

UNIVERSITY COLLEGE LONDON

University of London

EXAMINATION FOR INTERNAL STUDENTS

For the following qualification:

B.Sc. (Intercal) M.Sc.

Health Sciences C103: BIOMATERIALS SCIENCE

COURSE CODE	:	HESCC103
UNIT VALUE	:	0.50
DATE	:	3 May 2002
TIME	:	10.00 am
TIME ALLOWED	:	3 hours

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TURN OVER

HEALTH SCIENCES C103: BIOMATERIALS SCIENCE

Answer **FOUR** out of **EIGHT** questions (20 marks for each answer)

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

1. There have been no major advances in total hip replacement in the last 20 years – discuss.
2.
 - a) Describe addition and condensation polymerisation and give one example for each type
 - b) Explain the term ‘glass transition temperature’
 - c) What are the main clinical applications and types of polymers used in medicine and dentistry?
3. Metal and ceramic materials are used in contact with bone. Using specific examples of two ceramic materials and two metallic materials, indicate how the material properties (including modulus, strength, solubility, brittleness and appropriate methods of fabrication) influence the reaction of bone tissue locally.
4. What are the biological consequences of the degradation (wear and corrosion) of implant materials.
5. Biomaterials were once considered biocompatible if they did not elicit an adverse reaction in living tissue. Discuss how our understanding of biocompatibility has altered in the last few years with respect to biosafety and biofunctionality.
6. Describe how protein adsorption is an important aspect of cellular interaction with biomaterials. Give examples of how cell adhesion can have positive and negative aspects in the overall response.
7. The replacement or regeneration of local bone has been a challenge for many clinicians – describe and discuss current developments in the light of an “ideal bone graft substitute”
8. Write short notes on 4 of the following:
 - a) Substituted apatites
 - b) Porous hydroxyapatite
 - c) Influence of growth factors on bone
 - d) Biomaterials in wound healing
 - e) Cellular response to topography
 - f) Bioactive materials
 - g) Markers of degenerative joint disease