FOR OFFICIAL USE

Centre No.	Subject No.		Paper No.	Group No.	Marker's No.

Total

[C043/SQP084]

Intermediate 1 Geology
Specimen Question Paper

Time: 1 hour 30 minutes

NATIONAL QUALIFICATIONS

Fill in these boxes and read what is printed below.

Full name of centre

Town

First name and initials

Surname

Date of birth
Day Month Year

Candidate number

Number of seat

1 You should attempt **all** of the questions.
2 All answers should be written in the spaces provided in this answer book and should be written clearly and legibly in ink.
3 The marks allocated to each question or part of a question are shown at the end of each question or part of a question.
4 Before leaving the examination room you must give this book to the invigilator. If you do not, you may lose all the marks for this paper.

Candidates must not write in this margin

All questions should be attempted.

Marks

1. Complete the sentences by writing the correct word or words in the spaces provided.

Choose your answers from the list:

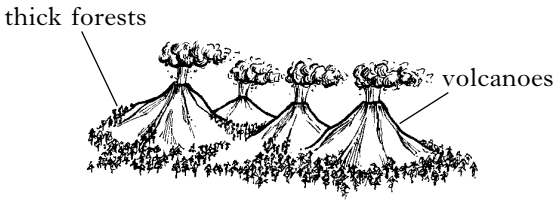
crust
mantle
outer core
inner core

(*a*) The ..... is solid metal.

(*b*) The ..... is made up of igneous, sedimentary and metamorphic rocks. **(1)**

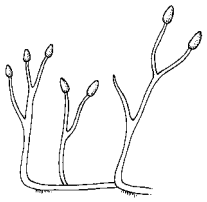
Marks

2. **A**



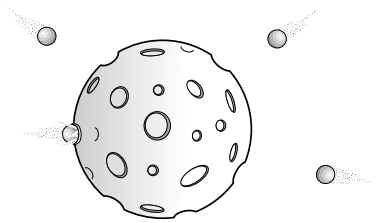
Volcanoes were active in Scotland

B



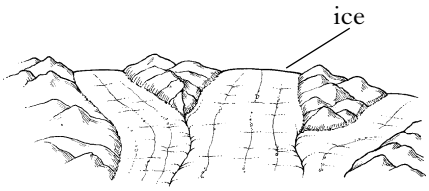
Plants appeared on Earth

C



The Earth was covered with craters

D



Scotland was covered by ice

Place the stages of the history of the Earth into the correct order from oldest to youngest.

Give only the letters: ..... → ..... → ..... → ..... **(2)**
oldest youngest

Marks

3. (*a*) Which statement is correct?

A Plants are not found as fossils.

B The hard parts of animals are fossilised more often than the soft parts.

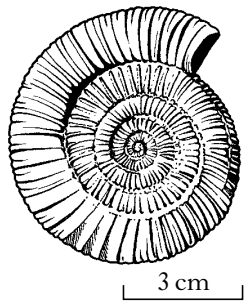
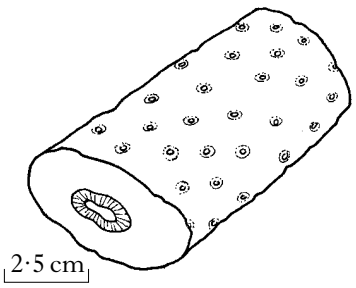
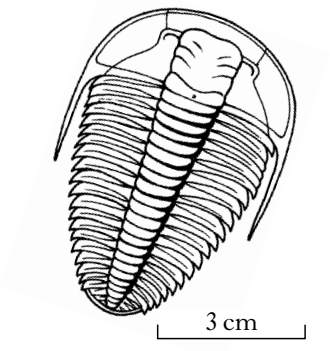
C Animals which live in fresh water are not found as fossils.

D Animals which live on land are fossilised more often than animals which live in the sea.

Give only the letter: ..... **(1)**

(*b*) Complete Table Q3(*b*) by naming the fossil and by saying where the organism lived.

Table Q3(*b*)

Drawing of fossil	Name of fossil	Where the organism lived
		
		
		

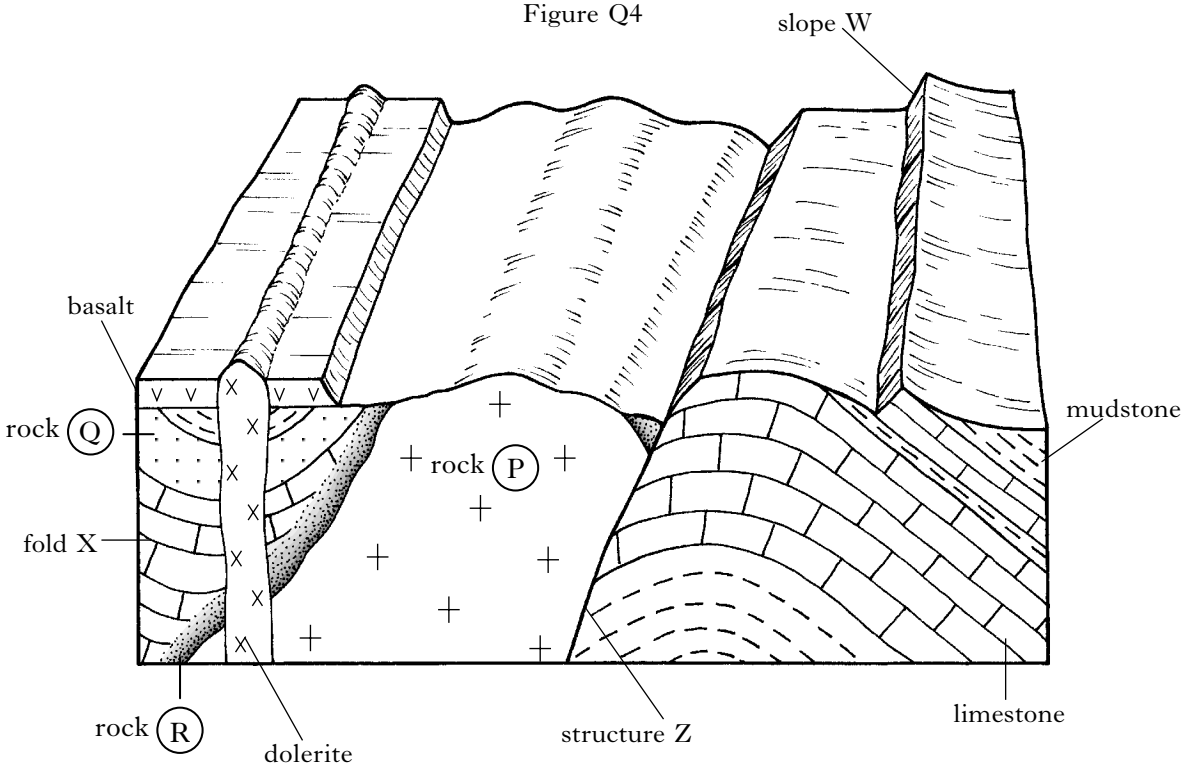
(3)

Candidates must not write in this margin

Marks

4. Figure Q4 is a block diagram.

Figure Q4



(*a*) What type of fold is fold X?

..... **(1)**

(*b*) What type of intrusion is formed by the dolerite?

..... **(1)**

(*c*) (i) Name structure Z.

..... **(1)**

(ii) How has structure Z affected the surface of the land?

.....

..... **(1)**

(*d*) What type of slope is slope W?

..... **(1)**

4. (continued) *Marks*

(*e*) Place the following rocks and structures into the correct order from oldest to youngest.

