5 **(a)** Describe the formation of coal.

.....

.....

.....

.....

.....

..... [3]

(b) Describe the advantages and disadvantages of coal as an energy resource.

advantages .....

.....

.....

.....

disadvantages .....

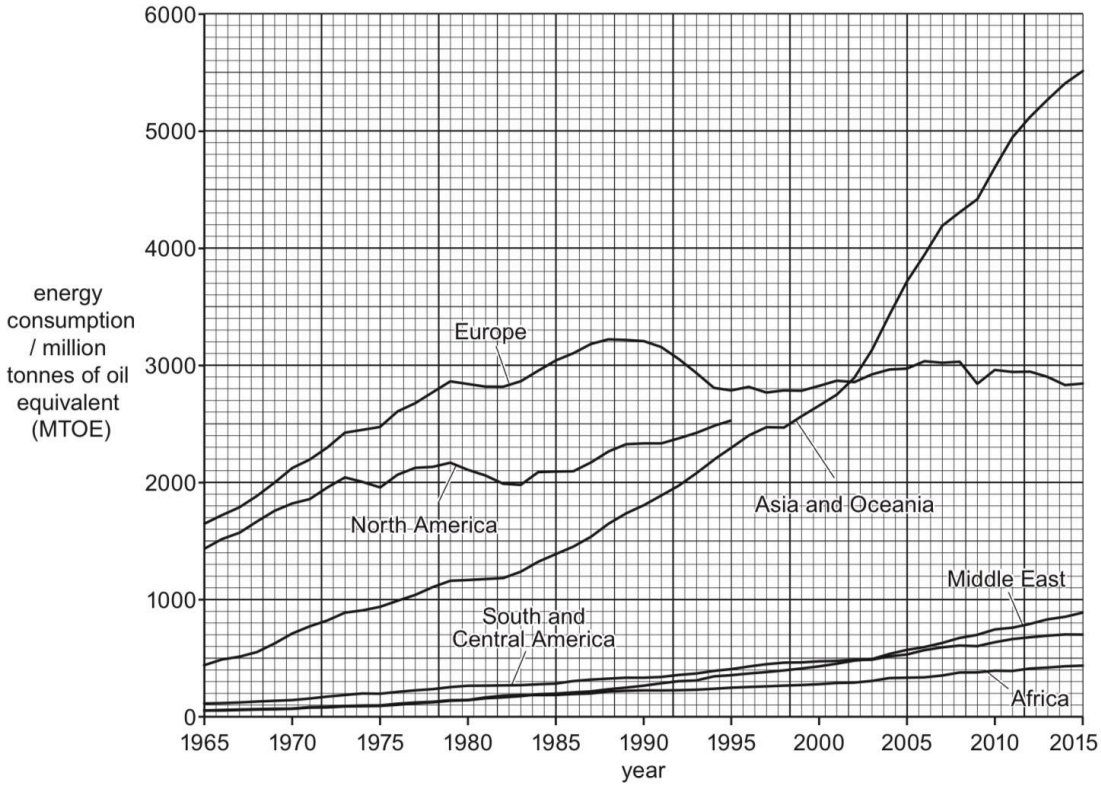
.....

.....

.....

[4]

(c) The graph shows energy consumption by world region from 1965 to 2015.



The table shows energy consumption for North America from 2000 to 2015.

year	2000	2005	2010	2015
energy consumption for North America / MTOE	2700	2850	2700	2800

(i) Complete the graph for North America. [2]

(ii) State which world region has had the largest increase in energy consumption from 1965 to 2015.

..... [1]

(iii) State which region had the highest energy consumption in 1965.

..... [1]

Section A

1 Many minerals are in short supply and new mineral deposits need to be found.

(a) One method of exploration for finding new mineral deposits is using photographs taken from the air.

Suggest how photographs taken from the air might help to locate mineral deposits.

.....

.....

.....

