No. of Printed Pages : 4

MBOI-004

M.S. IN BIOTECHNOLOGY (MSBOMM/MSBOCC)

Term-End Examination

00214

December, 2014

MBOI-004 : APPLICATIONS OF GENOMICS AND PROTEOMICS

Time : 3 hours *Maximum Marks : 100*

Note :

(i) *Section I is* ***compulsory****.*

(ii) *In Section II, answer any* ***five*** *questions.*

(iii) *Assume suitable data wherever required.*

(iv) *Draw suitable sketches wherever required.*

(v) *Italicized figures to the right indicate maximum marks.*

SECTION I

1. What are proteins ? Define the physico-chemical nature of proteins. Give the different protein purification methods. *2+4+4*

2. Explain the following terms : *5×2*

(a) Proteomics

(b) Genomics

(c) Stationary phase and mobile phase in Chromatography technique

(d) Probe and Target Sequence in a Microarray experiment

(e) STS

3. Explain the whole genome shotgun sequencing method with the help of relevant schematic diagrams. *10*

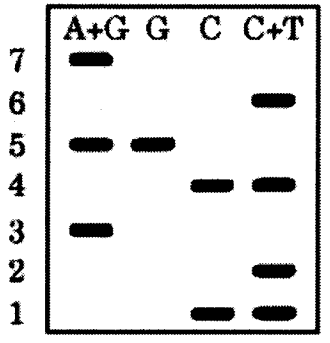
SECTION II

4. What is EST ? Explain its importance in biomarker discovery research. Explain the SAGE method of measuring gene expression. *2+3+9*

5. Describe Mass spectrometry and 2D gel Electrophoresis techniques in detail. Explain briefly the role of these two techniques in advancing proteomics research. *7×2*

6. Consider you are the principal investigator (PI) of a project concerned with the developmental biology of an insect which has four stages in its life cycle. Design a microarray experiment to identify the differentially expressed genes (DEGs) unique to each stage of the life cycle. *14*

7. Explain Maxam Gilbert DNA sequencing method. From the given auto-radiogram (Figure below), deduce the DNA sequence fragment. Also give the 5′ and 3′ ends of the fragment. *5+9*



8. What are the protein 3D structure determination techniques ? Write one limitation of each technique. Explain one of the techniques in detail. *3+3+8*

9. Describe the following :

(a) Size Exclusion Chromatography

(b) Affinity Chromatography

(c) Reverse Phase Chromatography

Tabulate the advantages and disadvantages of each technique. *4+4+4+2*

10. Describe the process of sequence assembly. Explain any two methods of physical mapping used for the validation of sequence assembly. *7+7*