A Formation of fold X

B Deposition of rock (Q)

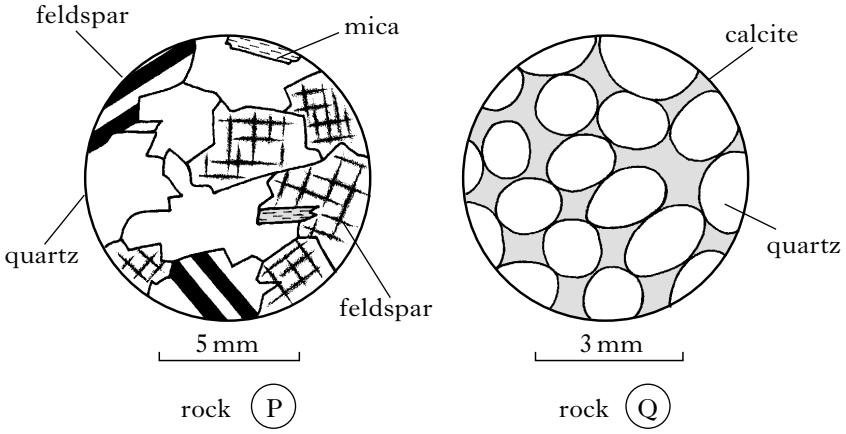
C Intrusion of dolerite

D Formation of basalt

Give only the letters: ..... → ..... → ..... → ..... **(2)**
oldest youngest

(*f*) Figure Q4(*f*) shows magnified views of rocks (P) and (Q).

Figure Q4(*f*)



(i) Is rock (P) igneous, sedimentary or metaphoric?

..... **(½)**

(ii) Name rock (P) .

..... **(1)**

(iii) Is rock (Q) igneous, sedimentary or metamorphic?

..... **(½)**

(iv) Name rock (Q) .

..... **(1)**

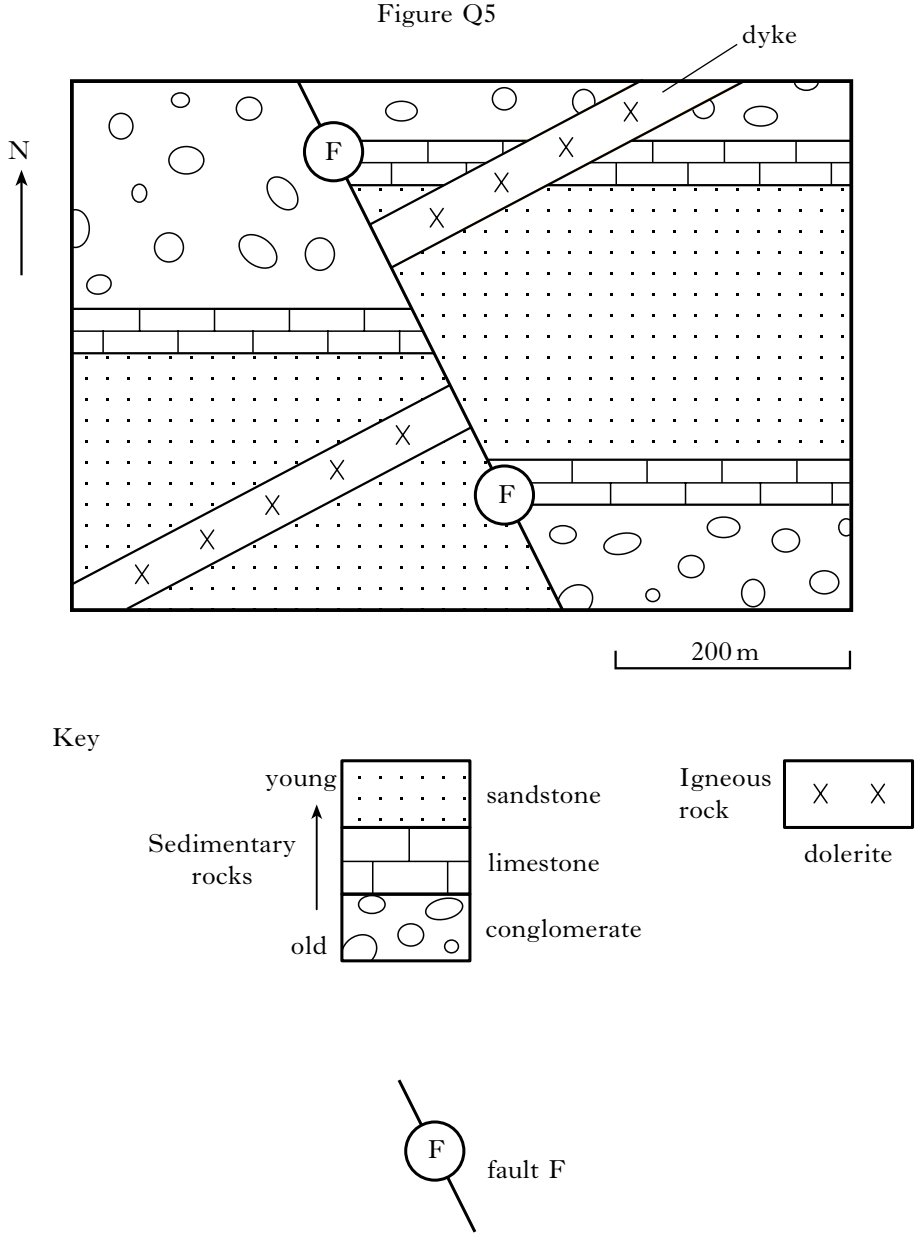
(v) From Figure Q4, how can you tell that rock (R) is metamorphic?

.....

..... **(1)**

5. Figure Q5 is a geological map. *Marks*

Figure Q5



(*a*) What type of fold is shown on the map?

..... **(1)**

(*b*) Place the following events in order from oldest to youngest.

A Folding of rocks

B Movement on fault F

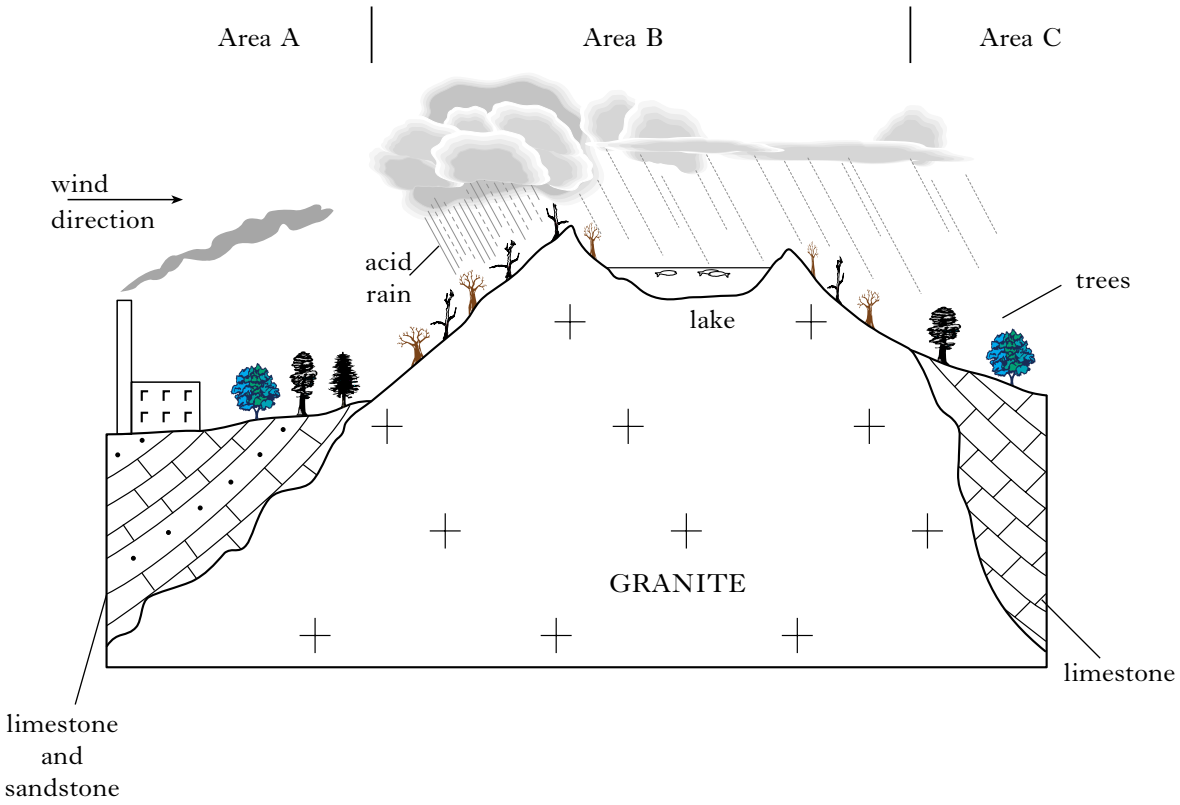
C Deposition of limestone

D Intrusion of dyke

Give only the letters: ..... → ..... → ..... → .....
oldest youngest **(2)**

6. Figure Q6 shows an area affected by acid rain. *Marks*

Figure Q6



(*a*) Give **one** reason to explain why Area B is more badly affected by acid rain than Areas A or C.