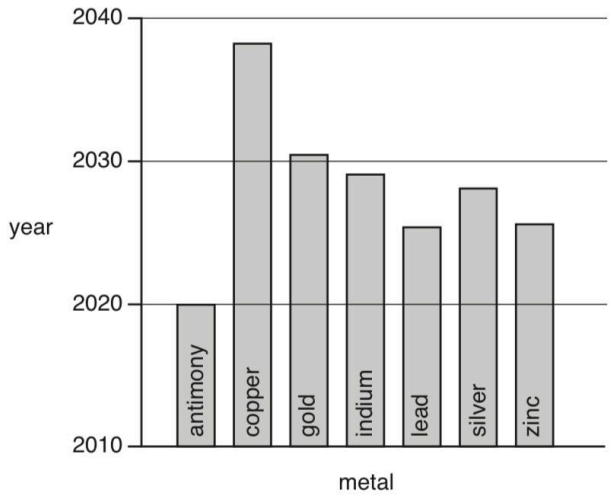
..... [2]

(b) Describe **one** other method of exploration for finding new mineral deposits.

.....

..... [1]

(c) The bar chart shows estimates of when some metals are predicted to run out. The estimates were made in 2010.



(i) Identify which metal is predicted to run out first.

..... [1]

(ii) Identify the metal(s) that are predicted to still be available after 2030.

..... [1]

[Total: 5]

Section A

1 The photograph shows terracing, a method of reducing soil erosion.

(a) Describe how this method reduces soil erosion.

.....

.....

.....

..... [2]

(b) State **two** other methods that could be used to reduce soil erosion.

1 .....

2 .....
[2]

[Total: 4]

9 The photograph shows an example of surface mining.

(a) State **two** advantages and **two** disadvantages of surface mining compared with subsurface mining.

advantage 1 .....

.....

advantage 2 .....

.....

disadvantage 1 .....

.....

disadvantage 2 .....

.....

[4]

(b) Rocks are classified into three main types.

Complete the table by identifying each type of rock.

basalt **granite** **limestone**

sandstone **shale** **slate**

type of rock		
igneous	**metamorphic**	**sedimentary**

[3]

(c) Describe how metamorphic rocks are formed.

.....

.....

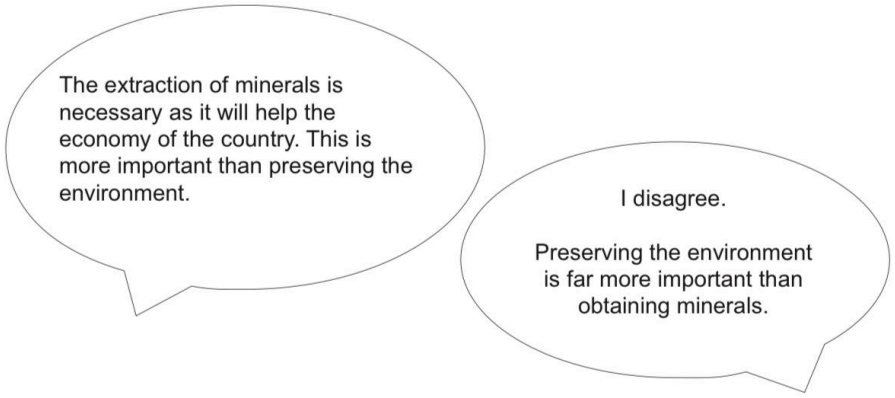
.....

.....

.....

..... [3]

(d) Two students were talking about the extraction of minerals.



How far do you agree with these views?

Give reasons for your answer.

.....

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.....

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.....

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..... [6]

[Total: 16]

5 Coal is an important fuel used for heat and electricity generation.

The photograph shows a mine where coal is extracted.

(a) (i) Identify the type of mining shown in the photograph.

..... [1]

(ii) Describe how coal is extracted from the mine shown in the photograph.

.....

.....

.....

.....

.....

.....

.....

..... [4]

(b) The Haerwusu mine in China is one of the largest coal mines in the world.

Haerwusu coal mine, China
area covered: 67 km^2
development cost: 1.1 billion USD
first coal production: 2008
annual output: 20 million tonnes
estimated total reserves in 2008: 1.5 billion tonnes

(i) Calculate the year when all the coal will have been extracted if there is no change in annual output.

