

# University of Dublin

## Trinity College

Matriculation  
Examination

Hilary Term, 2011

### Geology

Wednesday 27<sup>th</sup> April

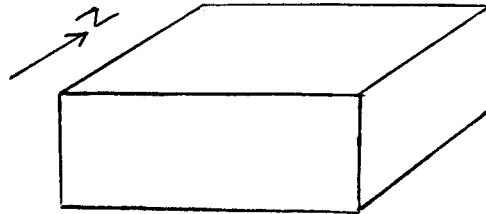
GMB

9.30 - 12.30

Dr I.S. Sanders and Prof. G. Clayton

*Answer any **five** questions. Credit will be given for citing examples, where appropriate, of geological features you have seen in the field.*

1. Describe the geological processes that are going on (a) at the Mid Atlantic Ridge and (b) along the western margin of South America.
2. Describe three different geological structures that serve as reservoirs for oil and gas. (8 marks) How are oil and gas reservoirs discovered, and how are they exploited? (8 marks) What do you consider to be the long-term future of the oil and gas industry? (4 marks)
3. Draw four separate block diagrams viewed from the south-east (as shown) to illustrate the following geological structures: (a) strata dipping west at  $60^\circ$  cut by a vertical NW-SE trending dyke, (b) strata dipping east at about  $70^\circ$  separated by an angular unconformity from younger, overlying strata that dip SE at about  $20^\circ$ , (c) strata folded into a symmetrical tight syncline that plunges at  $20^\circ$  to the SE, (d) horizontal strata cut by two normal faults that trend north-south to form a graben. (5 marks for each part)



4. For the minerals in each of the following pairs state those properties that are shared in common, and those properties (including the chemical composition) for which the minerals differ. (a) quartz and halite; (b) galena and pyrite; (c) calcite and barite.
5. How is sandstone formed? (5 marks) Describe features that can be preserved in beds of sandstone that allow the determination of 'way-up'. (12 marks) Why is some sandstone coloured red, and where in Ireland does red sandstone occur? (3 marks)
6. Using clearly labelled drawings describe an example of (a) a graptolite and (b) a coral. Discuss the mode of life and state the geological range of both kinds of fossil organism.
7. List the names of the eras and periods that subdivide geological time, with the oldest at the bottom and youngest at the top and state how many millions of years ago any three of the periods began (10 marks). Explain the principles of measuring the age of formation of a rock in millions of years (10 marks).
8. Write a short essay on the hydrological cycle, explaining the terms: run off, evaporation, water table, aquifer, spring line, permeability, swallow hole.
9. What causes earthquakes? How is it possible to give tsunami warnings, but not to give earthquake warnings? What is meant by *magnitude 9* in describing an earthquake? (10 marks) Describe the different kinds of earthquake wave? Roughly how fast does each kind travel? (10 marks)
10. Give an account of the nature and origin of metamorphic rocks.

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Instructions to candidates:

Answer any **five** questions. Credit will be given for citing examples, where appropriate, of geological features you have seen in the field.

Begin each answer on a new **page**.

**Write the numbers** of the questions you have attempted in the column provided on the cover of the answer book

You may not start the examination until you are instructed to do so by the invigilator.