

National University of Ireland, Galway
OLLSCOIL NA hÉIREANN, GAILLIMH

SUMMER EXAMINATIONS 2003

Earth's Physical Resources, ER301

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Time allowed : **THREE HOURS**

Answer 4 questions. *One* from each section, i.e. Section A, Section B, Section C & Section D.

Section A: Resources, reserves and fossil fuels

Answer EITHER question 1 OR question 2.

1. Describe the McKelvey Classification Scheme of resources and reserves. Define all terms you use.
2. Briefly discuss each of the following issues related to extraction of terrigenous and marine fossil fuels:
 - (a) depth of formation versus depth of extraction,
 - (b) technical difficulties related to geology,
 - (c) technology used for extraction and recovery rates obtained,
 - (d) dangers related to extraction, and
 - (e) environmental issues.

Section B: Alternative Energy Sources

Answer EITHER question 3 OR question 4.

3. In relation to renewable energy resources explain what is meant by four of the following terms:

(a) solar constant	(b) albedo
(c) green-house gas	(d) non-renewable energy source
(e) geothermal energy	(f) photosynthesis
(g) law of the conservation of energy	

Describe the general characteristics of renewable sources of energy, outlining their main advantages and disadvantages.

Describe the principal fluxes of solar energy through the biosphere and outline methods of harnessing any two of the following for the use and benefit of mankind:

hydro-power;

power from the wind;

domestic space and water heating;

fuel crops.

4. In relation to nuclear energy explain what is meant by four of the following terms:

(a) ionizing radiation

(b) half-life of an isotope

(c) becquerel

(d) fertile material

(e) nuclear fusion

(f) chain reaction

(g) enriched uranium

Describe briefly the structure of a nuclear fission power reactor, explaining the function of the main components.

Discuss the pros and cons for the greater use of nuclear energy for the use and benefit of mankind, with special reference to the fuel processing cycle.

Section C: Water resources and building materials

Answer EITHER question 5 OR question 6.

5. Summarise the major issues relating to the availability of water as a resource. Include supply, use and management. Give examples where appropriate.

6. Describe the processes used in the preparation of geological materials for the construction industry, in terms of reversible and non-reversible reactions.

Section D: Economic Minerals.

Answer EITHER question 7 OR question 8.

7. Using examples, compare and contrast hydrothermal mineralization formed by (a) tectonic stretching with mafic magmatism, (b) tectonic stretching with no magmatism and (c) tectonic compression with felsic magmatism.

8. Magmas produced by mantle melting solidify at shallower levels in the mantle, at depth in the crust, or after eruption at the earth's surface. Describe two economic deposits formed in relation to these magmas.