WJEC 2014 Online Exam Review

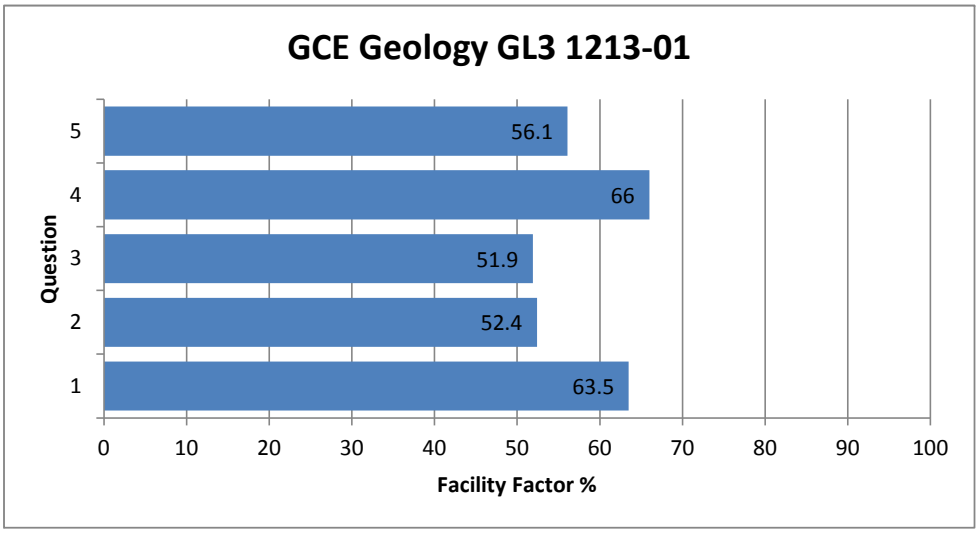
GCE Geology GL3 1213-01

All Candidates' performance across questions

Question Title	N	Mean	S D	Max Mark	F F	Attempt %
1	1649	7.6	2.2	12	63.5	100
2	1649	6.8	2.6	13	52.4	100
3	500	13	5.3	25	51.9	30.3
4	558	16.5	4.4	25	66	33.8
5	590	14	4.7	25	56.1	35.8

1aii 1bii 1cii

2ai 2aii 2c



Examiner only

1. **Figure 1a** is a map showing the epicentres of Mexican earthquakes leading up to the 8.1 magnitude earthquake of 19 September 1985. **Figures 1b** and **1c** show data on damage related to the 1985 Mexican earthquake.

