

University of Dublin

Trinity College

Matriculation
Examination

Trinity Term, 2015

Geology

Wednesday 8th April

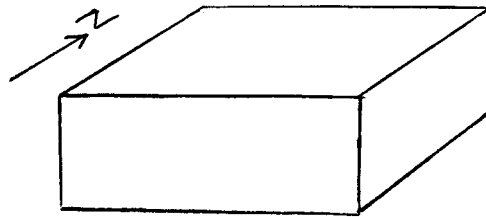
GMB

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, features, and rocks associated with the mid-Atlantic ridge, and provide a sketch cross-section across the Atlantic Ocean (17 marks). How do rocks produced at this part of the Earth's crust differ to those found in continental crust? (3 marks)
2. How old is the Earth? (3 marks) Draw a diagram showing the geological column, marking on it the names of eras and periods, and at least three time interval values (12 marks). By what methods do geologists determine the age of a rock? (5 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 30°, (b) strata dipping east at about 70° separated by an angular unconformity from younger, overlying strata that dip SW at about 30°, (c) strata folded into a tight symmetric anticline plunging north at 25°, and (d) horizontal strata cut by two normal faults that trend east-west to form a horst (5 marks for each part).



4. As an exploration geologist you are asked to distinguish between the pale coloured minerals barytes, calcite, gypsum, halite and quartz. What characteristics would you use to identify and describe the minerals? (10 marks). Produce a table showing the diagnostic features of the minerals named above (10 marks).
5. Write briefly on any **two** of the following: (a) coal; (b) the exploration for oil and gas; (c) stone quarrying in Ireland; (d) metal mining in Ireland (10 marks each).
6. Using clearly labelled drawings describe the general appearance of any **two** of the following fossil groups found in the Carboniferous rocks in Ireland: (a) brachiopods; (b) crinoids; (c) trilobites. Describe the mode of life of each (15 marks). In what different minerals may fossils be preserved? (5 marks).
7. There have been several orogenic events in Ireland. What caused these to happen? (5 marks). For either the Caledonian or Variscan Orogeny, state when it took place, describe the types of rocks formed during the event, and mention any effects it had on pre-existing rocks in Ireland (15 marks).
8. What processes produce the material that eventually becomes sandstone? (5 marks). Name two environments in which sandstone forms (5 marks). Describe two features that can be preserved in beds of sandstone that allow the determination of 'way-up' (5 marks). Why is some sandstone coloured red, and where in Ireland does red sandstone occur? (5 marks).
9. What may have caused Ice Ages to occur in the past? (5 marks) With particular reference to the last Ice Age in Ireland, what evidence can be seen in the Irish landscape for both glacial erosional and depositional features? (15 marks).
10. Write an essay on 'Metamorphic rocks, their classification and formation' (20 marks).

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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.