Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/PBIR (PHMB)/SEM-2/PHMB-203/2013

2013
GENOMICS AND PROTEOMICS

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
(GENOMICS)
SECTION - I
(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : $5 \times 1 = 5$

   i) Drug to cure a specific disease is

      a) effective for all the patients

      b) effective for many patients

      c) effective for some, not effective for other patients

      d) effective for some, toxic for some and non-effective for other patients.

ii) Polymerase chain reaction can be used to detect
   a) minisatellite markers and single base substitution only
   b) translocation of a gene and quantitative change in gene expression only
   c) microsatellite markers and single base substitutions only
   d) all of these.

iii) Southern Blot can be used to detect
   a) DNA variations including translocation only
   b) Translocation of a gene only
   c) DNA variations, translocation and the presence of specific DNA sequence
   d) The presence of specific DNA sequence only.

iv) Number of proteins in human is expected be higher than that of genes due to
   a) errors in predicting the number genes in human
   b) presence of many introns in most of the genes
   c) errors by the transcription machinery
   d) all of these.

v) Among the following vectors, which one was very useful for human genome sequencing
   a) plasmid
   b) cosmid
   c) mammalian artificial chromosome
   d) yeast artificial chromosome and bacterial artificial chromosome.

SECTION - II

Answer any *three* of the following. $3 \times 10 = 30$

2. Compare steps for genome sequencing by "clone by clone sequencing" and "shotgun" sequencing. What are the advantages and disadvantages of these two methods ? 7 + 3

3. What do you mean by "Genetic MAP" and "Physical MAP" of the Genome ? What are the markers for genetic mapping the human genome ? Briefly describe two markers used for genetic mapping. 4 + 2 + 4

4. What is SNP ? How SPN may change the function of the gene ? Describe in brief two methods for the detection of SPN.

5. Describe the basic principles and steps for detection of gene expression by microarray . 5 + 5

6. What is expressed sequence Tag (EST) ? How the ESTs are made ? What are the uses of EST ? 2 + 3 + 5

7. Write short notes on any two of the following : 2×5

   a) Sanger method for DNA sequencing

   b) Pharmacogenomics

   c) Gene Ontology

   d) Non-coding RNA.

GROUP – B
PROTEOMICS

Answer the following.

8. Answer in not more than two to three words : 5
   a) What unit is added to linear MALDI to improve its efficiency ?
   b) Name the matrix used for sample loading in MALDI-TOF.
   c) Name a data base/software used for analysis of 2D gel electrophoresis data.
   d) In cancerous cells ..... play important role in signal transduction.
   e) Which technique is used in gel free analysis of protein mixture ?
9. Explain briefly the various steps involved in separating proteins by 2D gel electrophoresis. Mention some of its limitations. 5 + 3
10. Why is in gel digestion needed to analyse proteins separated by gel electrophoresis ? Outline various steps involved in it. 3 + 4
11. Give a schematic representation of MALDI-TOF and explain the function of each unit. Justify why ESI (electron spray ionization) mass spectrophotometer is more popular than MALDI. 7 + 3

Or

Discuss the various classes of capture molecules for protein arrays. With suitable examples and diagrammatic representation. 5 + 5

12. Describe various types of protein interactions and mention their common methods of analysis. 5