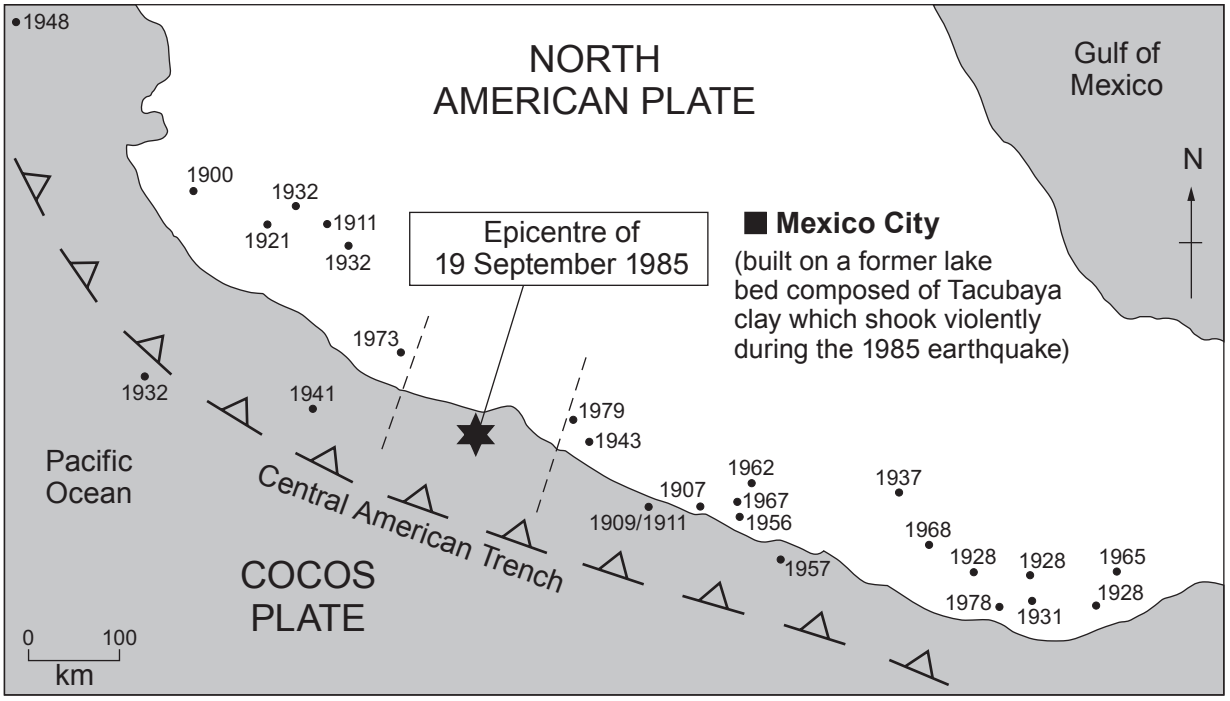


Figure 1a

(a) Refer to **Figure 1a**.

(i) Explain why earthquakes are frequent in the region shown on **Figure 1a**. [2]

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Turn over.

(ii) Explain why the 1985 earthquake might have been predicted to occur in the area where it did. [2]

- because ~~it of the earth~~ it is a highly seismic achive area ~~to~~ lots of earthquakes have been recorded to happen near there. It is also on the epicentre and close to The central American Trach.

(ii) Explain why the 1985 earthquake might have been predicted to occur in the area where it did. [2]

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(ii) Explain why the 1985 earthquake might have been predicted to occur in the area where it did. [2]

Its in the middle of all the foreshocks on a convergent plate boundary. There have had been no quakes in that area yet

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1g

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as there are earthquakes to the right and left of the 1985 and there was a gap in earthquakes where the 1985 earthquake occured.

(ii) Explain why the 1985 earthquake might have been predicted to occur in the area where it did. [2]

1

as there are earthquakes to the right and left of the 1985 and there was a gap in earthquakes where the 1985 earthquake occured.

(ii) Explain why the 1985 earthquake might have been predicted to occur in the area where it did. [2]

They might have predicted it here due to the lack of seismic activity in that area, so the pressure could have been building all this time.

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2

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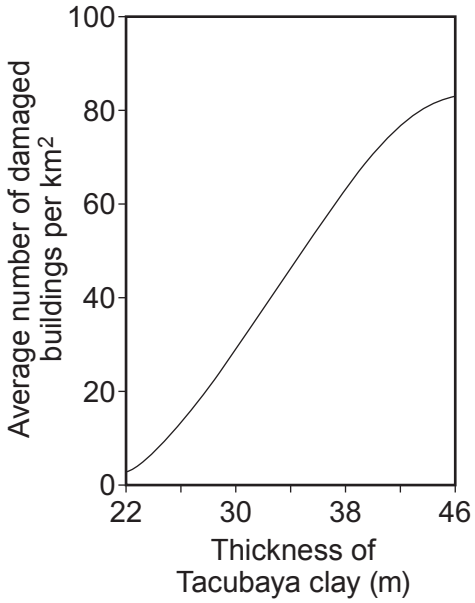

Figure 1b

(b) Refer to **Figure 1b**.

(ii) Explain why the damage caused by the earthquake varied with the thickness of the clay. [2]

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(ii) Explain why the damage caused by the earthquake varied with the thickness of the clay. [2]

The more clay one more unstabully and so more damage occured in buidungson more clay.

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(ii) Explain why the damage caused by the earthquake varied with the thickness of the clay. [2]

The clay shooked violently, which causes a The buildings to shake more and become damaged.

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As clay is incompetant, vibration with earthquakes disrupts the clay's alignment and may cause liquefaction. Hence, as clay is thicker, more damage is caused.

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because the clay will suffer from liquefaction. This means it will become less solid and will amplify the waves so can't support the building foundations. The more clay the more the amplification

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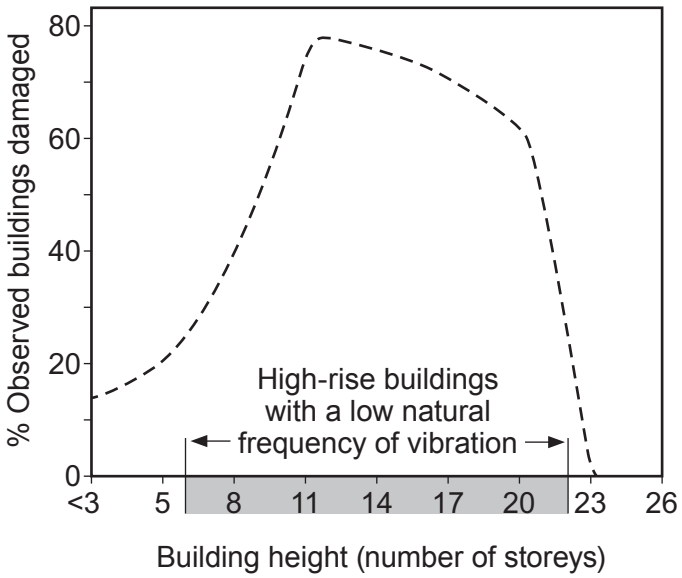

Figure 1c

(c) Refer to **Figure 1c**.

