UNIVERSITY COLLEGE LONDON

University of London

EXAMINATION FOR INTERNAL STUDENTS

For The Following Qualification:-

M.Eng.

Biochemical Eng E187: Bioprocessing of New Medicines

COURSE CODE	:	**BENGE187**
UNIT VALUE	:	**1.00**
DATE	:	**16-MAY-06**
TIME	:	**10.00**
TIME ALLOWED	:	**3 Hours**

TURN OVER

Answer 3 questions. ALL questions carry a total of 25 MARKS each, marks distributed as shown [ ]. Only the FIRST THREE ANSWERS will be marked

1.

Hunt et al have been studying the effect of low temperature incubation (pausing) on recombinant CHO cells grown in suspension culture in a 3-L bioreactor. Pausing began at 6 h post inoculation and ended at 78 h post inoculation. The control culture was maintained at 37 °C throughout the experiment. Results obtained are shown in Figure 1.

(a) Describe a method to determine cell concentration and viability. [5]

(b) What information does the packed cell volume (PCV) measurement provide? [5]

(c) What conclusion(s) can be drawn from results shown? [15]

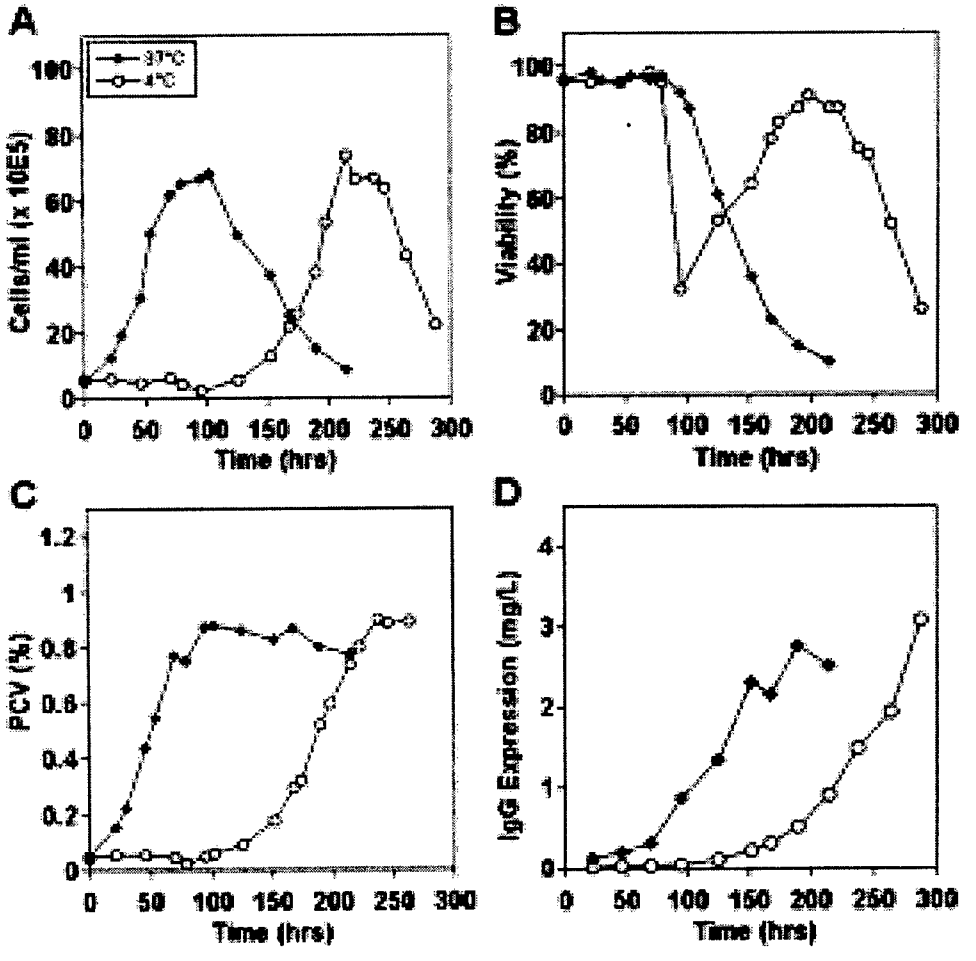

Figure 1

PLEASE TURN OVER

2.

Your group is developing novel scaffolds for tissue engineering of cartilage starting from hMSC (human mesenchymal stem cells).

(a) Describe the analytical techniques required to test the hypothesis that RGD coupled to X is a suitable scaffold to allow cell proliferation. Indicate positive and negative controls required [7]

(b) Describe the methods you would use to demonstrate that RGD coupled to X allows cell differentiation. [9]

(c) Assuming that results obtained indicate appropriate cell proliferation and differentiation. Give an outline of aspects that need to be considered before taking scaffold X to clinical studies. [9]

3.

Write short notes on:

(a) key features of mammalian cells as an expression system for therapeutic proteins. [10]

(b) factors that affect expression levels from mammalian cells. [5]

(c) main components of media for mammalian cell culture and the role of serum. [10]

4.

(a) Compare and contrast why the methods in the Lanza and Jaenisch papers were developed with regards to ethical problems of using human embryos in research? [4]

(b) Stem Cells and their characterisation.
   i) What are the defining features of stem cell populations? [3]
   ii) Discuss the methods used by Lanza and Jaenisch to characterise the resulting stem cell lines [12]

(c) Discuss the limitations associated with applying bioprocessing theory to the research methods employed by Lanza and Jaenisch. [6]

END OF PAPER