OCR
Oxford Cambridge and RSA

Monday 22 May 2017 – Morning

AS GCE GEOLOGY

F792/01 Rocks – Processes and Products

Candidates answer on the Question Paper.

OCR supplied materials:
None

Other materials required:
- Ruler (cm/mm)
- Protractor
- Electronic calculator

Duration: 1 hour 45 minutes

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

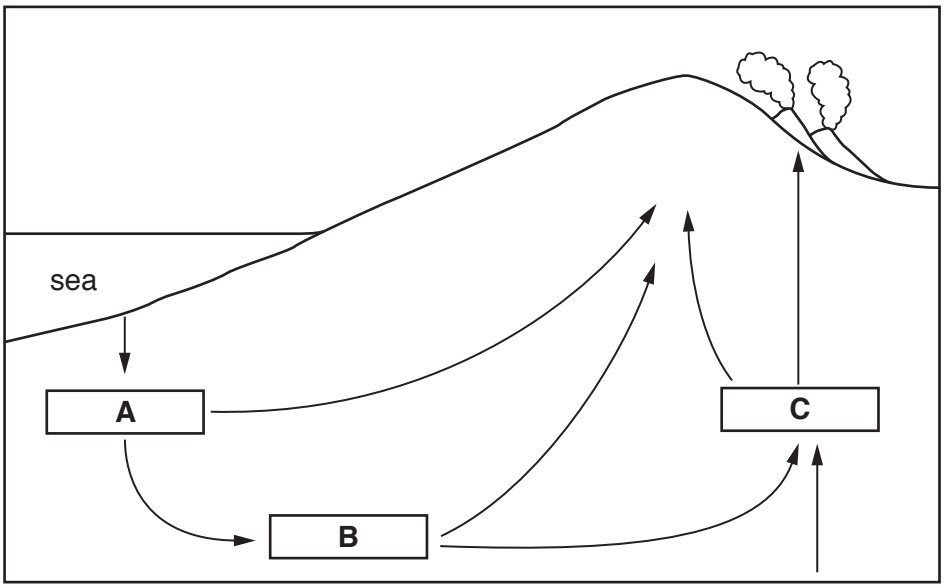
- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. If additional space is required, you should use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.
- Do **not** write in the barcodes.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- Where you see this icon you will be awarded a mark for the quality of written communication in your answer.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.
- The total number of marks for this paper is **100**.
- This document consists of **20** pages. Any blank pages are indicated.

Answer **all** the questions.

1 **(a)** Below is a diagram of the rock cycle.



(i) State the rock group which corresponds to **A**, **B** and **C**.

	rock group
A	
B	
C	

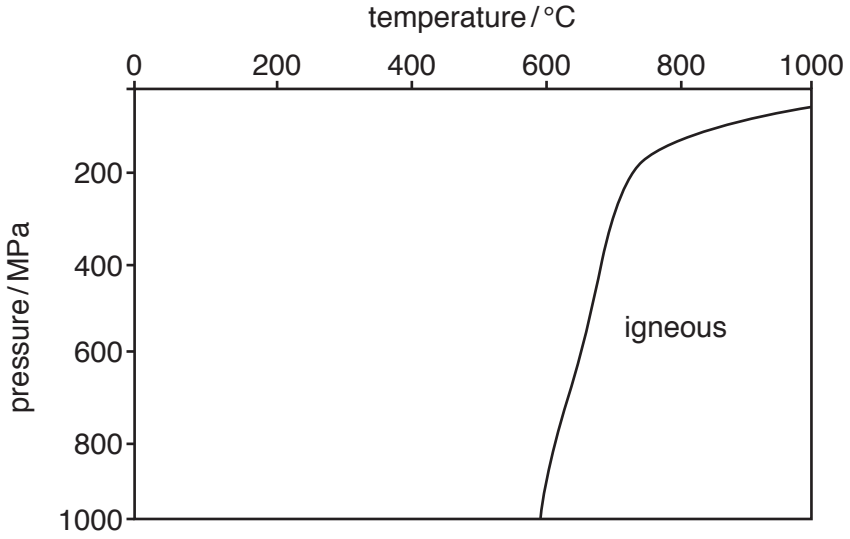
[1]

