

Gx1310

National University of Ireland, Galway  
OLLSCOIL NA hÉIREANN, GAILLIMH

CHRISTMAS EXAMINATIONS 1<sup>ST</sup> SEMESTER 2001

**3rd SCIENCE  
SEDIMENTOLOGY & APPLIED GEOSCIENCE (GE321)**

**PAPER ONE**

Prof. B.P.J. Williams  
Prof. Paul D Ryan  
Prof. Michael Williams  
Dr. Kate Moore

Time allowed: 3 hours

Answer: **Five** questions, **Two** from Section A and **All 3** questions from Section B.

**Please Answer Section A in a separate booklet and each of the three questions in Section B in three separate booklets**

**SECTION A – Aim to spend 1.5 hours on Section A**

- i) Outline the conditions necessary for the formation of coal. What factors control the rank of coal?
- ii) How may the grain size distribution of sediment be ascertained? What can be learned about sediment from such a size distribution?
- iii) Discuss the usefulness of sedimentary geochemical studies.
- iv) Write a short essay on the tectonic control of sedimentation.

**SECTION B**

**You should aim to spend half an hour on each part in Section B.**

**Answer each part in a separate booklet.**

**1. Geology.**

**Answer ALL of the following. Illustrate your answers where appropriate.**

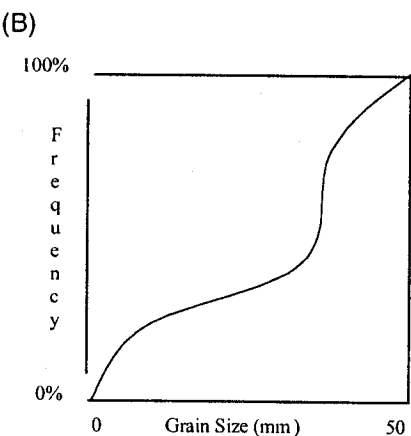
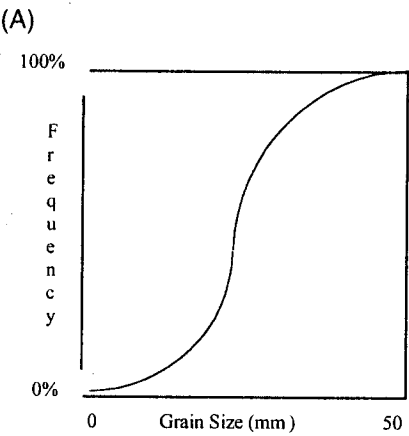
- I) Describe the differences in the physical characteristics between sedimentary and igneous rocks for engineering purposes.
- II) Describe how these rock properties may affect slope stability.
- III) Give three barrier methods for stabilising slopes in rock cuttings.
- IV) Using an example, describe the affect of water on slope stability in a rock sequence.

V) Using an example, describe the affect of water on slope stability in soil.

2. Statistics.

Spend ten minutes on each question. Answer all the questions.

1) Examine the two cumulative frequency polygons A) and B) which are measures of clast sizes in a gravel, then answer the following questions:



Which of these distributions is approximately 'normal?'	A	B
What is the very approximate median value for the grain size of B?	25mm	40mm
For which of these samples would the quartiles be the best measure of dispersion?	A	B
For which of these samples would the standard deviation be the best measure of dispersion?	A	B

2) Describe when a 'two sample test' is used and briefly describe a statistical test that could be used to perform such a test.

3) What method would you use to correlate two variables derived from normally distributed data, such as Fe and Mg values in glassy volcanic rocks?

3. Geophysics.

Write short notes on the following topics.

One page should be sufficient for each.

- i) Resistance, resistivity and apparent resistivity in the electrical resistivity technique.
- ii) Seismic reflection technique for imaging buried river channels.
- iii) Vertical Electrical Sounding (VES) over a layered earth.
- iv) Principles of Ground Penetrating Radar (GPR).
- v) Seismic refraction travel-time versus distance graph over a 2-layered earth.