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CS/B.TECH (BT)/SEP.SUPPLE/SEM-8/BT-803A/2012

2012

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 : $10 \times 1 = 10$

   i) Of the following, the one which is not a stop codon is
      a) UAA b) UAG
      c) UGA d) UAC.

   ii) An amino acyl *t*RNA synthetase is responsible for
      a) formation of peptide bond
      b) binding of *m*RNA to ribosome
      c) attaching an amino group to an organic acid
      d) joining an amino acid to *t*RNA.

   iii) Which of the following is not a protease ?
      a) Proteasome
      b) Trypsin
      c) Chymotrypsin
      d) Peptidyl *t*RNA hydrolase.

iv) In protein engineering, introduction of Disulphide bridge enhances
   a) thermal stability b) enzyme activity
   c) both (a) and (b) d) none of these.

v) Codon and anticodon interaction occurs by
   a) covalent bonds
   b) electrostatic interaction
   c) hydrogen bonds
   d) hydrophobic interactions.

vi) What is PEST sequence ?
   a) Proline, Glutamic acid, Serine and Threonine
   b) Proline, Ethylamine, Serine and Threonine
   c) Proline, Glutamin, Serine and Threonine
   d) None of these.

vii) Reverse genetics proceeds in the
   a) same direction as classical genetics
   b) same as forward genetics
   c) opposite to forward genetics
   d) both directions.

viii) Sickle cell anemia is resulted from the mutation in
   a) prion protein b) transthyretin protein
   c) haemoglobin, HbA d) α -synuclein protein.

ix) The nature of Influenza virus genome is
   a) (–) strand RNA b) (+) strand RNA
   c) double strand RNA d) single strand DNA.

x) Trypsin cleave the peptide bond containing
   a) Arg or Lys
   b) Glu or Asp
   c) Met or Trp.

xi) The Nobel Prize in Medicine for discovery of Prions was awarded to
   a) David Baltimore b) Stanley Prusiner
   c) Peter Mansfield d) Richarg Ernst.

xii) Beta amyloid is associated with
   a) Cystic fibrosis
   b) Alzheimer's disease
   c) Grave's disease.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. Write short notes on Reverse Genetics.
3. What is assisted folding ? Explain with an example.
4. Write the difference between prokaryotic and eukaryotic translation (five differences).
5. Describe the structural features of *t*RNA.
6. What is intein splicing ?
7. What are the different methods of drug delivery ?
8. Write on the mode of infection by negative strand RNA virus to animal cell.
9. How do you characterize a protein ?

GROUP – C

(Long Answer Type Questions)

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

10. a) Every organism has one genome but many proteomes. Explain.
    b) Discuss the principle of any one protein estimation method.
    c) How will you prepare sample for 2D gel electrophoresis ?
    d) Discuss any one procedure of protein fractionation for 2D gel electrophoresis. 4 + 4 + 4 + 3
11. a) Discuss the working principle of MALDI-TOF.
    b) Write the different types of protein modification and mention the amino acid residue involved in each case. Site an example where protein modification is involved in changing the character of the protein. 7 + 8
12. a) What is wobble hypothesis ?
    b) How can you prove that proteins are synthesized in the amino to carboxyl direction ?

c) The following antibiotics are potent inhibitors of protein synthesis. Write the steps where they are inhibitory :
(i) Puromycin, (ii) Tetracycline, (iii) Cycloheximide.

4 + 5 + 6

13. a) What is polyketide ? Name two polypetides.
b) Write two major differences between polyketide synthesis and fatty acid synthesis.
c) Name two non-ribosomal peptides. Write two differences between nonribosomal peptide synthesis and ribosomal protein synthesis. 4 + 5 + 6

14. a) What is protein aggregation ? What is its relation to diseases ?
b) How Protein aggregation is related to amyloid formation ?
c) What is 'protein only' hypothesis for prion disease ? How can it be proved that abnormal prion protein is the cause of the disease ?

15. Write short notes on the following :
a) Proteasome
b) Ribosome
c) Spliceosome
d) Polysome.

16. Write short notes on the following :
a) Hsp 70
b) Prion
c) $A\beta$ -peptide
d) Nonribosomal Peptides
e) Polyketide.

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