(ii) Mark on the diagram

- **Y**, where uplift takes place
- **Z**, where burial takes place

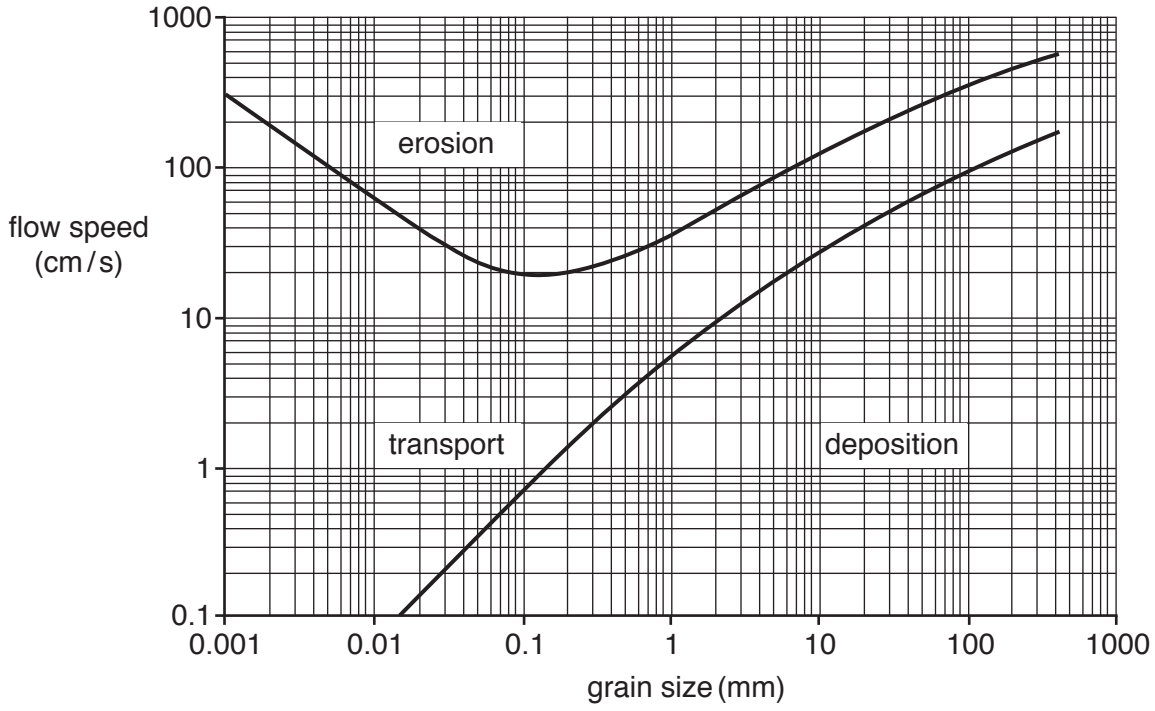
[1]

(iii) Complete the graph by labelling the position of the rock groups to show the relationship between temperature and pressure.



[2]

(b) The graph below shows the Hjulstrom curve, which shows the relationship between the size of a sediment and the velocity required to erode, transport and deposit it.



(i) State the minimum velocity required to transport a sediment size of 6 mm.

..... **[1]**

(ii) State the minimum velocity required to erode a sediment size of 0.1 mm.

..... **[1]**

(iii) Describe the difference between weathering and erosion.

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..... **[2]**

(iv) Draw a fully labelled diagram to show the processes of saltation and traction along a river bed.

[2]

(v) Describe how sediments may be transported by solution and suspension.

solution .....

.....

suspension .....

.....

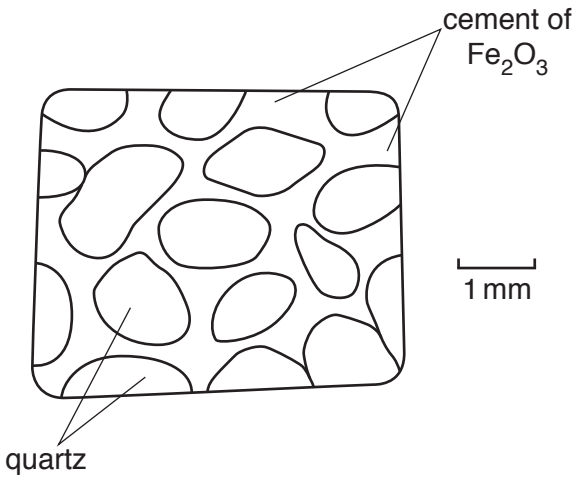
[2]

(c) (i) Define the following term:

diagenesis .....