.....

..... **(1)**

(*b*) Give **one** way in which Area B will be affected by acid rain.

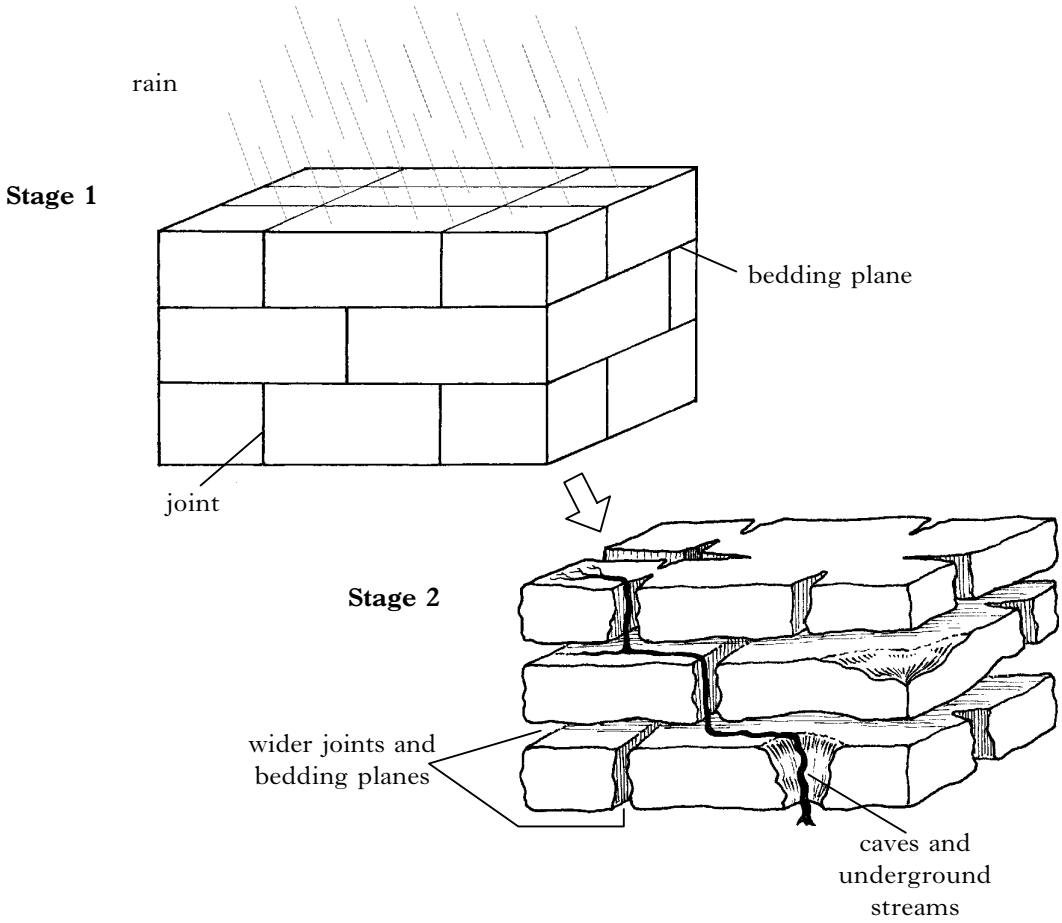
.....

..... **(1)**

Marks

7. Figure Q7 shows changes which have taken place in a limestone area.

Figure Q7



Describe the processes which have caused the changes seen in the limestone.

.....

.....

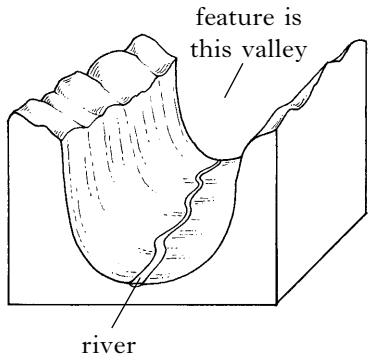
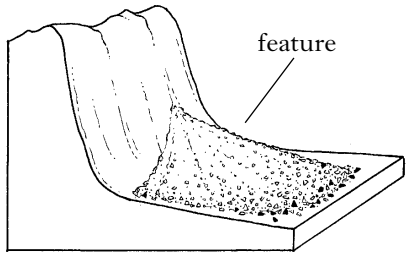
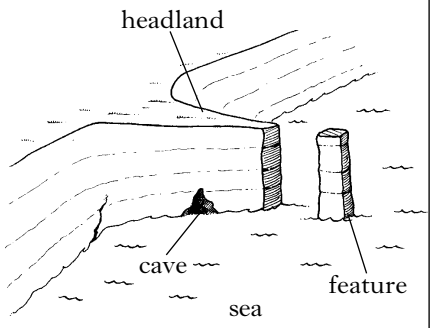
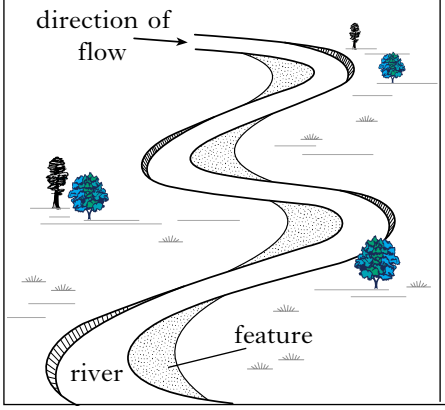
.....

..... **(2)**

Marks

8. Complete Table Q8 by naming the feature shown and by saying how the feature was formed.

Table Q8

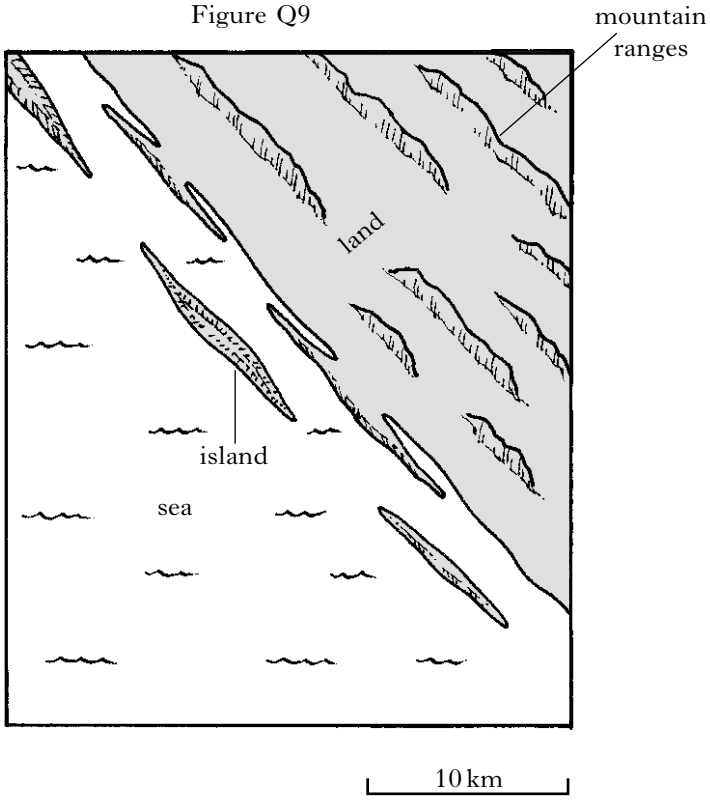
Diagram of feature	Name of feature	How the feature was formed
		
		
		
		

(8)

Marks

9. Figure Q9 is a map of a Dalmatian coast.

Figure Q9



Describe the process by which this type of coast is formed.

