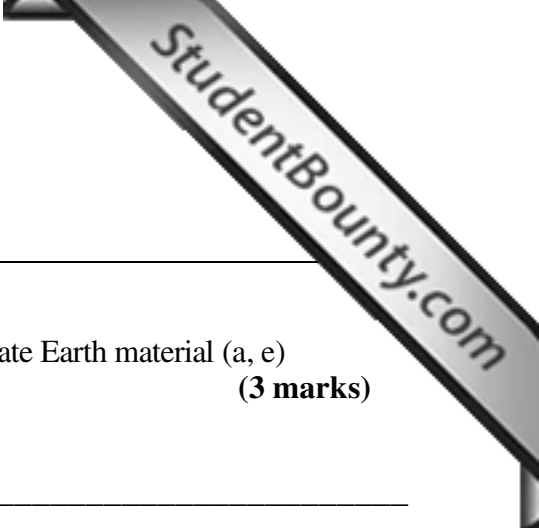


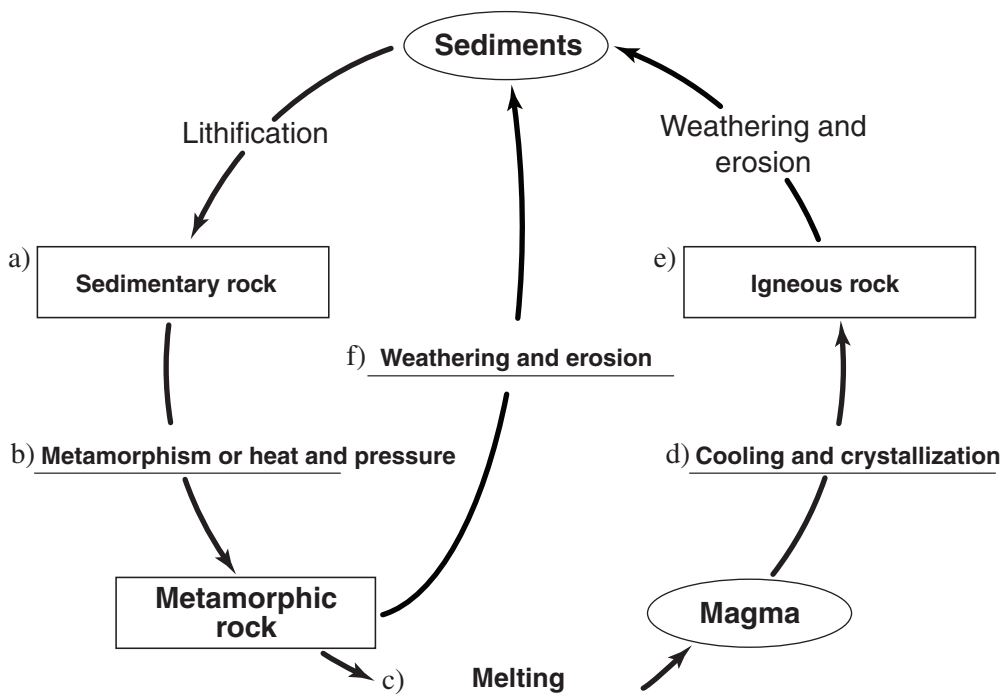
Geology 12  
Resource Exam B  
Scoring Guide



1. Complete the following rock cycle diagram by labelling the appropriate Earth material (a, e) or process (b, c, d, f) where indicated. (3 marks)