..... **[1]**

Below is a diagram of cemented sandstone.



(ii) Describe and explain the process of cementation to form this rock type.

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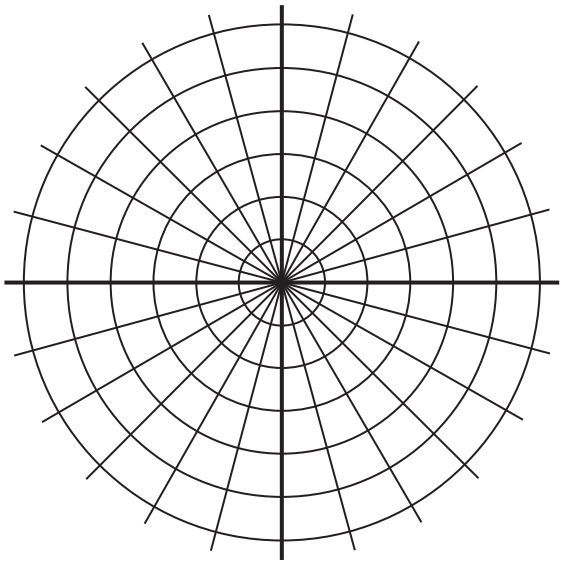
..... **[2]**

(iii) The table below shows measurements of clast imbrication taken in sandstones to determine palaeocurrent direction. Complete the rose diagram by shading the appropriate areas.



Orientation (degrees from North)	Number of clast readings
1-30°	2
31-60°	6
61-90°	4
91-120°	0
121-150°	0
151-180°	0
181-210°	0
211-240°	1
241-270°	2
271-300°	6
301-330°	12
331-360°	8

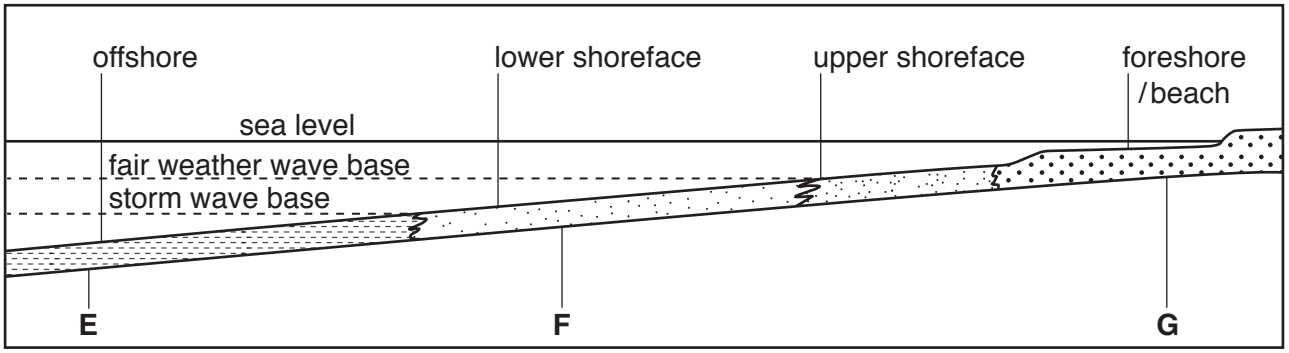
[3]

(iv) State the palaeocurrent direction.

..... **[1]**

[Total: 19]

2 **(a)** The diagram below shows a cross section of the extent of the continental shelf.



(i) Name the rock that will form at **E**.

..... **[1]**

(ii) State and explain the energy level that exists at **E**.