.....

.....

.....

..... **(2)**

Candidates must not write in this margin

Marks

10. (*a*) (i) How does a renewable resource differ from a non-renewable resource?

.....

..... **(1)**

(ii) Name **two** renewable physical resources and **two** non-renewable physical resources.

Two renewable physical resources: .....

.....

Two non-renewable physical resources: .....

..... **(2)**

(*b*) (i) Give **one** way in which each of the following may damage the environment.

Underground coal mining: .....

..... **(1)**

Extracting and moving oil: .....

..... **(1)**

(ii) What is meant by conservation of resources?

.....

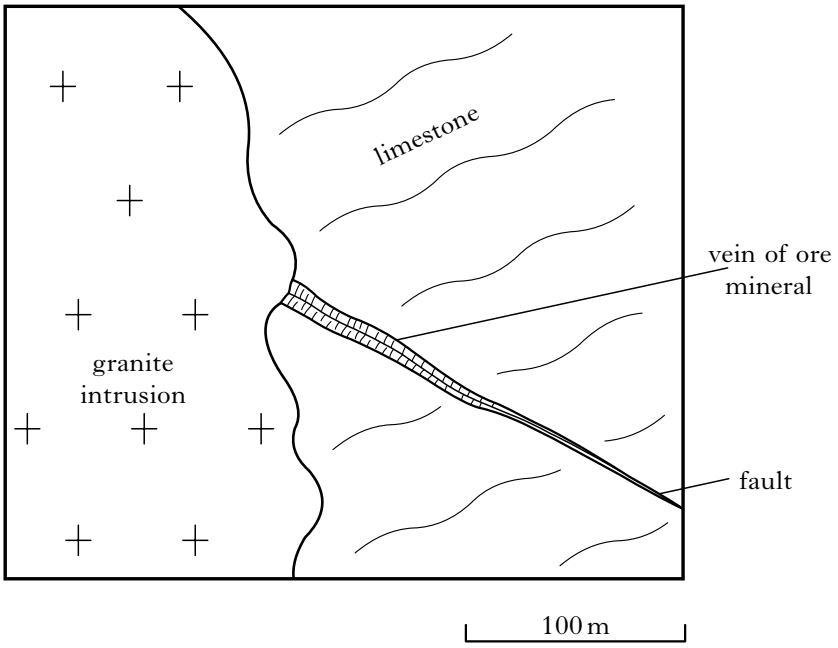
.....

..... **(1)**

Marks

11. (*a*) Figure Q11 is a map showing granite intruded into limestone. An ore mineral vein lies in a fault plane.

Figure Q11



Which **two** statements correctly describe the mineral vein?

A The vein is a hydrothermal deposit.

B Weathering of the limestone left the ore minerals in a crack formed by the fault.

C The vein is a placer deposit.

D The ore has been formed by faulting.

E Water heated by the intrusion deposited the ore minerals along the fault.

Give only the letters: ..... and ..... **(2)**

Marks

11. (continued)

(*b*) Use some of the following to complete Table Q11(*b*).

Ore mineral: haematite; bauxite; malachite; galena.

Metal extracted: iron; zinc; copper; lead.

Use for metal: making aeroplanes;
making girders;
electrical wiring;
coating cans.

Table Q11(*b*)

Ore mineral	*Metal extracted*	*Use for metal*
		making car batteries
chalcopyrite		
	aluminium	

(3)

Candidates must not write in this margin

Marks

12. (*a*) **Use one or more diagrams** to show the main stages in the water cycle.

(2)

(*b*) (i) What is the water table?

.....

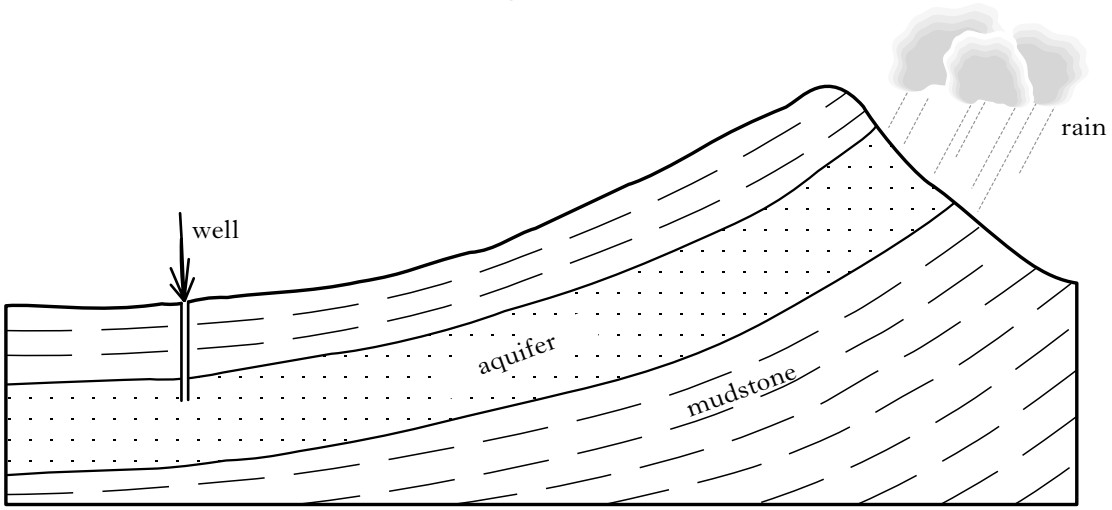
..... **(1)**

Marks

12. (*b*) (continued)

(ii) What type of well is shown in Figure Q12?

Figure Q12



Answer: ..... **(1)**

(*c*) Give **two** reasons to explain why developed countries use more water than developing countries.

1 .....

.....

2 .....

