



SPECIMEN

Advanced GCE

GEOLOGY

Unit F796: Centre-based Task

Specimen Task

For use from September 2008 to June 2009.

F796

All items required by teachers and candidates for this task are included in this pack.

INFORMATION FOR CANDIDATES

- Centre-based Task

INFORMATION FOR TEACHERS

- Mark scheme.
- Instructions for Teachers and Technicians.

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Candidates answer on this task sheet.

Additional Materials:

INSTRUCTIONS TO CANDIDATES

- Answer **all** parts of the task.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each part of the task.
- The total number of marks for this task is **20**.

ADVICE TO CANDIDATES

- Read each part carefully and make sure you know what you have to do before starting your answer.

FOR TEACHER'S USE		
Part	Max.	Mark
1	7	
2	5	
3	8	
TOTAL	20	

This task consists of **10** printed pages.

1 Ideally the rock underlying a reservoir should be impermeable so that water can not leak out. Where rocks under a reservoir are permeable then it may be necessary to grout the area to reduce leakage. In either case it is vital to know the porosity and permeability of the rocks before construction starts. This task will provide data that will allow you to determine the rocks with the lowest porosity and permeability.

(a) (i) Use the rock specimens of granite, chalk, poorly cemented sandstone and well cemented sandstone provided and measure the change in weight of the specimens immersed in water over time. Record your results in the table.

- weigh each of the dry rocks
- immerse each rock in a beaker of water with the water depth sufficient to cover the specimen entirely
- at 1 minute intervals remove each specimen and reweigh
- continue until each specimen maintains the same weight.

[1]

(ii) Calculate the % porosity for all the rocks [1]

rock	1 min	2 min	3 min	4 min	5 min	6 min	7 min	8 min	9 min	10 min	% porosity

(b) Describe each of the specimens using technical terms. [1]

rock	description
granite	
chalk	
poorly cemented sandstone	
well cemented sandstone	

(c) Draw line graphs using all the rock data, on the same axes, to show the change in weight over time. Clearly identify the rock with the highest permeability. [1]

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[Turn over

(d) Describe the likely errors that may have occurred in your experiment.

.....
.....
.....

[1]

(e) Using all the information, write a report suggesting what measures would be necessary to create a leak free reservoir for each of the rocks.

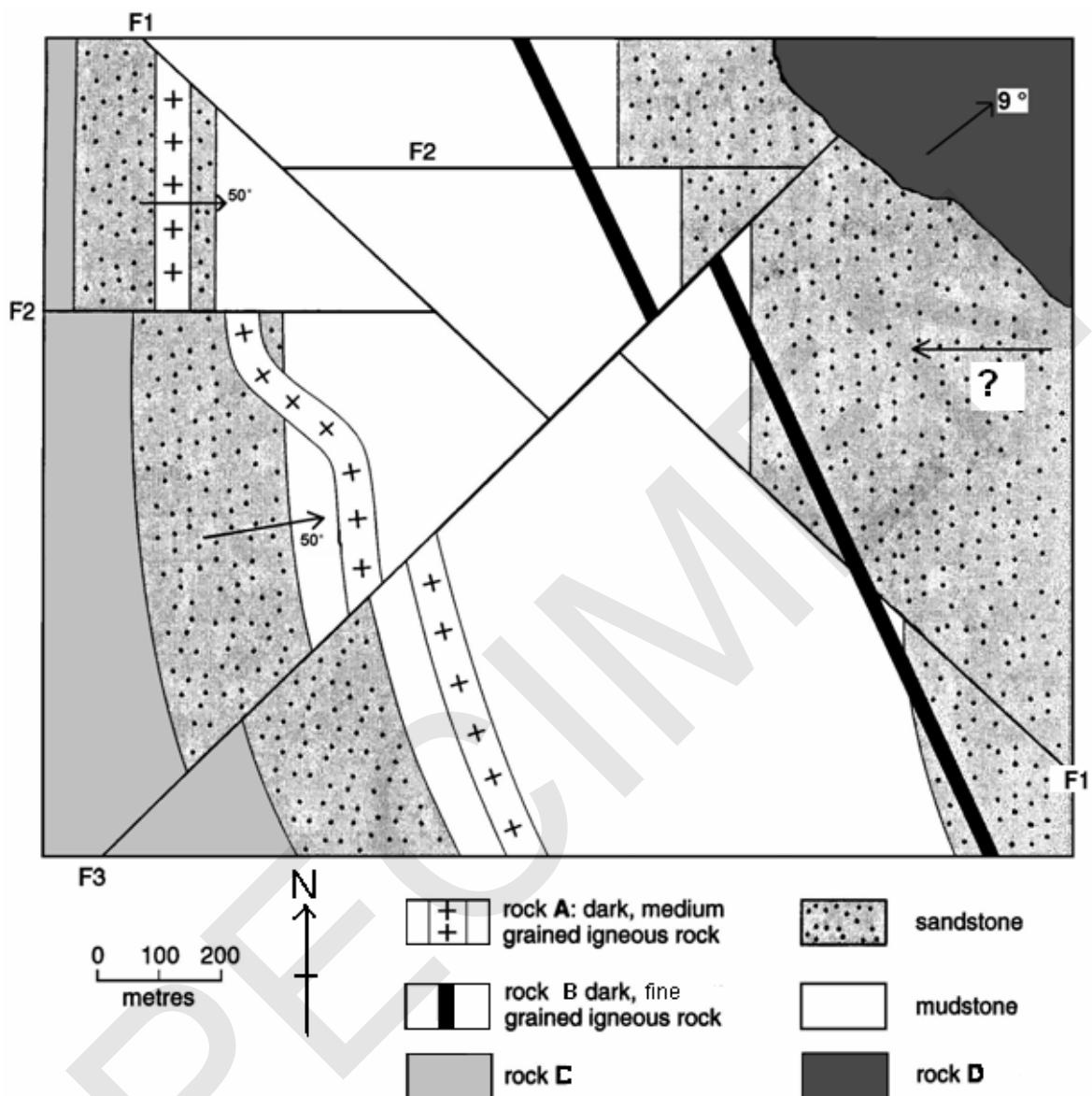
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[2]