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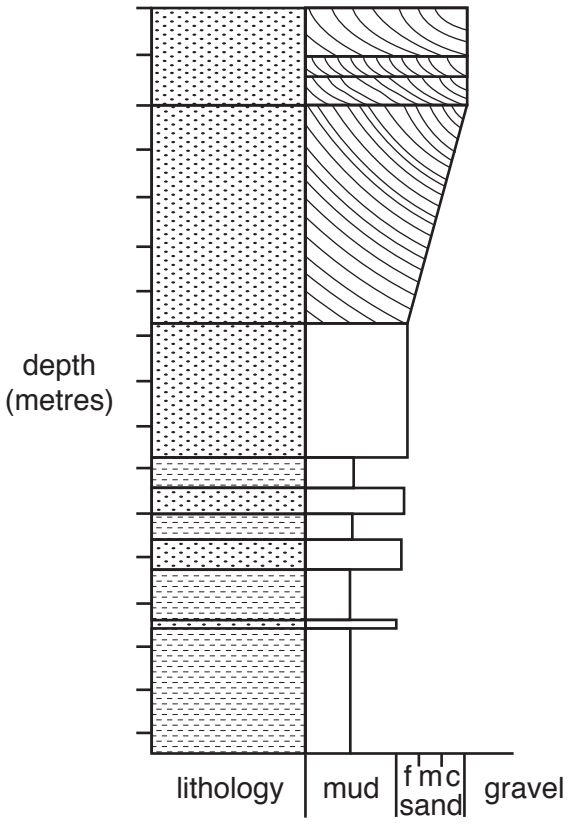
..... **[1]**

(iii) The graphic log below shows a sequence of rocks that formed at **F**. Describe and explain the sequence of environments shown in the graphic log.



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..... **[2]**

(b) Cross bedding forms at **F**. With the aid of a labelled diagram, explain how it forms.

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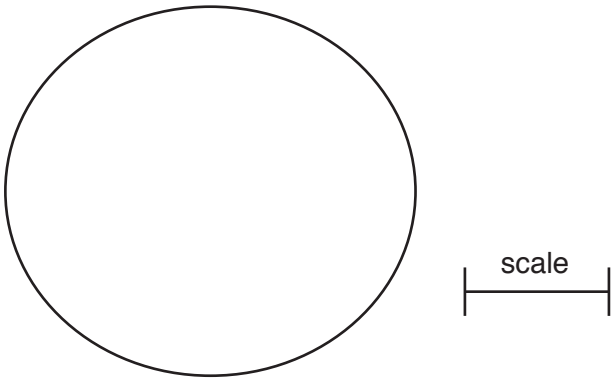
..... **[4]**

(c) **(i)** The rock type formed at **G** is coarse grained. Draw a diagram including an appropriate scale to illustrate this.



[1]

(ii) Name rock **G**.

..... **[1]**

(d) (i) Describe and explain the origin of the material deposited in these marine sediments.

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..... **[2]**

(ii) Draw labelled diagrams to illustrate the difference between symmetrical ripple marks and asymmetrical ripple marks.

symmetrical ripple marks	**asymmetrical ripple marks**

[1]

(iii) Explain why both symmetrical and asymmetrical ripple marks are found in shallow seas.

