through the turbine.

A Which energy transformations take place as the water flows from the river basin through the turbine and the generator to the sea?

1)gravitational potential to electrical to kinetic

2)gravitational potential to kinetic to electrical

3)kinetic to electrical to gravitational potential

4)kinetic to gravitational potential to electrical

B From the information above, one of the advantages of a tidal barrage over a wind farm is that it . . .

1)can be built anywhere.

2)generates electricity all the time.

3)has low building costs.

4)uses a predictable energy source.

C Environmentalists claim that one of the disadvantages of tidal power stations is that they . . .

1)cause noise pollution.

2)destroy the habitat of wading birds.

3)produce gases that pollute the atmosphere.

4)produce radioactive waste.

D A cheaper way to use tidal energy is to use underwater currents to drive turbines. This is the same idea as a wind farm, but it works under water.

One report states that electricity generated by underwater currents would be four times as expensive as electricity generated by a wind farm.

The cost of electricity, from cheapest to most expensive, would be . . .

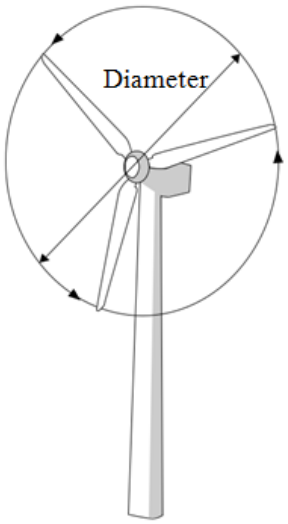
1)tidal barrage, underwater current, wind farm.

2)underwater current, wind farm, tidal barrage.

3)wind farm, tidal barrage, underwater current.

4)wind farm, underwater current, tidal barrage.

Q:12 The electrical power output from a wind turbine depends on the diameter of the turbine and on the wind speed.



Turbine diameter in metres	Electrical power output in watts for a wind speed of 6 metres per second
2	60
3	135
4	240
5	375
6	540

A Which conclusion about the electrical power output is correct for this data?

1)It increases in direct proportion to the diameter.

2)It increases in inverse proportion to the diameter.

3)It increases in inverse proportion to the radius.

4)It increases in direct proportion to the square of the diameter.

B The power output of a wind turbine . . .

1)is constant all the year round.

2)is greater in summer than winter.

3)varies on a monthly cycle.

4)varies throughout the year.

C An advantage of wind turbines compared with a hydroelectric power station is that . . .

1)their dismantling cost is low.

2)there is no output of polluting gases during their construction.

3)they have no visual impact on their surroundings.

4)they work equally well in any location.

D A disadvantage of wind turbines compared with a hydroelectric power station is that . . .

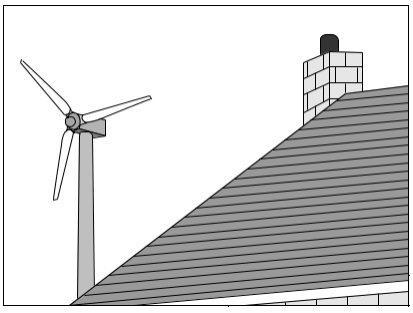
1)many hundreds are needed to produce the same power output.

2)their total atmospheric pollution in use is greater.

3)their total fuel costs are higher.

4)they use a non-renewable energy source.

Q:13 You can generate electricity for use in your own home using a wind turbine fixed above the roof.



A Wind is a renewable energy source. Which one of the following is not a renewable energy source?

