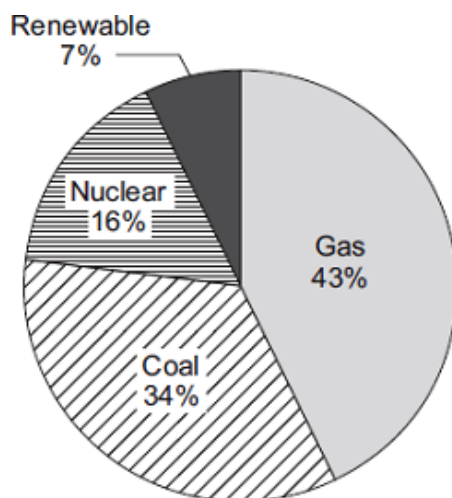


- Q1.** (a) The pie chart shows the proportions of electricity generated in the UK from different energy sources in 2010.



- (i) Calculate the percentage of electricity generated using fossil fuels.

.....

Percentage = ..... %

(1)

- (ii) The pie chart shows that 7% of electricity was generated using renewable energy sources.

Which **one** of the following is **not** a renewable energy source?

Tick (✓) **one** box.

Oil

☐

Solar

☐

Wind

☐

(1)

- (b) Complete the following sentence.

In some types of power station, fossil fuels are burned to heat ..... to produce steam.

(1)

- (c) Burning fossil fuels releases carbon dioxide into the atmosphere.

Why do many scientists think adding carbon dioxide to the atmosphere is harmful to the environment?

Tick (✓) **one** box.

Carbon dioxide is the main cause of acid rain.

☐

Carbon dioxide causes global warming.

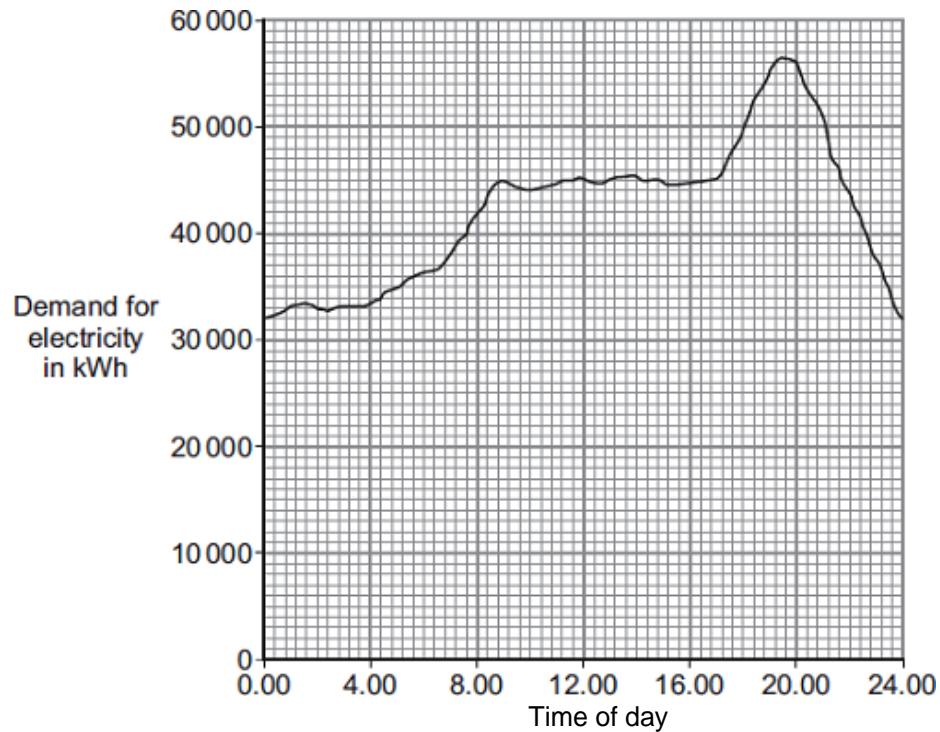
☐

Carbon dioxide causes visual pollution.

