

University of Dublin

Trinity College

Matriculation Examination

Trinity Term, 2020

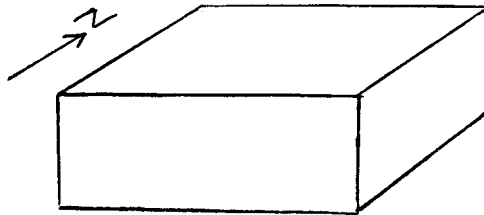
Geology

To be completed between Tuesday 2nd June and Tuesday 9th June (5pm)

Professor Patrick 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. What mechanism causes the Earth's lithospheric plates to move? (5 marks). Draw two diagrams showing cross-sections through (1) a named oceanic-continental destructive plate boundary, and (2) a continental-continental collision plate boundary (10 marks). What are the various rock types produced at each? (5 marks).
2. What is an earthquake and what causes them? (5 marks). Name the types of seismic waves produced in an earthquake and remark on the direction of their movement (5 marks). Why do some earthquakes lead to considerable loss of life? (5 marks). How can scientists estimate the distance from Ireland to an earthquake in another country? (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 50° and overlain by an angular unconformity that dips 20° to the south-west, (c) horizontal strata faulted by an eastward dipping normal fault, and (d) a north-south trending symmetrical anticline plunging 10° to the north with limbs dipping at 40° (5 marks for each part).



4. How would a mining geologist prospecting for minerals of economic value distinguish between galena, sphalerite, pyrite, gold, and silver? (10 marks). What is the economic value or use of each mineral and state where in Ireland they were mined for in the past or are so at the present day? (10 marks).
5. Water is important in everyday life, and in certain parts of the world there is not enough. Describe the hydrological cycle (10 marks). Explain the meaning of the following terms: evapotranspiration, water table, aquifer, groundwater flow, permeability. What rock types make good aquifers, and what causes differences in permeability in rocks? (10 marks).
6. Describe, and illustrate labelling the major morphological features, the general appearance of any **two** of the following fossil groups. Discuss their mode of life outlining how they fed and the environment where they lived: (a) a graptolite, (b) a trilobite, (c) a brachiopod (20 marks).
7. Write a short essay on sedimentary rocks, discussing how they are classified, and include information on the environments in which the major rock types are formed (15 marks). List five sedimentary rock types, and state in which county in Ireland they are found (5 marks).
8. Write short notes on **each** of the following topics: (a) Mass Extinctions; (b) Metamorphic grade; (c) Granite; (d) Mohs' Scale. Illustrate your answer where appropriate (5 marks each).

9. The planet has been subjected to various ice ages in the geological past – when did these major events happen and what caused them? (10 marks). How would you recognise a landscape that has been subjected to glaciation? (10 marks).
10. Discuss the various methods by which the absolute or relative age of rocks can be determined (10 marks). A geologist mapping a sequence of rocks believes it to have been overturned. What evidence can be gathered from the rocks to determine that this is in fact correct? (10 marks).

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Instructions to candidates:

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**.

Provide your name and CAO Application number at the top of page one of each answer.

Type out your answers in MS Word. If you wish to add drawings please photograph these and inserted these images at the appropriate place in the document. Ideally keep files to smaller than 10MB so that they can be emailed. If files are larger, you may need to use an online transfer site such as **wetransfer.com**.

Return the completed assignment via email to the Academic Registry (academic.registry@tcd.ie) in Trinity by no later than 5pm on Tuesday 9th June 2020.