



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/B.Tech/BT/SEM-8/BT-803A/2013**

**2013**

**PROTEOMICS AND PROTEIN ENGINEERING**

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 route of any drug delivery/administration is addressed in the
    - a) clinical trial phase of drug development
    - b) pre-clinical phase of drug development
    - c) during toxicological studies
    - d) in the discovery phase of drug development.
  - ii) Trypsin cleaves the peptide bond containing
    - a) Arg or Lys
    - b) Glu or Asp
    - c) Met, Trp.
  - iii) The 2D-Gel Electrophoresis provides information about the proteins which are
    - a) MW, pI and quantity
    - b) MW and pI
    - c) pI and quantity
    - d) none of these.



- iv) A permeation enhancer used in orally administered drug bioavailability typically uses a detergent based substance at what concentration ?
  - a) 0.01%
  - b) 1%
  - c) 10%
  - d) 20%.
- v) Transfer RNA's bind during translation by the
  - a) codon
  - b) template
  - c) anticodon
  - d) none of these.
- vi) Proteomics
  - a) is another terms for genomics in humans
  - b) is the study of the collection of proteins produced in a particular cell
  - c) is the study of proteins produced by a particular gene
  - d) proves that a single gene codes for only one protein.
- vii) The amino acid structure of a polypeptide chain determines its ..... structure.
  - a) Primary
  - b) Tertiary
  - c) Secondary
  - d) Quaternary.
- viii) Reverse genetic initiates from a/an
  - a) DNA
  - b) protein
  - c) RNA
  - d) protein or DNA.
- ix) Which is not an ion source in mass spectrometry ?
  - a) ESI
  - b) MALDI
  - c) FAB
  - d) TOF.
- x) Proteins known to have inteins include
  - a) DNA B
  - b) Rec A
  - c) DNA poly
  - d) all of these.
- xi) Formation of disulphide bond takes place in
  - a) lysosomes
  - b) ER
  - c) golgi body
  - d) none of these.
- xii) Beta-amyloid plaque is found in
  - a) Alzheimer's disease
  - b) Parkinson's disease
  - c) Tay-Sachs disease
  - d) none of these.



**GROUP – B**

**( Short Answer Type Questions )**

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

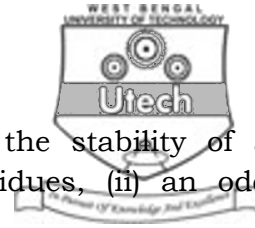
2. a) Write one basic difference between proteomics and protein chemistry.
- b) What are the names of different types of proteomics ? Write the names of tools and techniques used to study these ?
- c) What is the need of expressional proteomics ?  $1 + 2 + 2$
3. a) What are the different factors required for initiation of protein synthesis ?
- b) Write three differences between prokaryotic and eukaryotic translations.  $2 \times 2\frac{1}{2}$
4. Why is capping of *mRNA* important ? Describe the mechanism of capping in *mRNA*.  $2 + 3$
5. Direction of translation occurs from *N*-terminal to *C*-terminal. Explain with an experiment.
6. Write short notes on any *two* of the following :  $2 \times 2\frac{1}{2}$ 
  - i) Cathodic drift
  - ii) RNA dependent RNA polymerase (RdRp)
  - iii) Abzyme.

**GROUP – C**

**( Long Answer Type Questions )**

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

7. a) Write the principle of 2D-Gel electrophoresis.
- b) How do you prepare a protein sample for 2D-Gel electrophoresis ?
- c) What are the advantages and disadvantages of 2D-Gel electrophoresis ?  $5 + 5 + 5$
8. a) What is protein engineering ? What are the purposes of protein engineering ?



- b) Describe a strategy for increasing the stability of a protein that has (i) no cystein residues, (ii) an odd number of residues.
- c) How would you engineer streptokinase so that it will become less sensitive to protease ? 5 + 5 + 5
9. Why is it difficult to produce hemoglobin in prokaryotic system ? Discuss the role of post-translational modification of protein. State mechanism of any one type of PTM of protein. Name some antibiotics which can inhibit protein synthesis mentioning the steps of inhibition. 2 + 3 + 5 + 5
10. What different types of bonds present in Quaternary structure of the protein ? Name two non-ribosomal peptides. Write two differences between non-ribosomal peptide synthesis and ribosomal protein synthesis. What is Wobble Hypothesis ? 5 + 2 + 4 + 4
11. a) The following antibiotics are potent inhibitors of protein synthesis. Write the steps where they are inhibitory :
- i) Puromycin
  - ii) Tetracycline
  - iii) Cycloheximide
  - iv) Amphotericin B
  - v) Penicillin.
- b) What is polyketide ? Name two non-ribosomal proteins.
- c) Write two major differences between polyketide synthesis and fatty acid synthesis.
- d) What is plastibody ? Name few plastibodies.

5 + 3 + 4 + 3

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