☐

(1)  
(Total 4 marks)

- Q2.** (a) The graph shows how the demand for electricity in the UK changes during one 24-hour period.



The table gives the start-up times for two types of power station.

Type of power station	Start-up time
Gas	A few minutes
Nuclear	Several days

How would these two types of power station be used to meet the demand for electricity during this 24-hour period?

.....

.....

.....

.....

.....

.....

(3)

- (b) *In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.*

A farmer plans to generate all the electricity needed on her farm, using either a biogas generator or a small wind turbine.

The biogas generator would burn methane gas. The methane gas would come from rotting the animal waste produced on the farm. When burnt, methane produces carbon dioxide.

The biogas generator would cost £18 000 to buy and install. The wind turbine would cost £25 000 to buy and install.

The average power output from the wind turbine would be the same as the continuous output from the biogas generator.

Evaluate the advantages and disadvantages of the two methods of generating electricity.

Conclude, with a reason, which system would be better for the farmer to buy and install.

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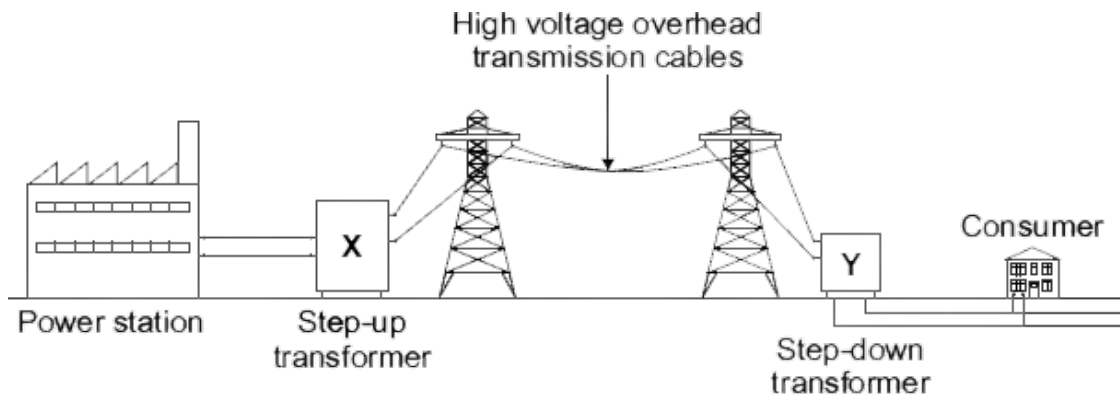
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(6)  
(Total 9 marks)

**Q3.** The diagram shows the National Grid system.



- (a) The National Grid includes step-up transformers.

Explain why.

.....

.....

.....

.....

(2)

- (b) *In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.*

Over the next 10 years, more than 300 kilometres of new high voltage transmission cables are to be added to the National Grid. Most of the new cables will be suspended from pylons and run overhead while the rest will be buried underground.

Outline the advantages and disadvantages of both overhead transmission cables and underground transmission cables.