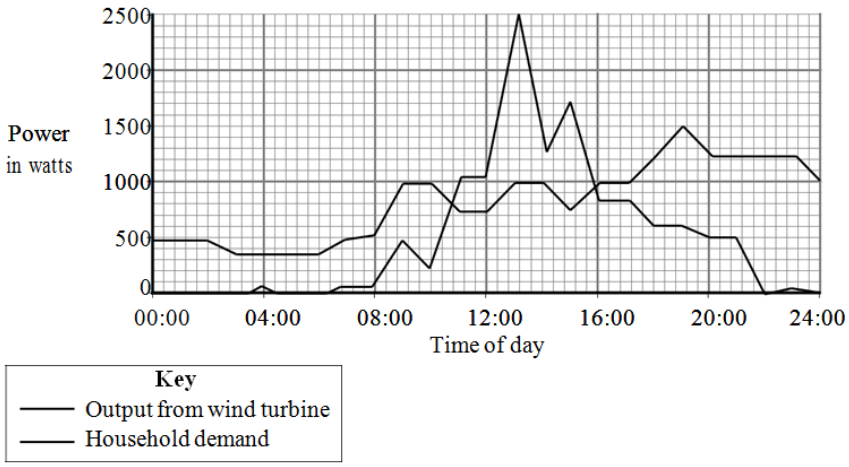
1)biomass

2)nuclear

3)solar

4)wave

The graph shows how the power output from a small wind turbine changes during 24 hours. It also shows how the demand for power for one household changes during the same period.



B Which statement is correct for 12:00?

1)The demand is larger than the power output from the wind turbine.

2)The demand is a maximum.

3)The power output from the wind turbine is larger than the demand.

4)The power output from the wind turbine is the same as the demand.

C The maximum household demand during the 24-hour period is . . .

1)1000 W

2)1500 W

3)2000 W

4)2500 W

D For how long, approximately, during the 24-hour period, does the power output from the wind turbine exceed the household demand?

1)0 hours

2)5 hours

3)19 hours

4)24 hours

Q:14 This is part of a report in a newspaper.

Tidal Barrage will power Britain

A 10-mile tidal barrage across the Severn Estuary could provide 5% of Britain's electricity needs. The project would cost £15 billion. It is one option being considered to reduce the use of fossil fuels in generating electricity.

A We need to reduce the use of fossil fuels because . . .

1)burning fossil fuels releases harmful gases into the atmosphere.

2)tidal power is less expensive than fossil fuels.

3)tidal power is more efficient than fossil fuels.

4)we have no fossil fuels left.

B Which of the following is not an argument in favour of building a tidal power station?

Tidal power stations . . .

1)are a predictable source of energy.

2)endanger wildlife and destroy habitats.

3)create jobs.

4)release no harmful gases in the atmosphere.

C In a tidal barrage, the water moves through a chamber and turns a turbine.

The turbines are connected to a . . .

1)boiler.

2)generator.

3)pump.

4)transformer.

Q:15 This question is about some of the different ways of generating electricity.

A Some power stations in the UK burn coal to produce heat.

Which row in the table gives the correct order of operations in a coal-fired power station?

1	The turbine heats the boiler	The boiler produces steam	Steam drives the generator which produces electricity
2	The boiler produces steam	Steam turns the blades of the turbine	The turbine produces electricity
3	The boiler produces steam	Steam turns the blades of the turbine	The turbine drives the generator which produces electricity
4	The turbine heats the boiler	The boiler produces steam	Steam from the boiler makes electricity

B Wind farms can be used to produce electricity.

A wind farm consists of a number of . . .

1)transformers connected to turbines.

2)turbines connected to generators.

3)generators only.

4)turbines only.

C The government wants more nuclear power stations to be built. Nuclear power stations have advantages and disadvantages.

Which of the following statements about nuclear power stations is correct under normal working conditions?

1)They use a renewable energy source, do not release harmful substances into the atmosphere and produce radioactive waste.

2)They use a renewable energy source, do not release harmful substances into the atmosphere and have a long start-up time.

3)They do not release harmful substances into the atmosphere, have a relatively short start-up time and produce radioactive waste.

4)They do not release harmful substances into the atmosphere, have a relatively long start-up time and produce radioactive waste.

D Solar cells can be used to produce electricity on a large scale in places like Australia and California. At present, they are not used on a large scale in the UK.

Which of the following statements about solar cells used to produce electricity on a large scale is correct?

1)They can be used where the Sun shines every day and they need only a small area of land.

2)They can harness a vast amount of energy from the Sun each day and they need only a small area of land.

3)They need a large area of land because the energy from the Sun is dilute.

4)They need a large area of land because the solar cells are very efficient.

Q:16 This question is about different ways of producing electrical energy.

A Which of the following fuels used for producing electricity is not a fossil fuel?

1)coal

2)natural gas

3)oil

4)uranium

B Which of the following is a renewable energy source?

1)coal

2)falling water (hydroelectric)

3)plutonium

4)uranium

C Where is a geothermal power station most likely to be sited?

