

OLLSCOIL NA hÉIREANN  
NATIONAL UNIVERSITY OF IRELAND, GALWAY

SUMMER EXAMINATIONS, 2002

FIRST-YEAR SCIENCE

BIOLOGY

*Second Paper*

Time allowed: *two and a half* hours.

Answer *four* questions, at least *one* from each section.

**Use a separate answer book for *each* section.**

**Section A**

Professor M.J. Dring  
Professor M.D. Guiry  
Professor P.M.T. Curran  
Professor M. O'Connell  
Dr M. McDonald

Describe clearly the relationship between Water Potential ( $\psi$ ), Osmotic Potential ( $\psi_s$ ) and Pressure Potential ( $\psi_p$ ).

Give a detailed account of the asexual and sexual anatomy and life-cycle of the salmon-infecting fungus *Saprolegnia parasitica*. Illustrate your answer.

Describe the structure, reproduction and life history of the brown alga *Laminaria hyperborea* (Phaeophyta).

Give a concise, illustrated account of sexual reproduction in the flowering plant. Refer, in particular, to those features that indicate alternation of generations.

**Section B**

Dr David Apps  
Professor J. Smith  
and the internal examiners

Write an essay on enzymes.

Answer **two** of the following:

- (a) What are hydrogen bonds? Illustrate their significance in the structure of biomolecules using examples.
- (b) Describe the structure and function of lipids in living cells.
- (c) Explain how proteins are synthesized.
- (d) Describe the basic steps of gene cloning and outline some beneficial applications of this technology.

Write an essay on 'The Exchange of Genetic Information in Bacteria'.

Write an essay on 'The Consequences of the Non-Disjunction of Human Chromosomes'.