

**UNIVERSITY COLLEGE LONDON**

**UNIVERSITY OF LONDON**

**EXAMINATION FOR INTERNAL STUDENTS**

**FOR THE FOLLOWING QUALIFICATIONS:**

***B.Sc. (Intercal)***

**Orthopaedics 3003: Skeletal Tissue Biology**

<b>COURSE CODE</b>	<b>:</b>	<b>ORTH 3003</b>
<b>UNIT VALUE</b>	<b>:</b>	<b>0.50</b>
<b>DATE</b>	<b>:</b>	<b>13-January-06</b>
<b>TIME</b>	<b>:</b>	<b>10.00</b>
<b>TIME ALLOWED</b>	<b>:</b>	<b>3 Hours</b>

## **SECTION A**

Answer **TWO** questions out of the following **THREE** (25 marks per question)  
Use diagrams to illustrate your answer where appropriate

Answer each question in a **SEPARATE** book

1. Discuss the role that the matrix metalloproteinase (MMP) family of enzymes play in the extracellular matrix and the regulation of their activity.
2. Describe the events involved in the synthesis and assembly of the fibril forming collagens from transcription to fibril formation.
3. Discuss the effects of loading and strain on the regulation of bone mass and remodelling.

## SECTION B

Answer **SIX** questions out of the following **EIGHT** (5 marks per question)  
Use diagrams to illustrate your answer where appropriate

Answer each question starting on a **NEW PAGE** of the answer book

1. What is the function of 'crimp' in tendon?
2. Name three common examples of proteoglycans AND three common examples of glycosaminoglycans (GAG).  
Draw the common linkage sequence between the proteoglycan core protein and a GAG chain (i.e. amino acid + 3 neutral saccharides).
3. List four aspects of the cell culture environment which influence the cells. Give a commonly used example of each.
4. Define the term 'Osteoporosis' and list eight risk factors associated with the development of this disease.
5. Gap junctions, Desmosome/Hemi-desmosome and Attachment Plaques are three types of cell interaction site.

With the help of diagrams explain what each is and how they differ functionally from one another.

Name one transmembrane protein each which is specifically associated with two of the junction types.

6. With the aid of a diagram, indicate the main features of a mature osteoclast and the process of bone resorption by the osteoclast.
7. Give two examples of a loose connective tissue and briefly describe the composition, location and function of each.
8. Outline the principles behind the dimethylmethylene blue (DMB) spectrophotometric assay to measure sulphated glycosaminoglycan (GAG) concentration in a solution.