[Turn over

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2 The geological map below shows an area of folded sedimentary rocks cut by several faults (F1, F2, F3) and igneous intrusions (rocks A and B).



(a)

(i) Identify rocks A and B

..... [1]

(ii) If a reservoir was constructed that covered the central area of the map state **two** problems that may arise.

.....

 [1]

[Turn over

(b) Describe the sequence of events that produced the geology shown on the map. Start with the earliest events and use technical terms including estimates of dips and fault displacements. You may use a series of numbered points.

[3]

3

(a) The rock shown in the photograph below reacts with dilute hydrochloric acid.



0 10 20 30 mm

(i) Identify and describe the preservation of the fossils in this rock.

.....
.....
.....
.....

[1]

(ii) The rock shown in the photograph is extensively quarried. Describe possible economic uses of this rock.

.....
.....
.....
.....

[1]

[Turn over

(b) The photographs below show two fossils in mudstone.

fossil 1



0 10 20 30 mm

fossil 2



0 20 40 60 mm

(i) Describe and identify the fossils above using measurements and observations from the photographs. Your answer should include morphological terms.

fossil 1

.....
.....
.....

fossil 2

.....
.....
.....

[2]

(ii) State a possible environment of deposition in which these rocks and fossils were deposited. Give reasons for your answers and name the most likely period of time for deposition.

.....
.....
.....
.....
.....

[1]

(c) Draw labelled sketches, with a suitable scale, to show a brachiopod that could be found in rocks of the same age as fossils 1 and 2.

[2]

(d) Describe why collecting fossils needs to be done responsibly and safely.

.....
.....
.....
.....

[1]

Total [20]

END OF TASK

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Oxford Cambridge and RSA Examinations

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GEOLOGY

F796

Unit F796: Centre-based Task

Specimen Mark Scheme

The maximum mark for this task is **20**.