(ii) Explain why buildings outside this range were less likely to be damaged by this earthquake. [2]

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(ii) Explain why buildings outside this range were less likely to be damaged by this earthquake. [2]

Low stoney buildings would have less weight on the ground, so be less likely to collapse or be damaged during an earthquake.

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They had a higher natural frequency of vibration so were less susceptable to damage from the frequency generated by this earthquake

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1m

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(ii) Explain why buildings outside this range were less likely to be damaged by this earthquake. [2]

Small buildings have a lower centre of gravity and won't be damaged as much through vibrations. Also, some buildings could have been built to reduce earthquake hazards.

(ii) Explain why buildings outside this range were less likely to be damaged by this earthquake. [2]

2g

Small buildings have a lower centre of gravity and won't be damaged as much through vibrations. Also, some buildings could have been built to reduce earthquake hazards.

(ii) Explain why buildings outside this range were less likely to be damaged by this earthquake. [2]

they were either small so had a low centre of gravity so didn't move with the quake or they were tall and flexible and did not vibrate at the quakes frequency. Taller buildings are probably better earthquake proof.

(ii) Explain why buildings outside this range were less likely to be damaged by this earthquake. [2]

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they were either small so had a low centre of gravity so didn't move with the quake or they were tall and flexible and did not vibrate at the quakes frequency. Taller buildings are probably better earthquake proof.

Examiner only

2. **Figure 2a** is a section through an aquifer and confining beds.

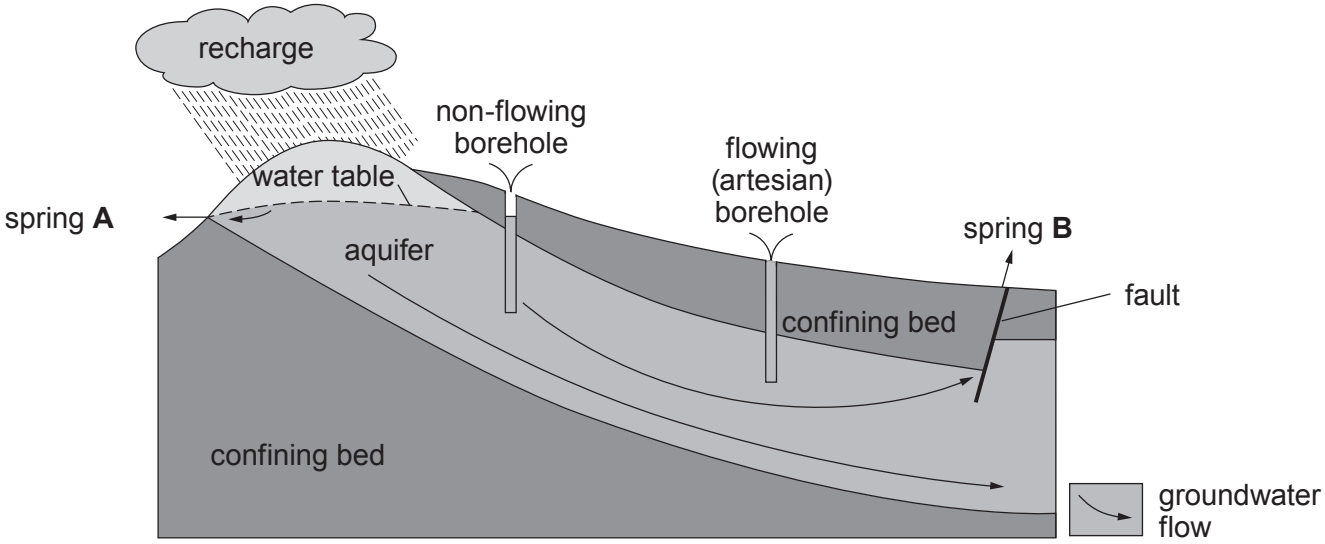

Figure 2a

(a) Refer to **Figure 2a**.

(i) Explain why springs occur at locations **A** and **B**. [3]

A .....

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B .....

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A because The water Table is above The spring.

