

University of Dublin

Trinity College

Matriculation
Examination

Trinity Term, 2014

Geology

Wednesday 23rd April

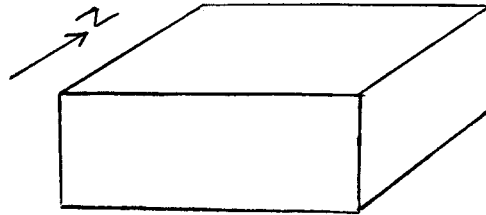
GMB

9.30 - 12.30

Dr P.N. Wyse Jackson

*Answer any **five** questions, illustrating your answers with appropriate diagrams. Credit will be given for citing appropriate examples of geological features you have seen in the field or are familiar with.*

1. Describe the geological processes and rocks associated with plate subduction along the western margin of South America, and provide a sketch cross-section through the region (17 marks). How does this plate boundary differ from that along western North America? (3 marks)
2. How old is the Earth? (3 marks) Explain the principles of radiometric dating (7 marks). Describe the appearance of both granite and basalt, and name and state the chemical formulae of three minerals normally present in granite (10 marks).
3. Draw four separate block diagrams viewed from the south-east (as shown) to illustrate the following geological structures: (a) strata dipping east at 30° , (b) strata dipping west at about 70° separated by an angular unconformity from younger, overlying strata that dip SE at about 40° , (c) strata dipping south-west at about 45° and cut by a vertical dyke striking north-south, and (d) strata dipping 10° west cut by a normal fault that trends north-south and dips at 45° to the east. (5 marks for each part)



4. How do geologists identify minerals? (5 marks) Produce a table showing the diagnostic features of **all** the following metallic minerals, some of which are mined in Ireland: galena, sphalerite, pyrite, chalcopyrite, hematite. (10 marks) For **three** of the mineral type suggest some economic uses they are put to once they have been extracted and processed (5 marks).
5. How is oil and gas generated? (5 marks). Briefly describe the geological structures where natural resources may get trapped beneath the Earth's surface, and provide quick sketches of some examples (10 marks). Outline briefly the process of 'fracking' (5 marks).
6. Using clearly labelled drawings describe the general appearance of any **two** of the following: (a) a trilobite, (b) a graptolite, and (c) a solitary coral. Describe the mode of life of each (15 marks). Suggest two ways a soft-bodied animal might be preserved as a fossil (5 marks).
7. What causes earthquakes to happen? What types of seismic wave are produced during earthquakes, and state how the magnitude of these waves can be measured (10 marks). Draw a cross-section through the Earth and mark on it the paths of the different wave types (5 marks). How can the devastating effects of earthquakes in highly populated areas be reduced? (5 marks).
8. Write brief notes on any **two** of the following topics: (a) Erosional features association with glaciation; (b) Explosive volcanic activity; (c) How to produce a geological map; (d) The origin of the Earth; (e) Orogenies.
9. Name and describe the kind of rock, and the kinds of landforms, associated with a karst landscape. What processes led to the formation of this landscape?
10. Write an essay on 'Sedimentary rocks, their classification and formation'.

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Instructions to candidates:

Fill in the details at the top of each booklet, then write your name in the bottom-right hand corner of scripts and seal the corner.

Answer any **five** questions, illustrating your answers with appropriate diagrams.

Credit will be given for citing appropriate examples of geological features you have seen in the field or are familiar with.

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

If you use more than one answer book tie them together using the green treasury tags.

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