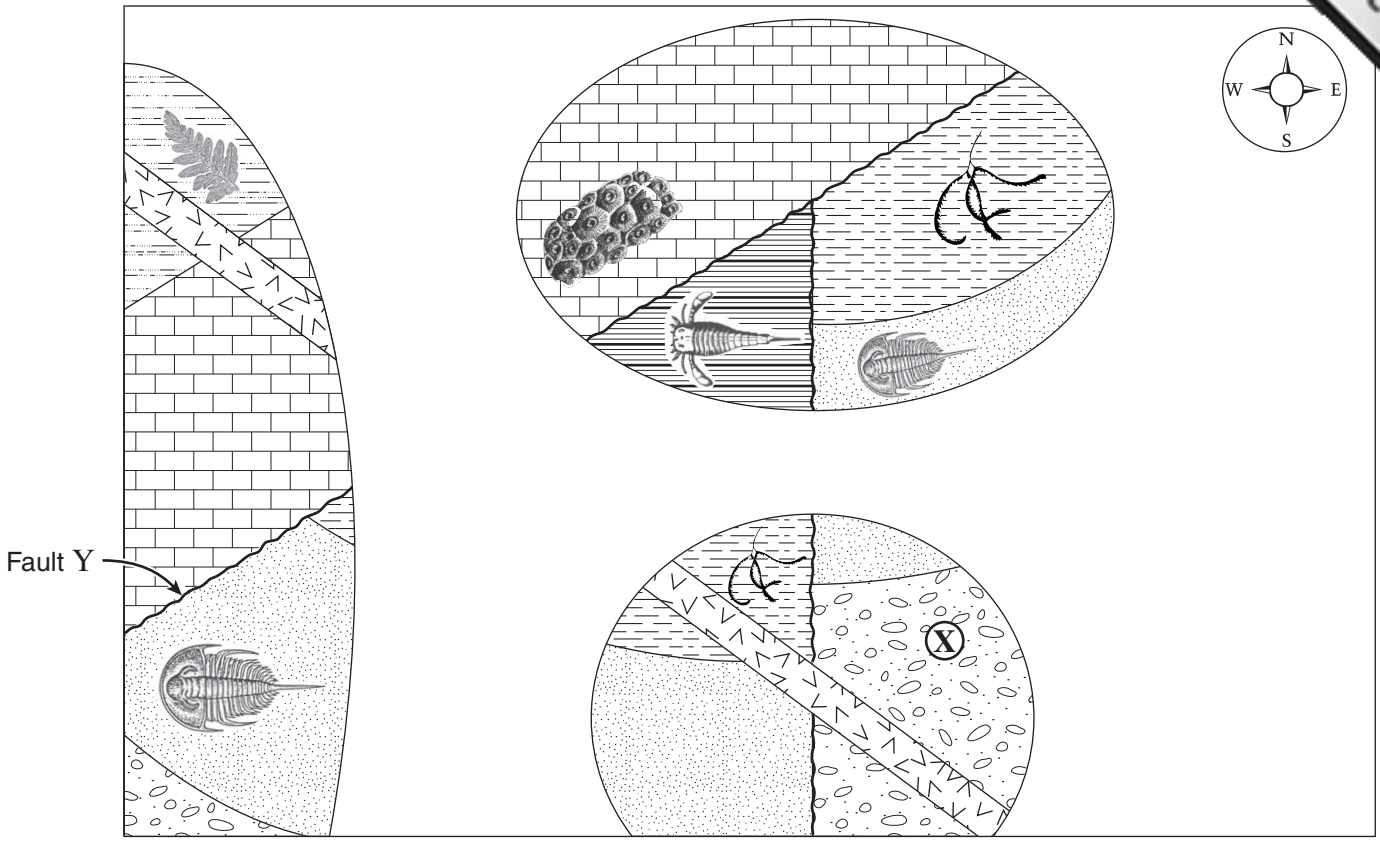
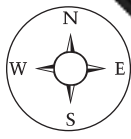
**KEY** \_\_\_\_\_