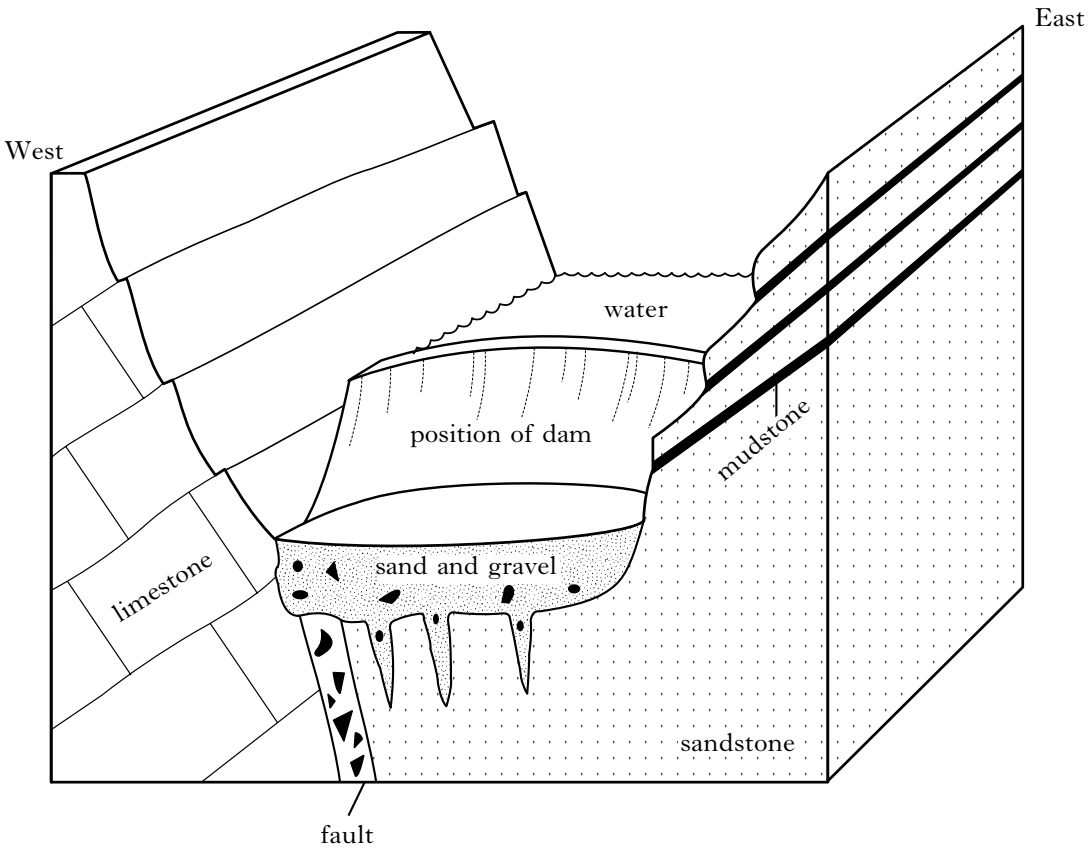
..... **(2)**

12. (continued)

Marks

(*d*) Give **two** reasons to explain why the site shown in Figure Q12(*d*) would not be suitable for a dam.

Figure Q12(*d*)



Reasons why the site is not suitable for a dam:

1 .....

.....

2 .....

..... **(2)**

Candidates must not write in this margin

Marks

13. **Using one or more diagrams**, explain how a seismic survey may be used to find an oil trap structure in the North Sea.

(3)

Marks

14. Table Q14 gives the chemical compositions of solid fuels.

Table Q14

Fuel	Composition (weight percent)			
	Carbon	Hydrogen	Nitrogen	Oxygen
Peat	55	6	2	37
Lignite	73	5	1	21
Bituminous coal	84	6	2	8
Anthracite	93	3	1	3

(*a*) (i) Which fuel has the highest ratio of carbon to hydrogen?

..... **(1)**

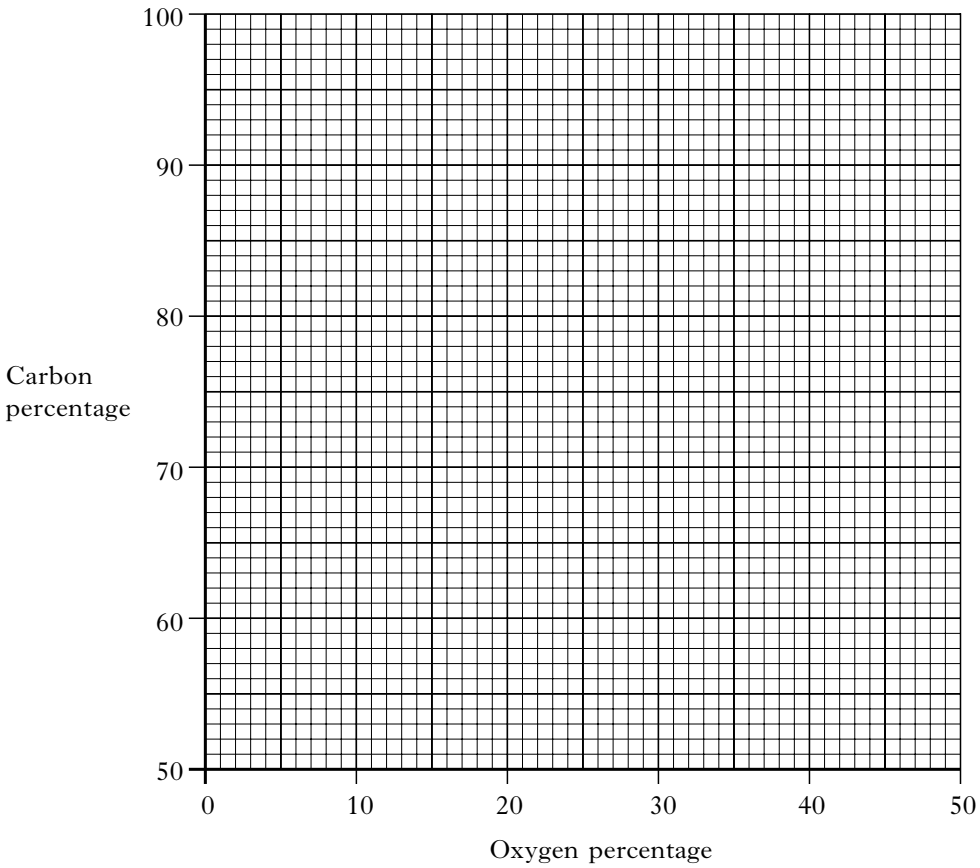
(ii) Which fuel has the highest ratio of oxygen to carbon?

..... **(1)**

14. (continued)

Marks

(*b*) (i) On the graph paper provided below, draw a line graph to show how the carbon percentage of the fuels changes with the oxygen percentage.



(2)

(ii) Complete the sentence:

As the carbon percentage increases, the oxygen percentage ..... . **(1)**

(*c*) The fuels have formed from wood or similar plant material.

Complete Table Q14(*c*) by giving a likely composition for wood. Explain why you have chosen your figures.

Table Q14(*c*)

	Composition (weight %)			
	Carbon	Hydrogen	Nitrogen	Oxygen
Wood				

(2)

Explanation for chosen figures: .....

.....

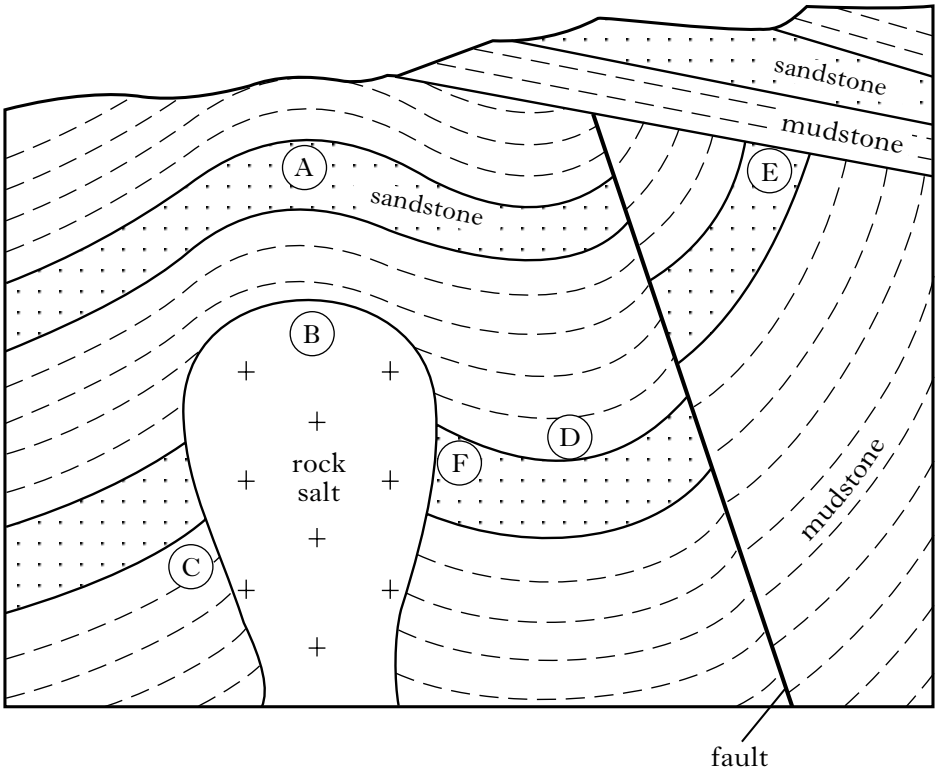
.....

