Shahjalal University of Science & Technology, Sylhet
Department of Biochemistry and Molecular Biology
B. Sc. (Hons) 4th Year 1st Semester Final Examination, 2014
Course No: **BMB -422** Course Title: **Genomics and Proteomics**
Credit-**3** Total Marks-**70** Time-**3** hours

Instructions:

- *Answer any **two (2)** questions from each part (A and B)*
- *All questions have equal marks*

Part A

1. (a) Define the term genomics and proteomics and elaborate the concept of structural genomics — 3
   (b) What is physical map of chromosome? How can genetic maps, cytogenetic maps and physical maps of chromosome be correlated — 4
   (c) VNTRs and STRs are specific classes of polymorphisms. What are the differences between VNTR and STR — 4
   (d) What does karyotype show us? What type of genetic disorders could we detect with a karyotype — 3.5
   (e) Write down the applications of genomics in medicine and biotechnology along with the other related fields of biotechnology — 3

2. (a) What is hot start PCR? Illustrates a few applications of PCR — 1+2
   (b) What is genetic map? Describe the relationship between genetic map and physical map — 1+2
   (c) CODIS uses 15 particular loci for DNA fingerprinting, what are the reasons, you think, for selecting those particular 15 loci? — 2
   (d) Compare and contrast among RFLP, AFLP and RAPD — 4
   (e) What is transposable element (TE)? How many types of TE are there in human? What is the evolutionary significance of TE — 4
   (f) Human genome project reveals that human have ~25000 genes but they have more than 200000 protein, how is this possible — 1.5

3. (a) What is chromosome walking? Describe the basic steps for the construction of a genomic library? — 1+3
   (b) What is the optimal length of a PCR primer, explain logic of your answer — 2
   (c) Why and How simple sequence repeats are used for DNA fingerprinting — 2+2
   (d) What are the applications of human genome project in medicine — 3
   (e) What is horizontal transfer? Comment on the horizontal transfer in human genome — 1+2
   (f) Most mutations occurred in males, explain the statement — 1.5

Part B

4. (a) What is nested PCR? Describes the principle and basic steps of PCR — 1+1.5+1.5
   (b) What is Real time PCR? How can you determine the load of RNA virus from the sample of an infected patient — 1+3
   (c) What is a gene? How can you identify a gene from the raw sequence of human genome — 1+3
   (d) The proteome encoded by the human genome is much more complex than invertebrates, explain the statement — 2.5
   (e) What is SNP? What is optimal cycle number of a PCR, justify your answer — 1+2

5. (a) What is Proteomics? Exemplify a few uses and possibilities of Proteomics? 1+2
(b) What is the secondary and tertiary structure of a protein, explain 2
(c) What are the advantages of 2-D gel electrophoresis over traditional electrophoresis? 2
(d) What is the importance of mass spectroscopy? Describe the principle and procedure of the mass spectroscopy 2+3
(e) Explain importance of studying of protein interaction network 2
(f) Describe the 2-D gel electrophoresis techniques? What are the limitations of 2-D gel electrophoresis 2+1.5

6. (a) Describe protein microarray 3
(b) Describe yeast two hybrid system for the detection of protein interaction 4
(c) What is MALDI-TOF? How did you can use it for protein sequencing 3.5
(d) What is GFP and YFP? 1
(e) Write short notes on the following database 2+2+2
   i. PDB
   ii. Uniprot
   iii. String