*1/2 mark for each correctly labelled material or process. Total 3 marks.*



KEY	
Earth material	Process
?	_____

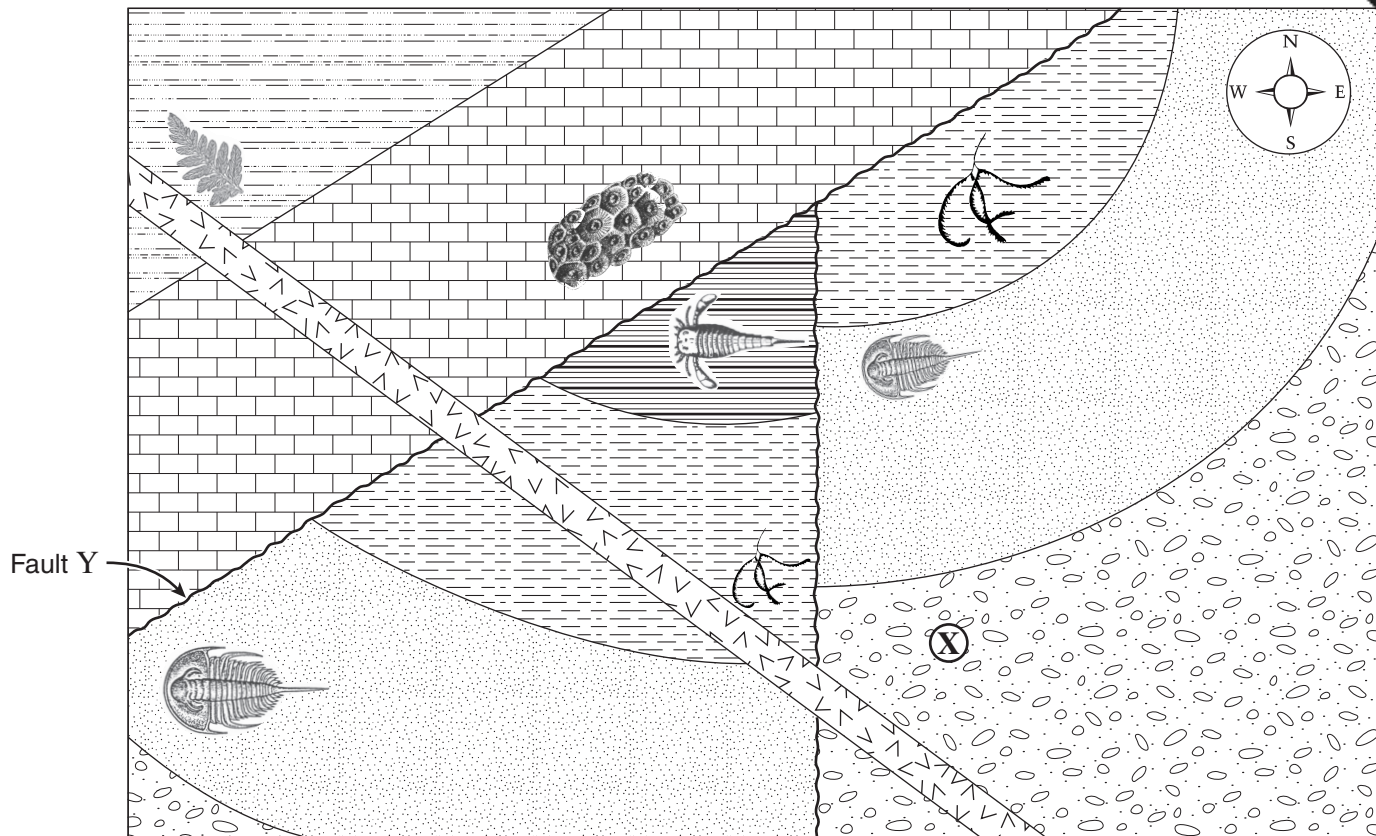
Use the following incomplete geological map to answer questions 2 to 4.  
 Each layer represents a different geologic period.










- |  |           |  |           |  |              |  |                 |
|--|-----------|--|-----------|--|--------------|--|-----------------|
|  | Sandstone |  | Limestone |  | Conglomerate |  | Mafic intrusion |
|  | Red shale |  | Siltstone |  | Black shale  |  |                 |

2. The diagram shows an incomplete geological map. Complete the map by drawing the contacts between rock layers. It is not necessary to fill in the legend patterns.

KEY \_\_\_\_\_



	Sandstone		Limestone		Conglomerate		Mafic intrusion
	Red shale		Siltstone		Black shale		

3. Using evidence from the diagram, describe how you could determine the geological period during which fault Y moved.

**KEY** \_\_\_\_\_

**Devonian—the youngest layer cut by the fault is Silurian, and the layer that cuts across the fault (above the unconformity) is Mississippian. (2 marks)**

4. Unit X is a Precambrian conglomerate. Describe two different geological reasons why fossils have not been found in unit X. (2 marks)

**KEY** \_\_\_\_\_

*1 mark each for any two of the following:*

- **The rock unit is Precambrian (lying below Cambrian rocks containing the trilobite). Organisms at this time were soft-bodied which were much less likely to be preserved than organisms with hard parts.**
- **conglomerate suggests a high-energy environment which most likely would not preserve material**
- **coarse-grained material is not conducive to preservation**
- **the conglomerate may be terrestrial and there was no life on land at the time**

5. The following pairs of Earth materials have some similarities to each other. Describe how they are **different**. (4 marks)

