

# UNIVERSITY COLLEGE LONDON

University of London

## EXAMINATION FOR INTERNAL STUDENTS

*For the following qualification:*

*B.Sc. (Intercal)*

### ~~HEALTH SCIENCES C103: BIOMATERIALS SCIENCE~~

COURSE CODE	:	<b>HESCC103</b>
UNIT VALUE	:	<b>0.50</b>
DATE	:	<b>8 May 2003</b>
TIME	:	<b>10. 00 am</b>
TIME ALLOWED	:	<b>3 hours</b>

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**TURN OVER**

## HEALTH SCIENCES C103: BIOMATERIALS SCIENCE

Answer **FOUR QUESTIONS** (20 marks for each answer)

Answer **EACH** question in a **SEPARATE ANSWER BOOK**

1. Ceramics such as zirconia and alumina oxide, metals such as cobalt chrome and stainless steel and polymers such as polyethylene are all used as articulating surfaces in manmade joint replacements. What are the advantages and disadvantages of these materials that make them good or bad joint replacement surfaces?
2. Describe experiments which you would use to discover if a new biomaterial used for bone replacements was osseo-inductive, osseo-conductive or bone bonding.
3. Describe the advantages and disadvantages of currently available biomaterials for the repair of
  - a. ligaments
  - b. articular surfaces
4. Discuss the importance of cell-material interaction with respect to biocompatibility and design an *in vitro* test protocol for a named biomaterial.
5. Describe the fundamental concepts of tissue engineering, and using bone as an example, discuss current methods available for it's regeneration.
6. "Biomaterials are being developed to elicit specific cellular responses". Using porous hydroxyapatite and substituted apatites as examples, discuss this statement
7. Write notes on 4 of the following
  - a. Orthopaedic bone cements
  - b. Mesenchymal stem cells
  - c. Bone morphogenetic proteins
  - d. Systemic bone hormones
  - e. International Standard Organisation (ISO) 10993-5
  - f. Cytokines