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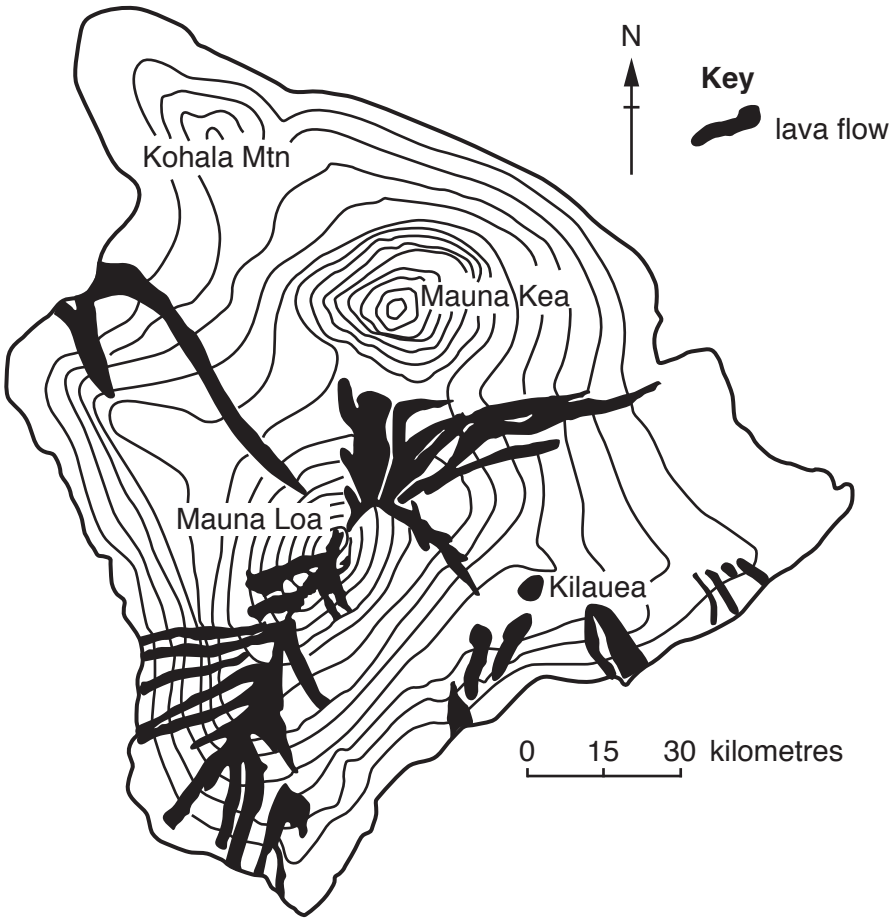
..... **[2]**

[Total: 15]

3 Below is a simplified map of lava flows since 1800 on the Island of Hawaii.



(a) (i) Describe the distribution of lava flows and the relationship to the shape of the island.

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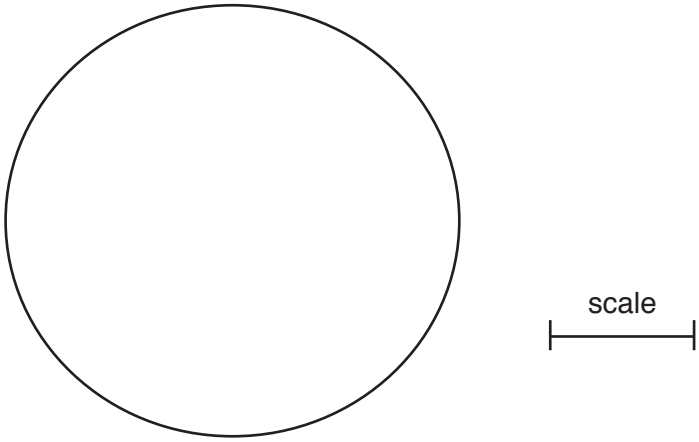
..... **[3]**

The photograph below shows a lava flow in Kilauea National Park.

(ii) Name the type of basaltic lava flow seen in the photograph.

..... **[1]**

(iii) Draw and label a vesicular texture including an appropriate scale and explain how this texture forms.



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..... **[3]**

(b) (i) Name the classification of magma found at hotspots.

..... **[1]**

(ii) Rocks **J** and **K** are rock types found on the island.

Name rock type **J** and **K**.

	Rock J	**Rock K**
Colour	dark	dark
Silica content	45–52%	45–52%
Crystal grain size	medium	coarse
Texture	porphyritic or equigranular	equigranular
Mode of origin	minor intrusions	major intrusions
Composition and minerals	plagioclase feldspar pyroxine	pyroxene, plagioclase feldspar occasional olivine
Rock name		

[2]

(iii) Explain why magma is found at hotspots.

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..... **[3]**

(c) Describe and explain with the aid of a labelled diagram(s) how pillow lava forms.

