

Ollscoil na hÉireann, Gaillimh GX_____
 National University of Ireland, Galway

Semester II Examinations, 2004/2005

Front Page Template

Exam Code(s)	4BO2
Exam(s)	4 th Biomedical Science
Module Code(s)	SI403
Module(s)	Physiology
Paper No.	II
Repeat Paper	Special Paper
External Examiner(s)	Dr. A.R. Noble
Internal Examiner(s)	Prof. M. Kane, Dr. K. Doyle
	Dr. L. Quinlan, Dr. D. Finn

Instructions:

Students must attempt **FOUR** questions from their registered modules with at least **one** question from **section A**.
 DO NOT attempt any questions from the module for which you are not registered

Duration	Three hours
No. of Answer books	Four

Requirements:

Handout	_____
MCQ	_____
Statistical Tables	YES _____
Graph Paper	_____
Log Graph Paper	_____
Other Material	_____

No. of Pages	_____
Department(s)	Physiology

OLLSCOIL NA hÉIREANN, GAILLIMH
NATIONAL UNIVERSITY OF IRELAND, GALWAY

Semester II, Summer 2005

B.Sc Biomedical Science (Hons.)

PHYSIOLOGY

Paper II

Examiners: Dr A.R. Noble, Prof. M. Kane, Dr. K. Doyle, Dr. L. Quinlan, Dr D. Finn

Answer **FOUR** questions from your registered modules.

Atleast One question must be from Section A.

Use a Separate Answer Book for each section.

Time Allowed Three Hours

Section A Experimental Design and Statistics

A1 You are investigating the effects of local follicular fluid factors on proliferation of granulosa cells in culture wells. From a low molecular weight extract of follicular fluid, you find three distinct peaks of material eluting from a chromatographic column. You compare the effects of each of the three peaks (added at a concentration of 1ng per ml of culture medium) on proliferation of cells in culture over three days with a control medium without additive. You repeat this experiment over 3 weeks and get the following results. Results are expressed for 10^4 cells per well after 3 days culture.

Week	Control	Peak 1	Peak 2	Peak 3
1	37, 34, 38, 33, 34	43, 45, 41, 46, 49	36, 29, 31, 37, 34	22, 27, 23, 21, 20
2	47, 44, 49, 41, 42	56, 54, 59, 53, 60	44, 40, 49, 45, 42	30, 29, 34, 33, 31
3	27, 33, 33, 30, 28	38, 40, 37, 44, 41	30, 29, 34, 29, 27	17, 19, 18, 23, 21

Set up the ANOVA table for this as a randomised complete block experiment and calculate the corrected sums of squares and the mean squares and the appropriate F ratios. Determine if weeks or treatments is significant and if there is an interaction of weeks and treatments. Assuming that there was a significant

effect of treatments, what would the appropriate type of post hoc test to use – comparing all means with each other or comparing the means for the 3 peaks with the control treatment? Give the name of one test of each type. If you were to compare the peaks with the control should you use a one or two tailed test? Should you decide on this before or after you see the data?

A2 Write short notes on the following:

- (a) The null hypothesis in statistical testing
- (b) What is meant by the term “experimental unit”? Give an example of when a number of variates represents different experiment units and when they represent just one experimental unit
- (c) If you carry out a randomised complete block experiment, and you get a significant interaction between blocks and treatments, explain in simple terms understandable to someone who does not understand statistics why that is a problem.
- (d) If you do get such an interaction between blocks and treatments, what means square would you use as a divisor to get the treatment F-ratio instead of the ordinary error mean square.

Section B Stress

B1 Discuss the hypothalamo-pituitary-adrenal (HPA) axis response to acute stress under the following headings (a) profile of HPA axis activation (b) functions of HPA axis activation (c) regulation of HPA axis activity.

B2. Write an essay on the neurobiological basis and pharmacological treatment of anxiety disorders.

Section C Cell Biology

C1 Give a brief overview of the eukaryotic cell cycle and specifically discuss the role p53 plays.

C2 Discuss the role of the caspase enzymes in apoptosis.

Section D Brain Pathophysiology

D1 'Alzheimer's disease is caused by abnormal amyloid processing.' Discuss this statement.

D2 Discuss the pathophysiology of prion diseases.