

National University of Ireland, Galway
OLLSCOIL NA hÉIREANN, GAILLIMH

SUMMER EXAMINATIONS 2003
First Science Examination

Earth Sciences, ES101

Professor B.P. Williams
Professor P. Ryan
Dr P. Orr

Time allowed : **Three** hours

Attempt **five** questions : Question 1 is compulsory and must be answered on the accompanying sheet. The remaining four questions should be selected from Question 2 to Question 8 and answered in the Answer Book.

Question 1 carries about twice the weight of the other questions. You should therefore spend between 60 and 80 minutes answering it, leaving between 25 and 30 minutes for each of the remaining four questions.

2. Summarise the main sub-divisions of the Earth's interior based upon seismic evidence. Pay particular attention to the definitions of the Moho, the Low Velocity Zone, Upper mantle – Lower mantle boundary and the Core. Give approximate depths of each of these structures. Comment on temperatures at the Moho and in the core and whether the core is solid or fluid.
3. What evidence is there for a bolide impact at the end of the Cretaceous period?
4. Worldwide evidence from young lava flows shows that they are often magnetised in a direction opposite to the current magnetic field. State why this happens and explain how it leads to the idea of the geomagnetic polarity timescale.

5. (a) Explain with the aid of a diagram the formation of deep water in the North Atlantic Ocean.

(b) What do you understand by the terms Lithogenic, Hydrogenic, Biogenic, Cosmogenic and Anthropogenic as applied to marine sediments?
6. Explain how studies of the nature of the ocean floor led to the development of the theory of plate tectonics.
7. Give the requirements for hydrocarbons formation. Compare and contrast the occurrence of fossil fuels from ocean and land environments, and describe how differences affect exploration and extraction.
8. List: (a) the controls on slope stability and (b) the factors that trigger mass movement. Describe, with examples, the different types of mass movement.