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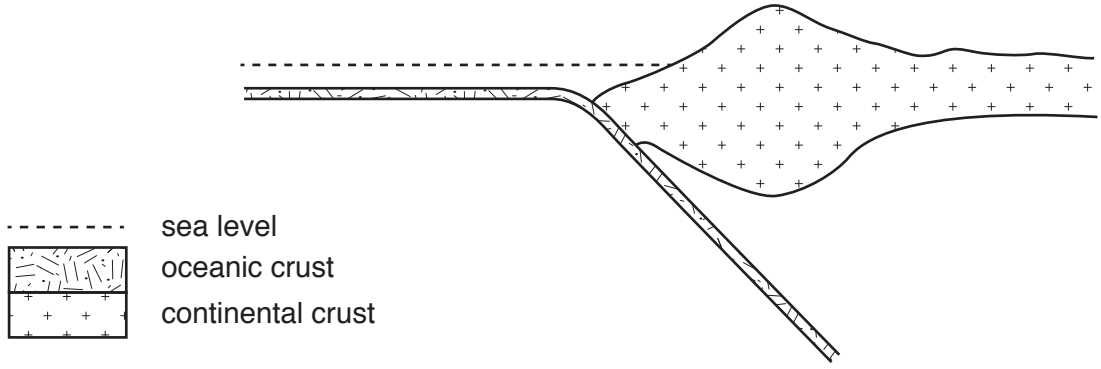
..... **[3]**

[Total: 16]

4 **(a)** The diagram below is a cross section through a convergent plate boundary.



(i) On the diagram:

- shade and label the area where partial melting of continental crust occurs
- shade and label the area where partial melting of oceanic crust occurs
- draw the likely position of a batholith
- add arrows to indicate plate movement

[2]

(ii) State **three** characteristics of a silicic magma.

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..... **[1]**

(iii) Explain the origin of granitic magmas in forming batholiths.

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..... **[2]**

(iv) Explain how a metamorphic aureole forms around a batholith.

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..... **[2]**

(v) State the parent rock which produced the following metamorphic rocks.

metamorphic rock	parent rock
spotted rock	
marble	
quartzite	

[2]

(b) The photograph below is of a volcanic product found near to a crater of a volcano which has formed at this plate boundary.

(i) Name the volcanic product shown in the photograph.

..... **[1]**

(ii) State two additional volcanic products associated with this volcano type.

.....

..... **[1]**

(iii) Describe how changes in ground level, groundwater and seismicity can be used to predict volcanic activity.

ground level .....

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groundwater .....

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seismicity .....

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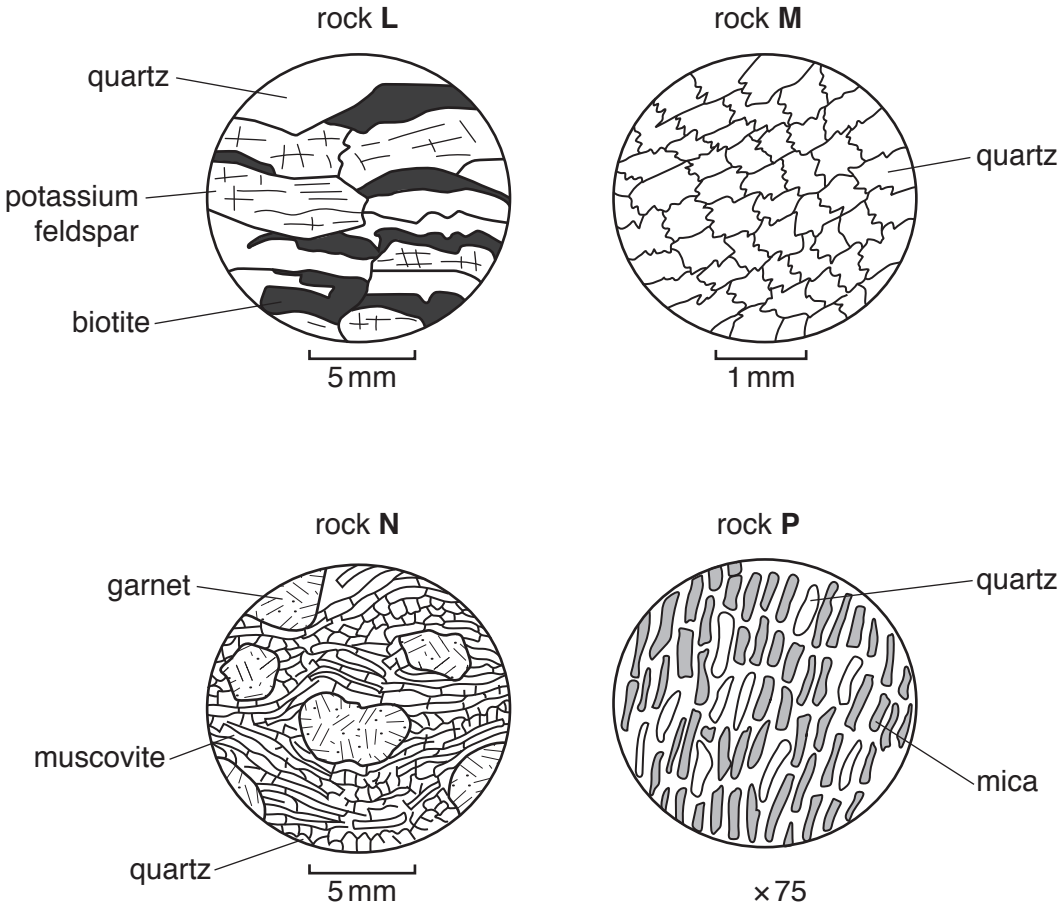
[3]