..... [2]

(ii) Describe **three** uses for the mine after coal extraction has stopped.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

(c) Environmentalists are concerned about the use of coal. Some countries continue to use coal in large quantities.

Suggest reasons why these countries are **not** changing to other fuel sources.

.....

.....

.....

.....

.....

..... [3]

(d) Coal is a non-renewable energy resource.

Name **one** other non-renewable energy resource.

..... [1]

[Total: 14]

7 **(a)** Marble and slate are metamorphic rocks.

Describe the formation of metamorphic rocks.

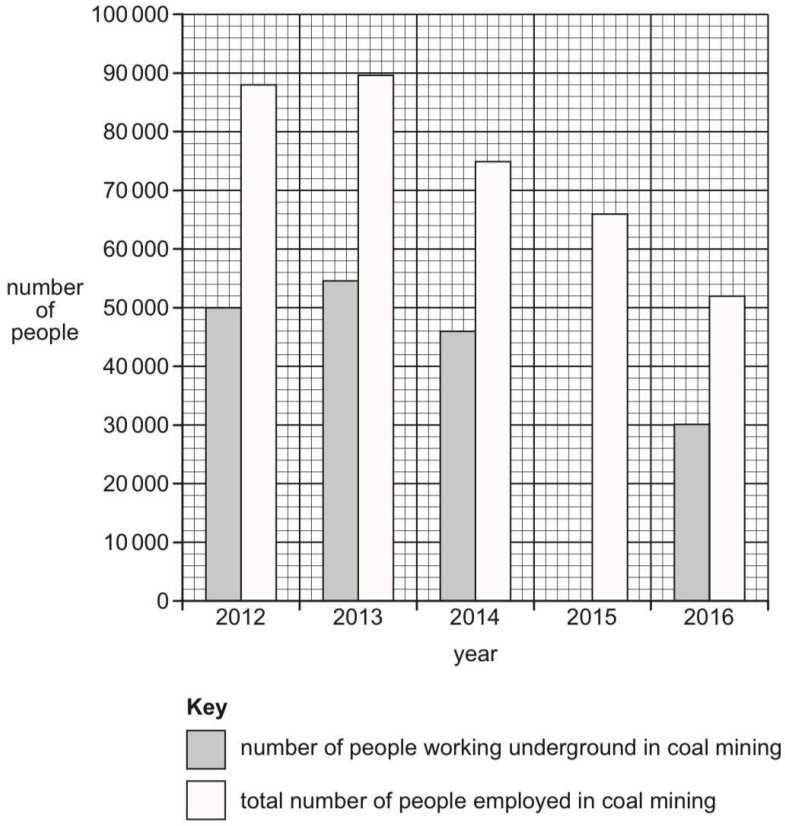
.....

.....

.....

..... [2]

(b) The bar chart shows the number of people employed in the coal mining industry in the USA from 2012 to 2016.



(i) Complete the bar chart to show that the number of people working underground in coal mining in 2015 was 40100. [1]

(ii) In 2013, a total of 89900 people were employed in the coal mining industry in the USA. The number of people working underground in coal mining was 54500.

Calculate the percentage of people working underground in coal mining in 2013.

..... % [1]

(iii) Suggest reasons why the total number of people employed in the coal mining industry in the USA decreased after 2013.

.....

.....

.....

..... [2]

(c) The photograph shows part of an opencast coal mine.

(i) The coal mine provides employment for local people.

Describe **other** benefits a coal mine can have for local people.

.....

.....

.....

.....

.....

..... [3]

(ii) State **two** ways the land can be used after the coal mine closes.

1 .....

2 .....

[2]

(d) Some countries are burning less coal to reduce carbon dioxide emissions. These countries are using other energy resources such as nuclear, wind and solar power.

Suggest reasons why some countries continue to use coal as an energy resource.

.....

.....

.....

.....

.....

..... [3]

[Total: 14]

3 **(a)** Complete the table by putting each rock in the correct column.

basalt **granite** **marble** **limestone** **shale** **slate**

rock type		
igneous	**metamorphic**	**sedimentary**

[3]

(b) Describe how a sedimentary rock such as sandstone is formed.

.....

.....

.....

.....

.....