..... **(3)**

Marks

15. Study Figure Q15.

Figure Q15



The sandstone is permeable.

The rock salt and mudstone are impermeable.

From Figure Q15, choose **three** positions at which oil and gas may collect.

Give only the letters: ..... , ... and ..... **(3)**

Marks

16. Table Q16 gives information on three sediments.

Table Q16

Particle type	Place where sediment comes from		
	Beach	Close to glacier	Middle course of river
	Weight % of particles	Weight % of particles	Weight % of particles
Pebbles	98	26	45
Gravel	2	4	35
Sand	0	30	15
Silt	0	12	5
Mud	0	28	0

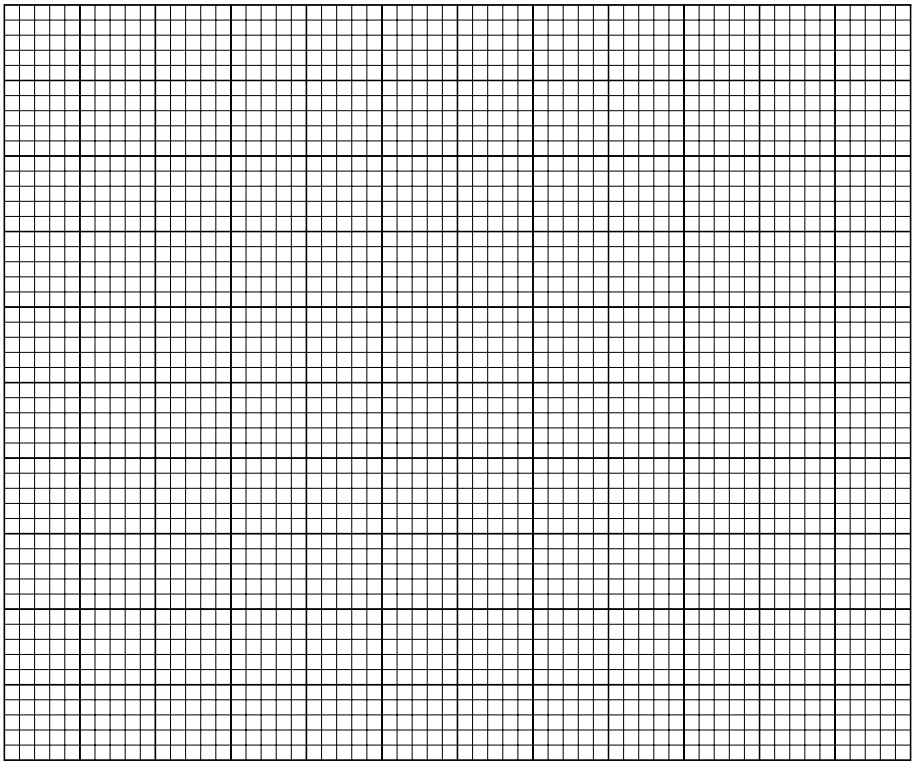
(*a*) Which type of particle shows the biggest differences in weight percentage between the three sediments?

..... **(1)**

Marks

16. (continued)

(*b*) On the graph paper below, show the percentages of your chosen particle type on a bar graph.



(2)

(*c*) What are the ratios of the weight percentages of gravel to pebbles in the three sediments?

Beach sediment: ..... **(1)**

Sediment close to a glacier: ..... **(1)**

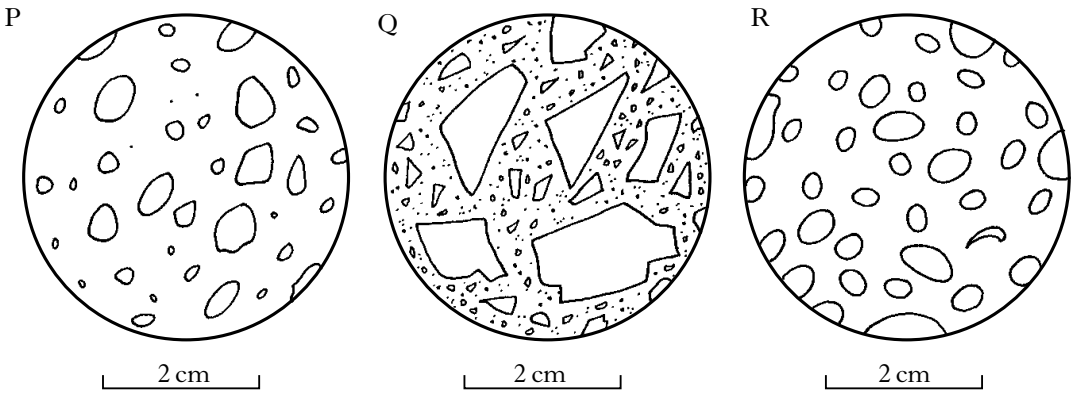
Sediment from the middle course of the river: ..... **(1)**

Marks

16. (continued)

(*d*) Figure Q16(*d*) shows the sediments.

Figure Q16(*d*)



Which sediment (P, Q or R) has come from close to the glacier?

Give a reason for your answer.

Sediment: .....

Reason: .....

..... **(1)**

(*e*) The river sediment comes from the middle course of the river. What differences in the weight percentages of particles would you expect to see in samples taken from

(i) the upper course of the river?

.....

..... **(1)**

(ii) the middle course of the river after a long period of flooding?

.....

..... **(1)**

(iii) the middle course of the river after a dam was built on the upper course of the river?

.....

..... **(1)**

Total: 80 marks

[*END OF QUESTION PAPER*]

[C043/SQP084]

Intermediate 1 Geology
Specimen Marking Instructions

NATIONAL QUALIFICATIONS

SCOTTISH QUALIFICATIONS AUTHORITY

1. (*a*) inner core

(*b*) crust

2. C → B → A → D
Order not position important

4 in correct order	2 marks
3 in correct order	1 mark
2 in correct order	½ mark

3. (*a*) B

(*b*)

Ammonite:	sea	
Plant (root):	land	
Trilobite:	sea	½ mark each

4. (*a*) Downfold or syncline

(*b*) Dyke

(*c*) (i) Fault

(ii) It has formed a steep slope or fault scarp or fault line scarp.

(*d*) Scarp or escarpment

(*e*) B → A → D → C
Order not position important

4 in correct order	2 marks
3 in correct order	1 mark
2 in correct order	½ mark

(*f*) (i) Igneous

(ii) Granite

(iii) Sedimentary

(iv) Sandstone

(v) (It forms a narrow zone close to rock (P).)
It has been formed by the effects of heat on limestone. (Rock (P) forms an igneous intrusion.)

5. (*a*) Syncline

(*b*) C → A → D → B
Order not position important

4 in correct order	2 marks
3 in correct order	1 mark
2 in correct order	½ mark

6. (*a*) One of: Area B (unlike A and C) has no limestone to neutralise the acidic rainwater.
Area B has the greatest rainfall (so will receive most acid).

(*b*) One of: Trees (and other plants) will be killed.
Fish (and other freshwater organisms) will be killed.
The rate of chemical weathering will increase.
Toxic metals (eg aluminium) may be dissolved to form toxic surface and ground water.

7. Rain dissolves CO_2 from the air to form a weak acid. 1 mark
The acidic rainwater dissolves the limestone to form caves. 1 mark

8.

Name of feature	How the feature was formed
U-shaped valley	Original V-shaped valley. Valley glacier erodes over area of contact between ice and bedrock to deepen and widen valley.
Scree	Frost shattering forms angular rock fragments which fall and accumulate as scree.
Stack	Weak points on a headland are eroded to form caves. Arch forms when caves cut through. Arch collapses to leave stack.
Point bar	In a meandering river the current is fast on the outside of the bend and slow on the inside. Material eroded from the outside is deposited on the inside.