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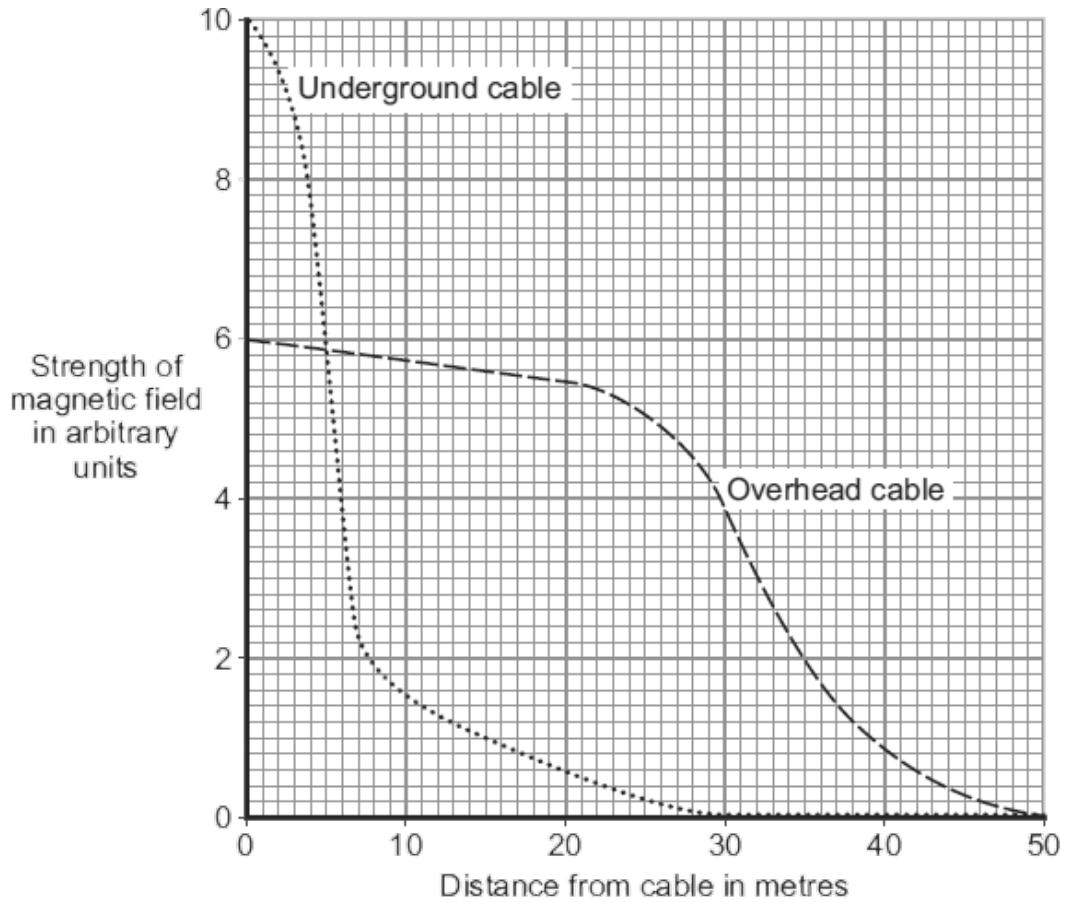
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(6)

- (c) When an electric current flows through a transmission cable, a magnetic field is produced.

The graph shows how the strength of the magnetic field varies with distance from both overhead and underground transmission cables that carry the same current.



What conclusions may be drawn from this graph?

.....

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.....

.....

(2)

- (d) Some people think that, because of the magnetic fields, living close to transmission cables is dangerous to health. Laboratory studies on mice and rats exposed to magnetic fields for two or more years found that the magnetic fields had no effect on the animals' health.

Draw a ring around the correct answer in the box to complete the sentence.

Using animals in scientific research raises 

economic
environmental
ethical

 issues.

(1)

(Total 11 marks)

**Q4.** About half of the UK's electricity is generated in coal-burning power stations and nuclear power stations.

- (a) Coal-burning power stations and nuclear power stations provide a reliable way of generating electricity.

What is meant by a *reliable way of generating electricity*?

.....  
 .....

(1)

- (b) Over the next few years, most of the older nuclear power stations in the UK will be closed down, and the process of decommissioning will start.

What does it mean to *decommission* a nuclear power station?

.....  
 .....

(1)

- (c) Climate change has been strongly linked to the emission of carbon dioxide. Many governments around the world are committed to reducing carbon dioxide emissions.

Generating electricity can increase carbon dioxide emissions.

The companies generating electricity could reduce carbon dioxide emissions.

Give **two** ways the companies could do this.

1 .....  
 .....  
 2 .....  
 .....

(2)



- (d) Electricity is distributed from power stations to consumers along the National Grid.

The voltage across the overhead cables of the National Grid needs to be much higher than the output voltage from the power station generators.

Explain why.

.....

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.....

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.....

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(3)  
(Total 7 marks)