..... [3]

(c) The photograph shows a quarry where gravel is extracted.

Describe the impacts of this gravel extraction on the local environment.

.....

.....

.....

..... [2]

[Total: 8]

5 The photograph shows a quarry where limestone is extracted.

(a) (i) State the name of the type of mining shown in the photograph.

..... [1]

(ii) Use the photograph to explain the impacts of this mine on the local environment.

.....

.....

.....

.....

.....

..... [3]

(iii) Describe how limestone rock is formed.

.....

.....

.....

..... [2]

(iv) A mining company wants to open a new mine.

Suggest factors that affect the decision of the mining company to open the mine.

.....

.....

.....

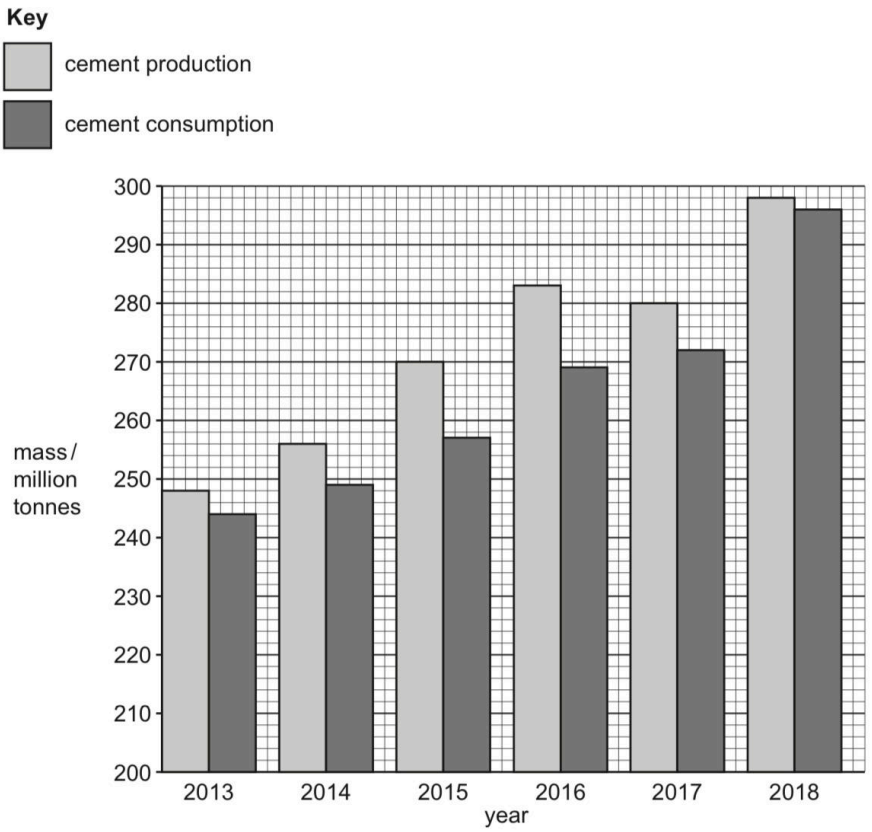
.....

.....

..... [3]

(b) Limestone is used to make cement.

The bar chart shows cement production and cement consumption in India between 2013 and 2018.



(i) Identify the year with the greatest difference between production and consumption.

..... [1]

(ii) Use data from the bar chart to describe the trend in consumption of cement in India between 2013 and 2018.

.....

.....

.....

..... [2]

(iii) In 2018, 298 million tonnes of cement was produced.

Cement production was predicted to increase by 4.5% in 2019.

Calculate the predicted cement production in million tonnes for 2019.

..... million tonnes [2]

[Total: 14]

Section A

1 Rocks and minerals needed for building can be extracted from the ground by open-pit mining.

(a) State **one** environmental impact of open-pit mining.

..... [1]

(b) Describe how rock and mineral extraction can benefit the local community.

.....

.....

.....

..... [2]

(c) The photograph shows an area of land that was used for open-pit mining.

The land has been restored.

Use the photograph to describe how this land has been restored.

.....

.....

.....