Name of feature: $\frac{1}{2}$ mark each

How feature formed: $1\frac{1}{2}$ marks each

9. When sea level was lower during the Ice Age mountain ranges running parallel to the coast (were eroded into a series of ridges).

1 mark

When the ice melted, sea level rose and the ridges were partly submerged (to form strings of islands).

or

Valleys were flooded to leave high ground as islands.

1 mark

10. (*a*) (i) Renewable resources replace themselves in a short time.

Non-renewable resources do not replace themselves (or replace themselves only after a very long time).

(ii) Two renewable physical resources (eg water, solar power, tidal power, etc). 1 mark

Two non-renewable physical resources (eg coal, oil, ores, etc). 1 mark

(*b*) (i) Underground coal mining: One example, eg: subsidence; acidification of groundwater; groundwater polluted; metals dissolve in groundwater; creation of unsightly bings.

Extracting and moving oil: One example, eg: subsidence; oil spills from tankers and leakage from pipelines and installations; release of methane into atmosphere.

(ii) One of:

1 Using non-renewable resources as slowly and efficiently as possible.

Using renewable resources at a rate equal to or more slowly than they can replace themselves.

2 Using resources in the least damaging way so that future generations will still benefit from their use.

3 Increasing use of recycling and reuse of resources and increased use of renewable energy so that non-renewable resources will last for as long as possible.

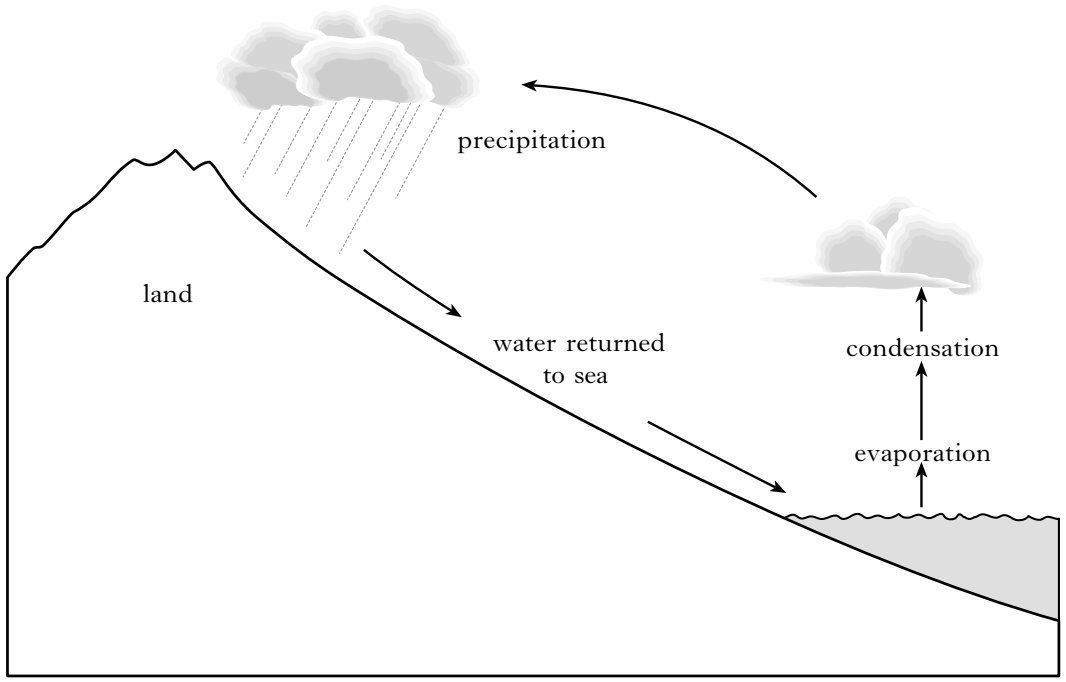
4 The aim towards sustainable development in the use of renewable resources and the slowest possible use of non-renewable resources.

11. (*a*) A, E

(*b*)

Ore mineral	*Metal extracted*	*Use for metal*
galena	lead	
	copper	electrical wiring
bauxite		making aeroplanes

12. (*a*)



$\frac{1}{2}$ mark for each stage

(*b*) (i) The (underground) surface beneath which the pore spaces (in the soil and rock) are filled with water.

(ii) Artesian well

(*c*) Any two reasons, eg

1 In developed countries houses have a piped supply. In developing countries fewer houses have piped supplies.

2 Houses in developed countries have washing machines, dishwashers, showers, sprinklers, toilets, etc. Less of these exist in developing countries.

3 The industries of developed countries use a lot of water. Developing countries have less industry so use less water.

(*d*) Any two reasons, eg

1 On the east side of the dam, the dip of the sandstone indicates that it may slide into the reservoir.

2 The main rock types adjacent to the dam are limestone and sandstone. Both are permeable.

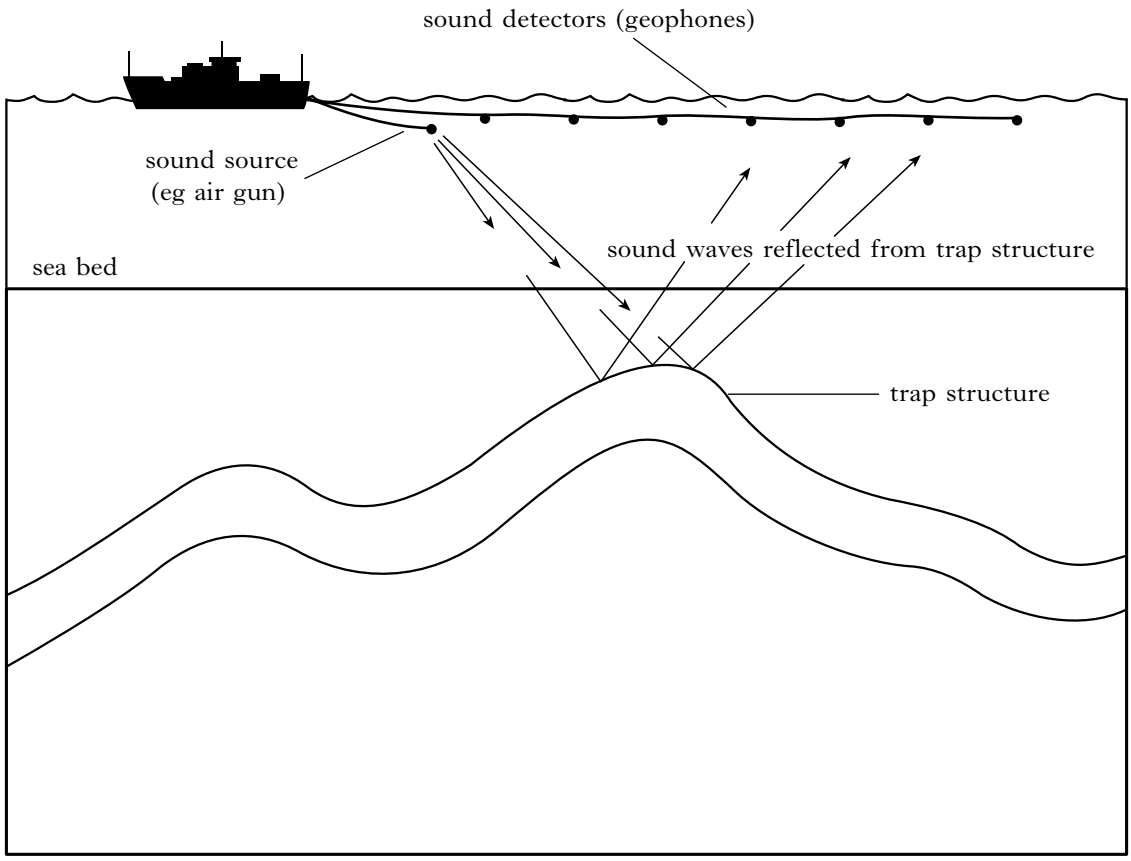
3 There is a fault under the dam. Movement on the fault may fracture the dam.