**KEY**

*1 mark for each correct description:*

Earth Material 1	Earth Material 2	Description of Difference between Materials
<i>Example:</i> <b>Rock</b>	<b>Mineral</b>	<i>A rock is an aggregate of one or more minerals. A mineral is a pure substance (element or compound).</i>
<b>Feldspar</b>	<b>Pyroxene</b>	<i>Feldspar is lighter coloured than pyroxene. Feldspar is richer in K and Na. Pyroxene is richer in Mg and Fe.</i>
<b>Sandstone</b>	<b>Quartzite</b>	<i>Sandstone contains sand grains but quartzite is recrystallized.</i>
<b>Pahoehoe lava</b>	<b>Aa lava</b>	<i>Pahoehoe lava has a ropy surface but Aa lava is blocky and broken.</i>
<b>Sand</b>	<b>Silt</b>	<i>Sand is composed of larger particles (2 mm – 1/16 mm ) than silt ( 1/16 mm – 1/256 mm).</i>

6. It is hypothesized that millions of years ago the African and South American continents were connected in a single land mass, and have since drifted apart. Explain two pieces of evidence that can be found on these continents which confirm this hypothesis. (4)

**KEY**

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*2 marks each for any two of the following:*

- 1. Plant and animal fossils are the same on continents on either side of the ocean:**

**The same plant and animal species could not evolve identically at the same time – a location containing the same fossils suggests the continents were once together.**

*$\frac{1}{2}$  mark for just saying plant and animal fossils*

- 2. Coal deposits found in polar regions:**

**The formation of coal requires the decomposition of organic material, usually tropical swamp material. The South Pole has never had a tropical climate, which suggests that Antarctica was once in a warmer location than it is now.**

- 3. Glacial evidence in tropical areas:**

**Erosional features caused by glaciation require a cold environment. It is unlikely that areas this close to the equator were extremely cold. This suggests the two continents were at one time in colder locations than they are now.**

**Direction of ice flow (i.e. from South Africa towards and across South America) is consistent with their being joined.**

- 4. Matching coastlines of continents:**

**The continental shelves of both continents fit together, much like puzzle pieces.**

- 5. Matching rock features between continents:**

**Rocks of similar ages, structures and formation (i.e. mountain ranges) can be found on both continents.**

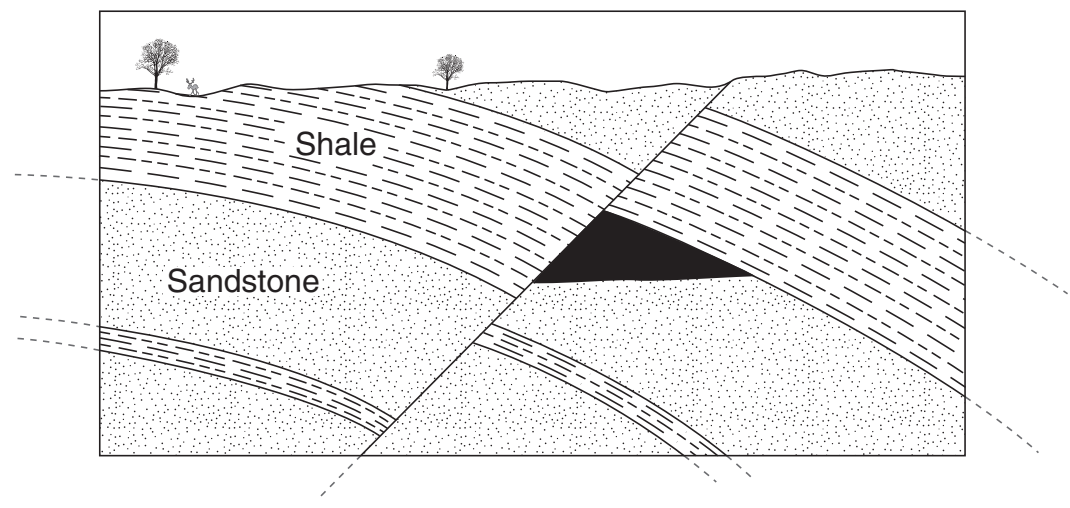
7. Describe two pieces of evidence for plate movement that could be found on the floor of a typical ocean.

**KEY** \_\_\_\_\_

*1 mark each for any two of the following:*

- **central location of the Atlantic Rise (Mid-Atlantic Ridge)**
- **symmetrical pattern of magnetic striping on either side of ridge**
- **increasing age of seafloor basalts with increasing distance from ridge**
- **increasing thickness of sediments moving along the Mid-Atlantic Ridge towards the continents on either side**
- **fossils in the lowest layers of ocean sediments increase in age**
- **continental shelves match**
- **chains of hotspot volcanoes**

Use the following diagram to answer questions 8 and 9.  
Note: The rock units continue beyond the edges of the diagram.