..... [2]

[Total: 5]

1 **(a)** The table shows data for the extraction of mining products from eight countries in one year.

country	mass of mining product extracted / million tonnes
Australia	1196
Brazil	474
China	4084
India	1014
Indonesia	668
Russia	1659
Saudi Arabia	689
USA	2176

(i) State the country with the largest mass of mining product extracted.

..... [1]

(ii) Iron is one of the mining products extracted.

62% of the mining product extracted in Brazil was iron.

Calculate the mass of iron extracted from Brazil.
Give your answer to the nearest whole number.

..... million tonnes [1]

(b) Explain why a more economically developed country (MEDC) might decide **not** to extract iron from the Earth.

.....

.....

.....

..... [2]

(c) State **one** strategy for restoring landscapes damaged by rock and mineral extraction.

..... [1]

[Total: 5]

2 **(a)** The table shows the year that reserves of fossil fuels are predicted to be used up.

fossil fuel	year the reserve will be used up
oil	2052
coal	2090
natural gas	2060

(i) Calculate the number of years the reserves of coal are predicted to last.

..... years [1]

(ii) State **two** reasons why the reserves of fossil fuels might be used up before the predicted year.

1 .....

.....

2 .....

.....

[2]

(b) Describe the formation of coal.

.....

.....

.....

.....

.....

..... [3]

(c) State **two** renewable energy resources.

1 .....

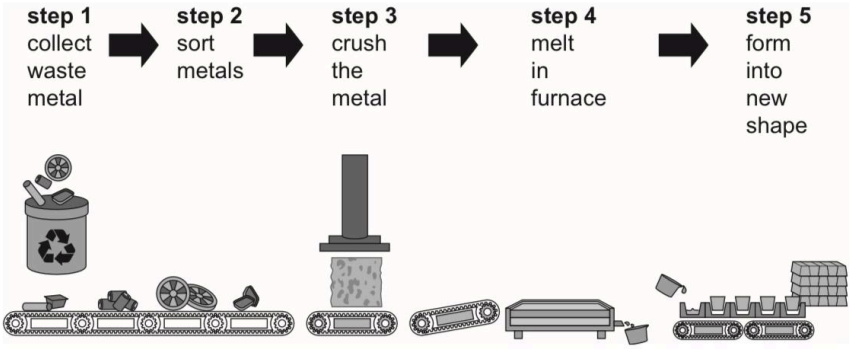
2 .....

[1]

[Total: 7]

Section B

4 The diagram shows a process for recycling metals.

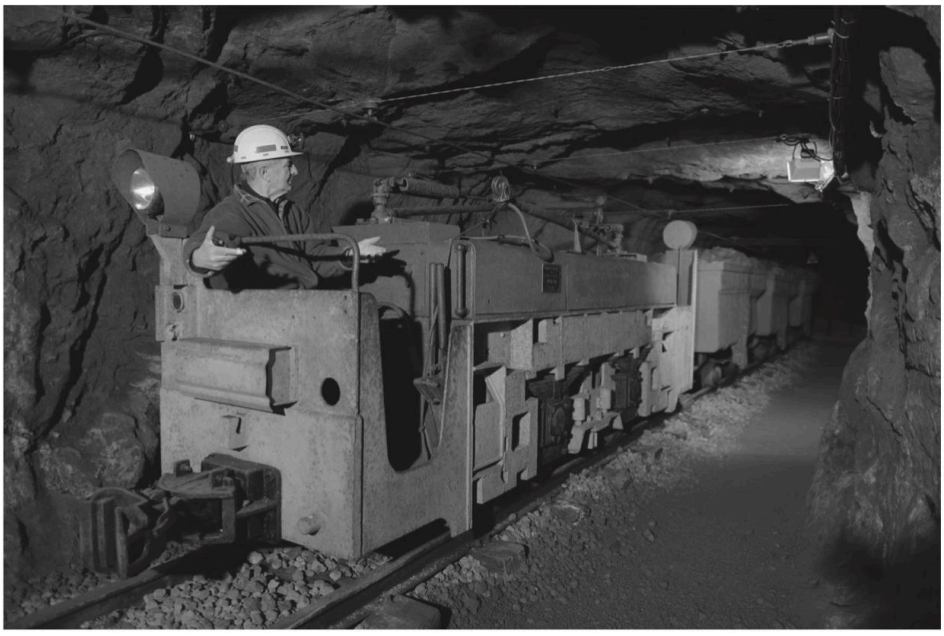


(a) Explain the importance of step 2 in the recycling process.