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A It's the outcrop of the aquifer

B The water from the aquifer travels up the fault, due to it being under high pressure underground, & flows out the fault onto the surface

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A water table intersects with earths surface along the confining bed

B hydrostatic pressure forces water up fault line as below piezometric surface

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A water table intersects with earths surface along the confining bed

B hydrostatic pressure forces water up fault line as below piezometric surface

(ii) Explain how overpumping from the non-flowing borehole might interfere with the hydrological system. [3]

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(ii) Explain how overpumping from the non-flowing borehole might interfere with the hydrological system. [3]

An over abstraction of water can cause the water table to fall deeper. Continuing boreholes deeper could cause a complete depletion of the ground water store and disruption of the closed cycle of water

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(ii) Explain how overpumping from the non-flowing borehole might interfere with the hydrological system. [3]

It would lower the water table, and this would have an effect on rivers as it could cause them to dry up. Also, the flowing borehole may stop flowing if the water table becomes too low.

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(ii) Explain how overpumping from the non-flowing borehole might interfere with the hydrological system. [3]

It could cause a cone of depression which intersects with a contamination source, such as salt water. This is irreversible and the aquifer is now unusable.
It can also result in reducing pore pressure which can cause aquifers to collapse and fall in on themselves - subsidence. This reduces the aquifers ability to store water which would mean more water would be found above land forming rivers or lakes.

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Examiner only

Porosity depends upon a number of sedimentary characteristics. **Figure 2b** shows three sediment models (**A**, **B** and **C**) representing the packing of spherical grains of different sizes.

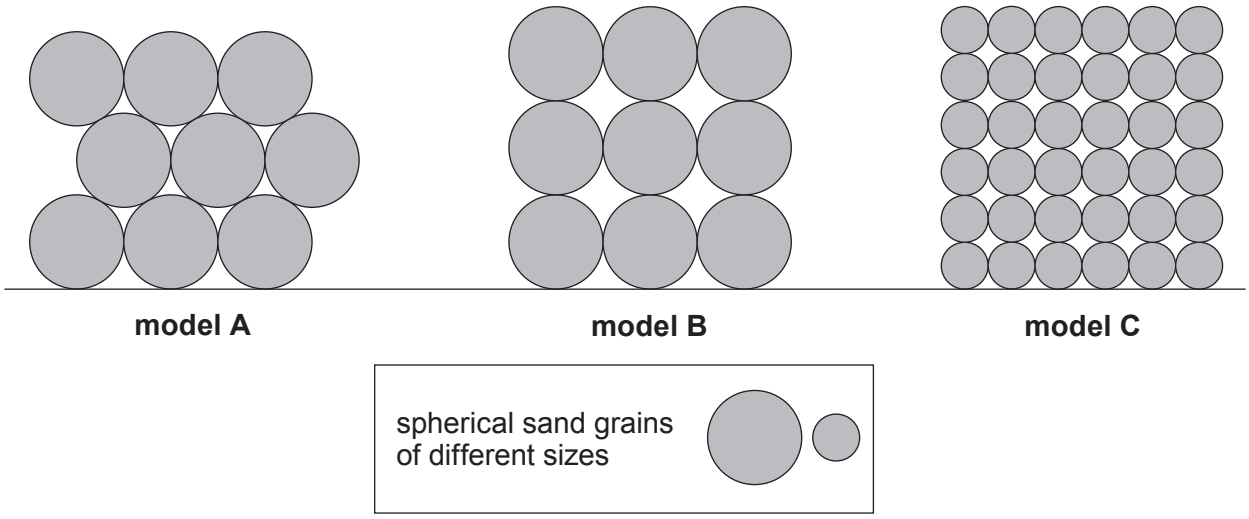

Figure 2b

13

(c) Using **Figure 2b and your knowledge**, explain how overuse of an aquifer can lead to surface subsidence. [3]

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Examiner only

(c) Using **Figure 2b and your knowledge**, explain how overuse of an aquifer can lead to surface subsidence. [3]

Overusing an aquifer can lead to the water table going down very low, as an aquifer is a permeable, saturated layer of rock above a non-permeable layer of rock. If the groundwater level decreases, then the surface will ~~be very~~ lose access to the aquifer from wells that before would have had water in them.

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Examiner only

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Examiner only

(c) Using **Figure 2b and your knowledge**, explain how overuse of an aquifer can lead to surface subsidence. [3]

If an aquifer is drained, there will be much less pressure to hold the above ground up. If this area has been built on, the weight alone could cause the surface to subside. There will be less upwards pressure to hold the building ground up.

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Examiner only

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Examiner only

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A water is removed from an area the volume decrease so there is less support underneath and area of grand so it sinks.

Examiner only

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release pumping water out of an aquifer can result in a pressure reduction. This can change how sediments allign, potentially leading to surface subsidence.

Examiner only

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