1)along a coastline

2)in hot countries

3)in large cities

4)near volcanoes

D Which of the following methods of producing electricity always causes atmospheric pollution?

1)burning fossil fuels

2)solar cells

3)nuclear energy

4)wind turbines

Q:17 Biodiesel is a biofuel.

Biodiesel can be made from the waste products from the manufacture of chocolate.

The chocolate waste products would otherwise be sent to landfill sites.

Biodiesel can also be made from crops such as oilseed rape and palm trees.

Biodiesel can be mixed with ordinary diesel and used to run vehicles.

A It is better to make biodiesel from chocolate waste than from crops because this biodiesel . . .

1)can be mixed with ordinary diesel.

2)can be used to run vehicles.

3)makes use of a waste product.

4)requires the use of agricultural land.

B Cars can run on different fuels.

In the early 20th century, the Model T Ford car ran on ethanol, a biofuel.

Large reserves of crude oil were discovered in America in the 1920s. As a result, cars were made to run on petrol.

After World War II, oil from the Middle East was cheap, so cars continued to run on petrol.

What was the biggest influence in producing the change of fuel from ethanol to petrol?

1)environmental concerns

2)the price of the fuel

3)wars between countries

4)whether the fuel was renewable

C A farm is located on a hillside. There are no rivers or streams near the farm. The farmer wants to help the environment by generating his electricity from a renewable source.

Which of these sources is he most likely to choose?

1)a hydroelectric generator

2)a petrol generator

3)a wave generator

4)a wind generator

D A renewable energy source is one that . . .

1)can be used again.

2)will not run out.

3)does not pollute the atmosphere.

4)is always available.

Q:18 This question is about different ways of generating electricity.

A Some types of power station heat water to produce steam. The steam then drives a turbine connected to an electrical generator.

Which types of power station produce steam?

1)biomass, coal and nuclear

2)biomass, wind and wave

3)coal, nuclear and wave

4)gas, wind and wave

The table gives data for the cost of generating electricity in different types of power station.

Type of power station	Building and operating costs in pence per kWh	Fuel costs in pence per kWh	Total cost in pence per kWh
Biomass	5.9	0.8	6.7
Coal	1.3	1.2	2.5
Gas	0.7	1.5	2.2
Nuclear	1.8	0.4	2.2
Wave	6.6	0.0	6.6
Wind	3.7	0.0	3.7

B Which one of the following is correct?

1)Electricity generated from fossil fuels is always the cheapest.

2)The fuel cost for all renewable sources is zero.

3)The most expensive electricity comes from renewable sources.

4)Wind power stations produce the cheapest electricity.

C Fossil fuel power stations release polluting gases into the atmosphere. The government has suggested a carbon tax because of this. This tax would add 0.8 p/kWh to coal prices and 0.4 p/kWh to gas prices.

Which type of power station would produce the cheapest electricity if a carbon tax was added?

1)coal

2)gas

3)nuclear

4)wind

Q:19 Read this summary of a report on future energy supplies.

- By 2020, the UK should get 20% of its electricity from wind power.
- Thousands of wind turbines will need to be erected.
- Very large wind turbines should be erected out at sea.
- More nuclear power stations will need to be built.

A Which of the following statements describes an advantage of wind power over nuclear power?

1)Wind power does not make any dangerous waste.

2)Wind power puts less carbon dioxide into the atmosphere.

3)Wind power puts less sulfur dioxide into the atmosphere.

4)Wind turbines do not cause pollution during their manufacture.

B Large wind turbines may be erected far out at sea because . . .

1)there is less air pollution than on land.

2)there is no danger to wildlife.

3)they cause less visual pollution than on land.

4)the wind speed is constant.

C Why does a nuclear power station take up less space than a wind farm producing the same amount of energy?

1)The nuclear power station produces less electricity than a wind farm.

2)The energy in the wind is more spread out than the energy in nuclear fuels.

3)Nuclear power stations are usually built near the coast.

4)Nuclear power stations produce radioactive waste which must be contained.

D Which of the following statements describes an advantage of nuclear power over wind power?

1)Electricity can be produced from nuclear power at any time and in any weather.

2)Fuel costs for nuclear power are very low.

3)Nuclear power does not cause atmospheric pollution.

4)Nuclear power does not damage river estuaries.

TOTAL MARKS=74