.....

..... [1]

(b) New metal is extracted from mined rock.
The picture shows a type of mine.



(i) State the type of mining shown in the picture.

..... [1]

(ii) Suggest reasons why recycling metals is less harmful for the environment than mining for new metals.

.....

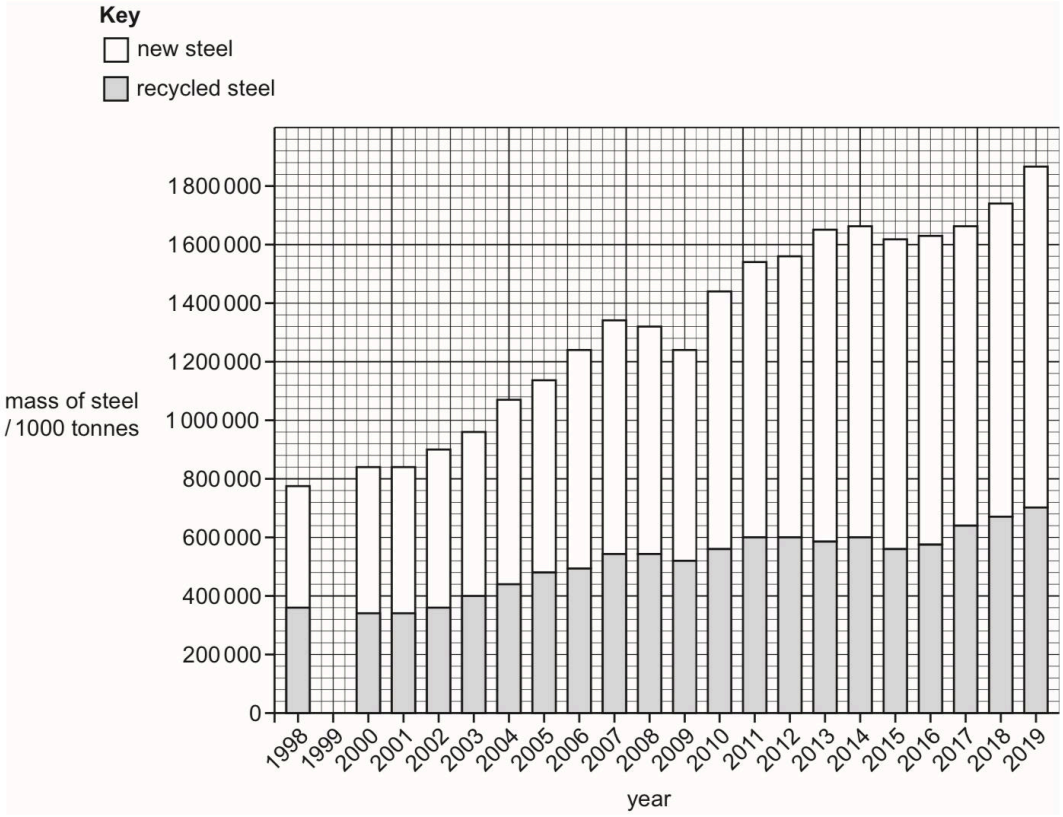
.....

.....

..... [2]

(c) The graph shows the total mass of steel produced from 1998 to 2019.

The total mass of steel contains recycled steel and new steel.



(i) Use the data in the table to complete the graph.

year	1999
mass of recycled steel /1000 tonnes	340 000
mass of total steel production /1000 tonnes	800 000

[2]

(ii) Describe the trend in the production of recycled steel between 2000 and 2019.

.....

.....

.....

..... [2]

(iii) Calculate the percentage of steel production from recycled steel in 1999.

Give your answer to one decimal place.

.....% [1]

(d) Suggest **three** strategies to increase the recycling of metals.

1 .....

.....

2 .....

.....

3 .....

.....

[3]

[Total: 12]