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Question Number	Answer	Mark
1(a)(i)	correct data for granite and cemented sandstone that show no or little increase in weight Correct data for chalk and uncemented sandstone that show an increase in weight	[1]
1(a)(ii)	granite and cemented sandstone likely to show zero porosity chalk and uncemented sandstone may have up to 30% porosity	[1]
1(b)	suitable descriptions of grain/crystal size, colour, sorting, texture	[1]
1(c)	correct line graphs, and uncemented sandstone likely to have highest permeability	[1]
1(d)	air trapped in rock / rock disintegrating water lost when weighing	[1]
1(e)	grouting needed for chalk and uncemented sandstone or impermeable cut off curtain / the higher the porosity the more grout is needed / clay seal on bottom of reservoir granite and cemented sandstone should require no measures at all	[1] [1]
2(a)(i)	A = dolerite B = basalt	[1]
2(a)(ii)	Faults would act as leakage areas / potential movement along faults Syncline structure means that sandstone on mudstone dipping inwards may slip / landslides	[1]
2(b)	order of deposition of beds as rock C, sandstone and mudstone; folding into asymmetric syncline with axial plane trace trending N – S and western limb dipping east at 50° – eastern limb dipping west at a lower angle (ecf); intrusion of rock A as a transgressive sill into the sandstone that moves into the mudstone; faults F2, F1 and F3 in that order displace beds, all are vertical faults as straight outcrop, not clear movement on F1 and F2 but F3 is a strike slip fault with sinistral movement of 140m shown by dyke of rock B which was after F2 and F1 but before F3; erosion and rock D laid down unconformably; tilted 9° NE	[1] [1] [1]
3(a)(i)	internal casts and external moulds of gastropods where shell infilled and covered by lime mud, original shell dissolved away by ground water, holes left where shell was.	[1]
3(a)(ii)	building stone, decorative stone, crushed for cement fossil 1 ammonite 37 mm wide, no ribs, crushed specimen, evolute with umbilicus 20 mm wide	[1] [1]
3(b)(i)	fossil 2 crinoid with round stem 29 mm long, calyx 20 mm made up of pentagonal shaped plates and branching arms over 25 mm long though not all shown	[1]
3(b)(ii)	shallow sea (continental shelf) as crinoids are common there, low energy as both are delicate fossils and are found whole, rapid deposition of mud to cover organic material before decay or scavengers. Jurassic age	[1]
3(c)	terebratula or rhynchonella type of short hinged brachiopods drawn with scale and labels of brachial and pedicle valves, foramen, ribs / growth lines, hinge line, commissure	[1] [1]

Question Number	Answer	Mark
3(d)	erosion of areas, conservation of a limited resource, only taking what's needed, following geological code, wearing protective equipment	[1]
	Total	[20]

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Advanced GCE

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F796

Unit F796: Centre-based Task

Instructions for Teachers and Technicians

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This document consists of **2** printed pages.

This task relates to Module 1, Unit F794 and Module 2 Unit F795. There is no time limit but it is expected that it can be completed within one timetabled session.

It is assumed that you will have completed the teaching of the above modules before setting your students this task. This module has links to other modules which contain related learning experiences – please refer to your specification.

Candidates may attempt more than one Centre-based Task with the best mark from this type of task being towards the overall mark for Unit F796.

Preparing for the assessment

It is expected that before candidates attempt Centre-based Task (Unit F796) they will have had some general preparation in their lessons. They will be assessed on a number of skills such as demonstration of skilful and safe practical techniques using suitable qualitative methods, the ability to make and record valid observations, and the ability to organise results suitably. It is therefore essential that they should have some advance practice in these areas so that they can maximise their attainment.

Preparing candidates

At the start of the task the candidates should be given the task sheet.

Candidates must work on the task individually under controlled conditions with the completed task being submitted to the teacher at the end of the lesson. Completed tasks should be kept under secure conditions until results are issued by OCR.

Candidates should not be given the opportunity to redraft their work, as this is likely to require an input of specific advice. If a teacher feels that a candidate has under-performed, the candidate may be given an alternative task. In such cases it is essential that the candidate be given detailed feedback on the completed assessment before undertaking another Centre-based Task. Candidates are permitted to take each task **once** only.

Assessing the candidate's work

The mark scheme supplied with this pack should be used to determine a candidate's mark out of a total of 20 marks. The cover sheet for the task contains a grid for ease of recording marks. To aid moderators it is preferable that teachers mark work using red ink, including any appropriate annotations to support the award of marks.

Notes to assist teachers with this task

Teachers must trial the task before candidates are given it, to ensure that the apparatus, materials, chemicals etc provided by the centre are appropriate. The teacher carrying out the trial must complete a candidate's task sheet showing the results obtained, and retain this, clearly labelled, so that it can be provided to the moderator when requested.

Health and Safety

Attention is drawn to Appendix C of the specification.