8. The diagram shows a geologic cross section of an area known to contain petroleum deposits. Shade the place where a petroleum deposit would most likely be found. (1 mark)

**KEY** \_\_\_\_\_

The petroleum deposit must be located in the fault trap beneath the thicker layer of shale. (1 mark)

9. Describe two reasons why the sandstone would make a better reservoir rock than the shale. (2 marks)

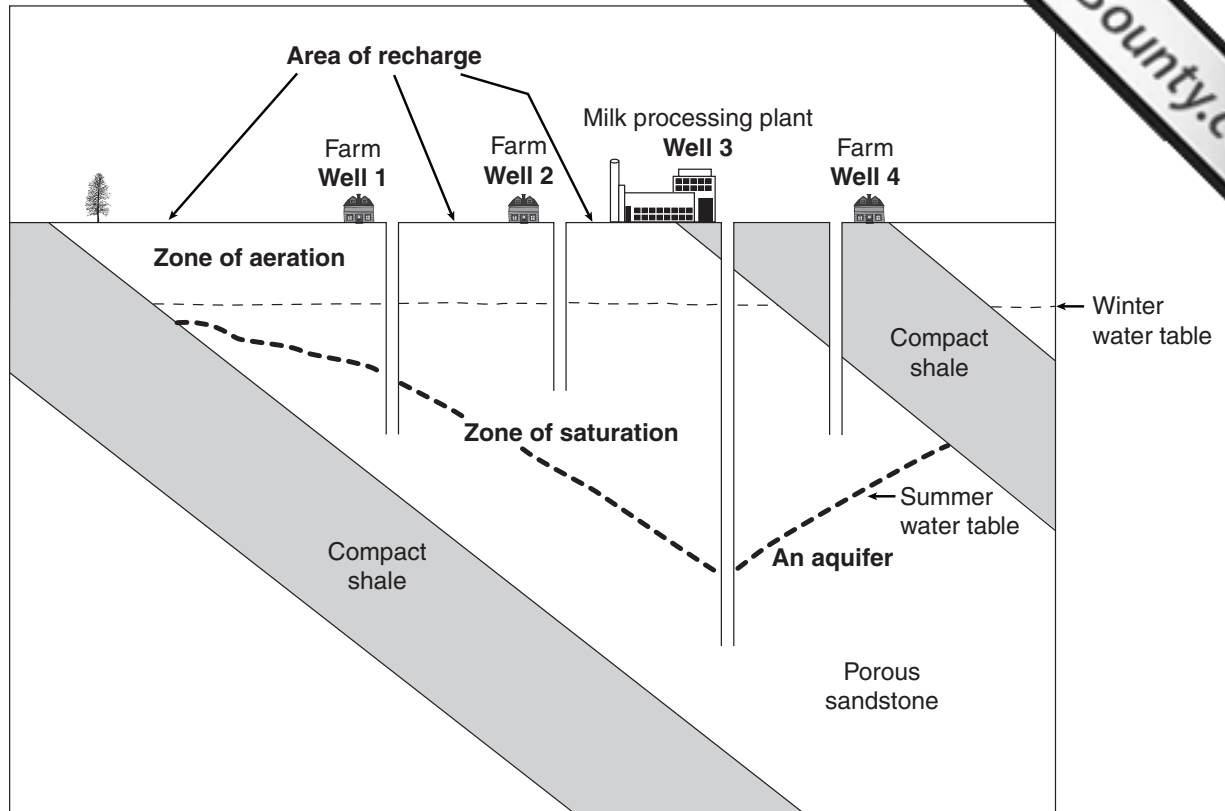
**KEY** \_\_\_\_\_

1 mark each:

- sandstone has higher porosity and higher permeability than shale
- sandstone can contain more petroleum than shale and the petroleum can be pumped out of the sandstone more easily



Use the following cross section to answer questions 10 and 11.



10. The cross section shows four water wells in a dairy farming area. The underlying bedrock consists of layers of porous sandstone and thick bands of compact shale. The position of the water during the winter months is indicated with a dotted line. On the cross section, label the following: (2 marks)
- i) zone of aeration
  - ii) area of groundwater recharge
  - iii) zone of saturation
  - iv) an aquifer

See diagram above.  $\frac{1}{2}$  mark each for correct labelling. Total 2 marks.

11. During a dry summer period of very high water usage, wells 2 and 4 go dry but wells 1 and 3 are still able to produce a supply of water from the sandstone. On the cross section, draw and label the likely shape of the water table during this dry summer period. (2 marks)

See diagram above.