994

Ollscoil na hÉireann, Gaillimh

National University of Ireland, Galway

Spring Examinations, 2004/2005

Front Page Template

Exam Code(s)	4BG1, 1MV1
Exam(s)	Bachelors in Biomedical Engineering Masters in Biomedical Science
Module Code(s)	ME 422
Module(s)	Tissue Engineering
Paper No.	
Repeat Paper	Special Paper
External Examiner(s)	Prof. D.F. Williams
Internal Examiner(s)	Prof. J.F. McNamara Prof. A. S. Pandit
Instructions:	Answer any 5 questions from 1-6. Each question is 20 Marks
Duration	3 hours
No. of Answer books	
Requirements:	
Handout	
MCQ	
Statistical Tables	
Graph Paper	
Log Graph Paper	
Other Material	
No. of Pages	2
Department(s)	Medical and Biomedical Engineering

1 (a) Explain the role of fibroblasts, endothelial cells and macrophages in wound repair. For each type of cell, describe cellular activity and its effects. **(15)**

1 (b) State the role of any two growth factors in soft tissue repair. **(5)**

2 (a) Define osteoinduction, osteoconduction and osteointegration **(9)**

(b) Describe the method of extraction of one of the following scaffolds:

(i) Collagen
(ii) Chitosan **(10)**

3 (a) Describe two methods of fabricating synthetic biodegradable scaffolds. **(16)**

(b) Differentiate between porosity and pore size of a scaffold. **(4)**

4 (a) Define a bioreactor system for tissue engineering applications **(10)**

(b) Describe the biochemical and biomechanical requirements of a typical bioreactor system that is used in tissue engineering **(10)**

5 (a) Describe in detail the theory of tensigrity and how it relates to tissue engineering. **(10)**

(b) Describe any two assays that can be used for analysing the cell phenotype that may aide in understanding cell scaffold interaction. **(10)**

6 (a) Metastasis describes the spread of tumor cells from their site of origin and the establishment of areas of secondary growth. For an epithelial tumor cell, what molecule is most likely absent from its surface? **(5)**

6 Describe an experiment that would demonstrate that such a molecule is both necessary and sufficient for cell-cell adhesion. **(15)**