

Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech(BT)/SEP. SUPPLE/SEM-7/BT-701/2012

2012

**ANIMAL CELL & CULTURE AND MOLECULAR
MODELING**

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

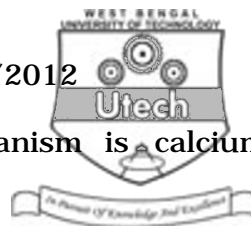
*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :
10 × 1 = 10

- i) Harrison used cold blooded animal tissue for his first attempt towards cell culture due to
- a) low incubation temperature
 - b) serum free culture conditions
 - c) easy availability
 - d) inexpensiveness.



ii) Which one of cell adhesion mechanism is calcium dependent ?

- a) CAM
- b) Cadherin
- c) Integrin
- d) Transmembrane glycoprotein.

iii) Which one of the following component is more stable and can serve to be a potential substitute for glutamine in cell culture media following autoclaving and long term media storage ?

- a) Glycylglutamine
- b) Valine
- c) Proline
- d) Glutamate.

iv) Prions can be removed from cell culture media by using virus filters having pore size of

- a) 0.1 μm
- b) 0.4 μm
- c) 0.2 μm
- d) 15 nm.

v) For insect cell culture one of the popular basal media is

- a) BME
- b) IMDM
- c) TC199
- d) Schneider's medium.



- x) QSAR stands for
- a) Quality Structure Activity Relationship
 - b) Quality Structure Accessory Relationship
 - c) Quantitative Secondary Activity Relationship
 - d) Quantitative Structure Activity Relationship.
- xi) Which of the following database can be used to access protein domain information ?
- a) Prosite
 - b) DDBJ
 - c) Sanger
 - d) Kegg.
- xii) Databases such as CATH and SCOP are used to identify
- a) the structural family to which a protein belongs
 - b) the genic family to which a protein belongs
 - c) homologous proteins
 - d) analogous proteins.



GROUP - B
(Short Answer Type Questions)

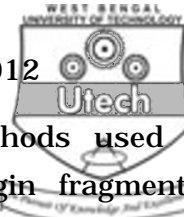
Answer any *three* of the following. $3 \times 5 = 15$

2. How one can grow cells in glass bead bed bioreactor ?
3. What are the advantages of porous carries compared to solid carriers ?
4. Write short notes on the following : $3 + 2$
 - a) Mycoplasma
 - b) Lipofection.
5. Describe Linear Free Energy Relationship developed by Hammett.
6. What are the three main components of tissue engineering ?

GROUP - C
(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7.
 - a) In a conformational energy calculation, what are the two types of interaction between molecules ?
 - b) How are conformational coordinates of a protein specified ?
 - c) Write out the quantitative expressions for 6 terms that are used in the evaluation of the energy of a specific protein conformation.
 - d) What role do solvent interactions play in protein structure stabilization ? How is the solvent modelled in molecular modelling ? $3 + 3 + 5 + 4$



8. a) What are the different types of methods used for disaggregation of animal tissue or organ fragment ? What are different enzymes used for disaggregation of animal tissue or organ fragment ?
- b) Describe briefly the procedure involved in warm and cold trypsinisation for the preparation of primary culture from animal tissue or organ fragment.
- c) Write three important advantages of cold trypsinisation. 5 + 7 + 3
9. a) How animal cells are stored in the laboratory ?
- b) Discuss the method for thawing and recovering animal cells from a frozen sample.
- c) How you can determine the viability and cell number using hemocytometer and trypan blue staining ? 4 + 5 + 6
10. Some animal cells are immobilized in a microcarrier beads of sephadex of 8 mm diameter with cells loading of 0.018 kg/m^3 . 100 such cells are introduced in a 1.5 l CSTR stirred at 20 rpm. The kinetics of the system can be approximated as first order of $3.11 \times 10^{-5} \text{ sec}^{-1}$ per kg cell mass :
- a) What is the feed rate of substrate ($S_0 = 3.2 \times 10^{-3} \text{ kg/m}^3$) for 80% conversion of the substrate ?
- b) If the diffusivity of substrate the beads is $D_e = 2.1 \times 10^{-9} \text{ m}^2/\text{s}$, what is the value of Thiele parameter, ϕ ? Comment on the intra particle diffusion effect in the system. 10 + 5



11. Can you use methylene blue instead of trypan blue for counting viable cells ? Why ? What is 'Colony Forming Efficiency' ? What steps would you take for the development of a new drug ?

1 + 3 + 2 + 9

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