[Total: 14]

5 **(a)** The four diagrams below represent four different rock types in thin section.



(i) Identify the **rocks L**, **M**, **N** and **P**.

	Name
Rock L	
Rock M	
Rock N	
Rock P	

[4]

(ii) State which rock **L**, **M**, **N**, **P** is unfoliated and explain why it does **not** show foliation.

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..... **[2]**

(iii) Describe and explain how the texture in **Rock N** formed.

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..... **[2]**

(b) (i) Define the following terms:

Metamorphic grade .....

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Index mineral .....

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Isograd .....

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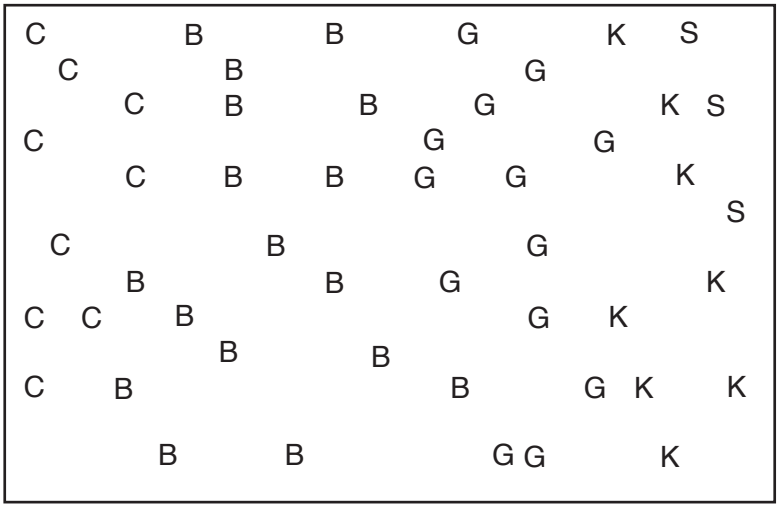
[3]

(ii) Complete the map below by drawing the isograds.

Key

C	chlorite
B	biotite
G	garnet
K	kyanite
S	sillimanite



[2]

(iii) In which direction does the metamorphism increase in intensity?

..... **[1]**

(iv) State the name of the rock and the temperature and pressure conditions in which sillimanite is typically found.

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..... **[2]**

[Total: 16]

6 Describe the processes of magmatic differentiation. Include the following:

- fractional crystalisation
- gravity settling
- filter pressing.

You may use diagrams to illustrate your answer. **[10]**

In your answer you should make clear links between the process and product.

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[Total: 10]

7 Describe deposition in glacial environments. Include the following:

- boulder clay
- varves
- sands and gravels.

You may use diagrams to illustrate your answer. **[10]**

In your answer, you should make clear links between the environment and the rocks deposited.

boulder clay .....

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varves .....

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sands and gravels .....

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[Total: 10]

END OF QUESTION PAPER

ADDITIONAL ANSWER SPACE

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).