4 There is a fault under the dam. Water may leak through the shattered rock in the fault zone.

5 The valley bottom is filled with sand and gravel. It will be difficult to establish a firm foundation for the dam.

6 The valley bottom is filled with sand and gravel. Water may leak under the dam.

13.



Three points to be given eg

1 Sound waves from source

2 Reflected by rocks of trap structure

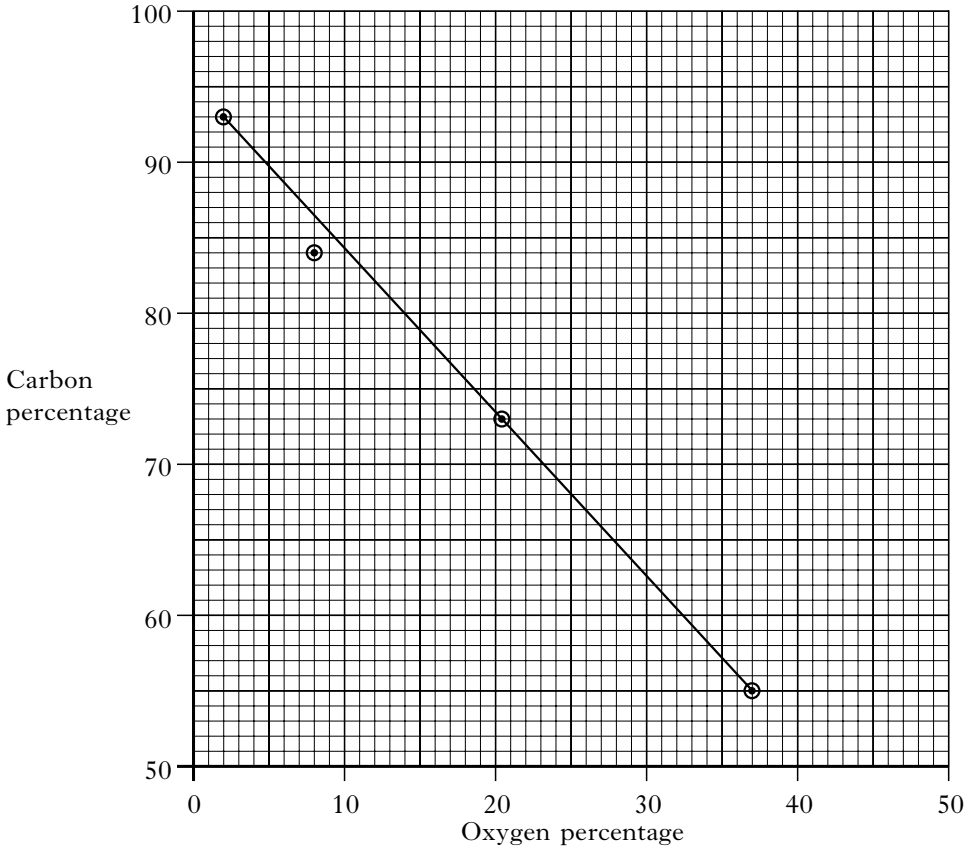
3 Detected by geophones

4 The pattern of reflections is analysed to determine the rock structure.

14. (*a*) (i) Anthracite

(ii) Peat

(*b*) (i)



(ii) Decreases or falls

(*c*) Possible figures:

	Composition (weight %)			
	Carbon	Hydrogen	Nitrogen	Oxygen
Wood	50	5–6	1–2	43

Carbon: Less than in peat. This continues the trend from anthracite to peat.

1 mark

Hydrogen and nitrogen: About the same as those of peat. No trend of changing percentages from bituminous coal to peat.

1 mark

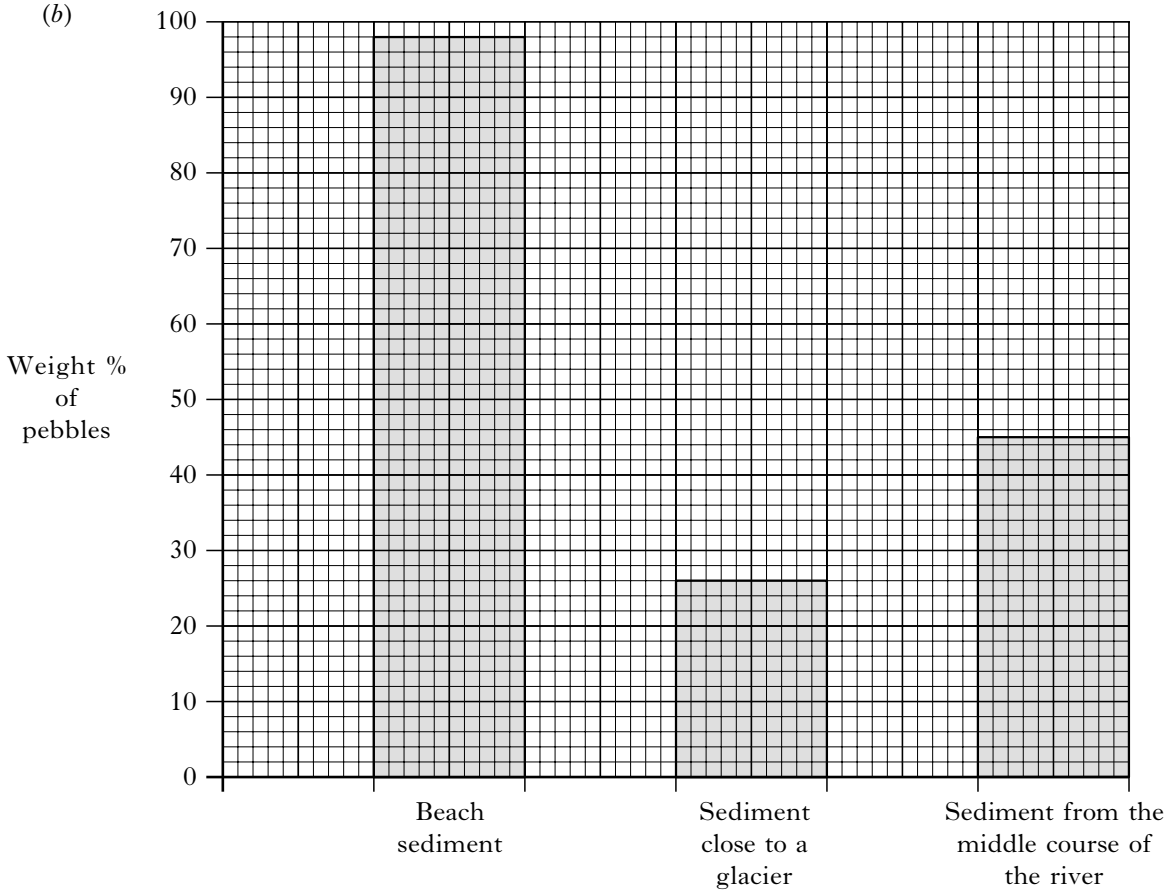
Oxygen: More than in peat. This continues the trend from anthracite to peat.

1 mark

15. A, E, F

16. (*a*) Pebbles

(*b*)



2 marks for bar graph of pebble percentages

1 mark for bar graph of other particle type

(*c*) Beach sediment: 0·02

Sediment close to a glacier: 0·15

Sediment from the middle course of the river: 0·78

(*d*) Q

Reason: Very wide range of grain size **or** Particles very angular.

(*e*) Accept any reasonable answers, eg

(i) You would expect a greater percentage of larger particles (because strong currents wash the small particles to lower parts of the river). 1 mark

(ii) You would expect a greater percentage of larger particles (because larger particles would be washed from upstream by the flood water). 1 mark

(iii) You would expect a greater percentage of smaller particles (because larger particles which would normally be washed down from upstream will be trapped by the dam). 1 mark

[*END OF MARKING INSTRUCTIONS*]