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 allignment

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 immortial 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 softwre

d) Protein homology modelling software.

xii) pH of a culture medium is initially controlled by

a) presence of CO_2

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 × 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 ? 2 + 3

5. What is tissue engineering ? What are the functions of seaffolds in tissue engineering ? 1 + 4

6. What is the role of comparative modelling in sequence based protein structure prediction ?

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) Describe with a neat diagram, a bioreactor used for suspension culture of animal cells. What is Monte-Carlo algorithm ? 6 + 1

   b) Compare the different methods of protein structure prediction. What are the demerits of spinner culture ?

6 + 2

8. a) Why is it necessary to supply CO_2 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 *r*DNA 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