

**Shahjalal University of Science and Technology**  
**Department of Biochemistry and Molecular Biology**  
**4<sup>th</sup> year 2<sup>nd</sup> Semester Examination 2014**  
**Course No: BMB 428, Course Title: Molecular Biology- II**  
**Credit: 3.0 Time: 3 hours Marks : 70**

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**Any two questions from each part**

**PART A**

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| 1. | a. | The ribosome is a complex supramolecular machine-elaborate the statement. Write down the difference between a prokaryotic and eukaryotic ribosome. | 4.0 |
|    | b. | Explain the statement- RNA binding proteins (RBPs) are key players in the regulation of gene expression.   | 3.0 |
|    | c. | What do you understand by ribosomal recycling? Describe briefly the termination of protein synthesis.  | 5.0 |
|    | d. | How are ribosomes synthesized? Write down the regulation of ribosome synthesis.  | 5.5 |
| 2. | a. | Define the following term i) nucleosome ii) chromosome iii) chromatin  | 2.0 |
|    | b. | What is heterochromatin and euchromatin? Discuss the packaging of DNA into chromosome  | 5.0 |
|    | c. | What is centromere and telomere? Discuss the molecular organization of centromere and telomere   | 4.0 |
|    | d. | What is an interrupted gene? Discuss the organization of an interrupted gene.  | 3.5 |
|    | e. | What is alternative splicing? Describe how an interrupted gene can result in two or more proteins  | 3.0 |
| 3. | a. | Mention the types of RNA polymerase in a eukaryotic system. Describe their functions   | 4.5 |
|    | b. | What do you understand by cis-regulatory elements? Discuss the role of promoter and enhancer.  | 4.0 |
|    | c. | What is a transcriptome? Discuss the role of chromosome structure in gene expression.  | 5.0 |
|    | d. | What do you understand by post-transcriptional modification? Describe eukaryotic post translational modification.                                  | 4.0 |

## Part B

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| 4. | a. | What is epigenetics? Discuss the role of methylation, acetylation and deacetylation in gene regulation   | 7.0 |
|    | b. | Epigenetic alteration can lead to diseases- Explain the statement  | 3.0 |
|    | c. | Discuss the molecular evolution of the globin gene   | 5.0 |
|    | d. | What is a pseudogene? How can you distinguish a pseudogene from a gene?  | 2.5 |
| 5. | a. | What are the consensus sequences of a eukaryotic promoter that are recognized by RNA polymerase II? Briefly describe the assembly of RNA polymerase and transcription factors at a promoter. | 8.0 |
|    | b. | Define cis-acting and trans-acting factors. Write down their feature and functions.  | 3.0 |
|    | c. | What was the origin of mitochondrial genome? Write down the relationship of aging with mitochondrial genome dysfunction.   | 6.5 |
| 6. | a. | Changes in chromosome structure and number can lead to diseases- Explain the statement   | 5.0 |
|    | b. | Formation of the dorsal-ventral axis in drosophila is determined by the action of toll receptor protein and spatzle – Explain the statement  | 7.0 |
|    | c. | Discuss a possible influence of genes in maintaining your behavior and beliefs in the context of your family history or environment.   | 5.5 |