UNIVERSITY COLLEGE LONDON

UNIVERSITY OF LONDON

EXAMINATION FOR INTERNAL STUDENTS

FOR THE FOLLOWING QUALIFICATIONS:

M.Sc.

Health Sciences C104: Biomechanics

COURSE CODE	:	HESCC104
UNIT VALUE	:	0.5
DATE	:	10-MAY-04
TIME	:	10.00
TIME ALLOWED	:	3 Hours

TURN OVER

Answer **FOUR** questions out of **SIX** (20 marks for each question)
Answer **EACH** question in a **SEPARATE** book

Use diagrams to illustrate your answers where possible.

1. The amplitude of force acting across the surfaces of the hip joint fluctuates in a regular pattern during walking.

   a.   Explain what determines:

       i. the absolute amplitude of the forces
       ii. the relative peaks and troughs, i.e. the maximum and minimum   values, of the force within a gait cycle

   b.   How could you determine the force amplitude at the hip at a particular point in the gait cycle?

   c.   Explain what assumptions and/or approximations you would have to make in arriving at your results

2. Describe the relationship between fracture micromotion and union in long bone fracture.

3. You are asked to design a hip stem. What factors would you consider in determining the centre and size of the femoral head and why?

4. The incidence of osteolysis is much greater around hip joint replacements than around knee joint replacements. Discuss the reasons for this.

5. Describe the design features of total condylar knees and constrained knees and their clinical indications.

6. Describe the merits of using either instrumented implants or mathematical models to determine the forces applied to orthopaedic implants during activity.