



Name :

Roll No. :

Invigilator's Signature :

**CS/B.TECH/BT/SEM-7/BT-701/2012-13
2012**

ANIMAL CELL CULTURE & MOLECULAR MODELLING

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) The 'training' process in a HMM involves
 - a) calculation of the ordering of the residues in each column of the multiple algorithm
 - b) deconstruction of a PSSM
 - c) calculation of the residues in each column of the alignment
 - d) all of these.



- ii) Motif is a
- a) secondary structure
 - b) tertiary structure
 - c) supersecondary structure
 - d) quaternary structure.
- iii) QSAR relates a molecule's structural features to its
- a) Chemical activity
 - b) Physical activity
 - c) Biological activity
 - d) None of these.
- iv) Which of the following is membrane based ?
- a) Hollow fibre reactor
 - b) Perfusion reactor
 - c) Stirred tank reactor
 - d) Fluidized bed reactor.



v) Which of the following is used as ECM ?

- a) Polyglucose
- b) Hypoxanthine
- c) Fibronectin
- d) Polyethylene glycol.

vi) Chou-Fasman method is based on

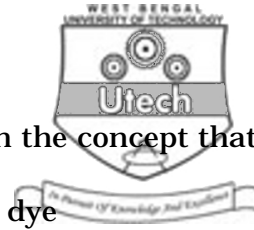
- a) Neural network method
- b) Rule based method
- c) Information theoretical method
- d) none of these.

vii) First human immortal cell line is

- a) H1299
- b) HeLa
- c) NIH-3T3
- d) CHO.

viii) CATH includes

- a) Class, Fold, Superfamily
- b) Homology, Fold, Family
- c) Class, Architecture, Topology
- d) All of these.



- ix) Trypan blue dye-exclusion is based on the concept that
- a) viable cells are permeable to the dye
 - b) only the mitochondria of the viable cells take up the dye
 - c) dead cells are permeable to the dye
 - d) none of these.
- x) The software that takes the file input in mmdb format is
- a) Cn3D
 - b) RasMol
 - c) SPDV
 - d) PyMol.
- xi) Swiss Model is a
- a) Protein database
 - b) Modelling database
 - c) Commercial modelling software
 - d) Protein homology modelling software.
- xii) pH of a culture medium is initially controlled by
- a) presence of CO₂
 - b) presence of bicarbonate buffer
 - c) addition of bases
 - d) none of these.



GROUP - B

(Short Answer Type Questions)

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

2. Explain the role of micro-carrier bead density, bead rigidity and bead porosity in animal cell culture.
3. Mention the necessity of secondary structure prediction of α -helical transmembrane proteins and mention the algorithms of the prediction of these categories of proteins citing one suitable software which follows this algorithm.

1 + 3 + 1

4. What is lead compound ? What are the three factors for absorption of drug ?
5. What is tissue engineering ? What are the functions of scaffolds in tissue engineering ?
6. What is the role of comparative modelling in sequence based protein structure prediction ?

2 + 3

1 + 4

GROUP - C

(Long Answer Type Questions)

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

7. a) Describe with a neat diagram, a bioreactor used for suspension culture of animal cells. What is Monte-Carlo algorithm ?
- b) Compare the different methods of protein structure prediction. What are the demerits of spinner culture ?

6 + 1

6 + 2



8. a) Why is it necessary to supply CO₂ enriched air for most animal cell cultures ? How do side chain properties and hydrophobicity affect protein structure ?

3 + 3 + 3

- b) Why is cell banking done ? Write the functions of a Docking algorithm.

3 + 3

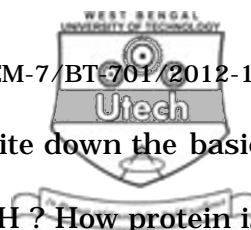
9. a) State the advantages of using microcarriers in animal cell culture. What are the criteria for a chemical compound to qualify as a drug ?

3 + 5

- b) Discuss the role of multiple sequence alignment in protein secondary structure prediction. Why are cultured mammalian cells more suitable than prokaryotic cells for the production of rDNA products ?

5 + 2

10. What are the applications of animal tissue culture ? What is cross-contamination in animal tissue culture ? How do you establish a culture from cryo-preserved cells ? Describe different enzymatic degradation procedures.



11. When do we use Homology Modelling ? Write down the basic steps of Homology modelling. What is CATH ? How protein is classified according to CATH notation ? What is DALI server ?

2 + 6 + 1 + 4 + 2
