



# Shahjalal University of Science & Technology, Sylhet

## Department of Biochemistry and Molecular Biology

B. Sc. (Hons) 1<sup>st</sup> year 1<sup>st</sup> Semester Examination, 2012

Course No. : **BMB -121** Course title: **Introductory Biochemistry**

Credit: **4** Total marks: **70** Time: **3** hours

- Answer any two (2) questions from each Part (A and B).

### Part A

1. (a) Mention one important contribution made by each of the following scientist in the development of biological science: (i) Louis Pasteur, (ii) J Watson and F Crick 2×2 = 4

(b) Write down the classification of carbohydrate. 3

(c) "Simple monosaccharides are reducing agents"- explain. 3

(d) Explain why D-glucose shows mutarotation in solution. 3.5

(e) Define the following terms with examples 4

(i) Epimer, (ii) Anomer, (iii) Sugar acid, (iv) glycans
2. (a) Write down the structure of the followings 5

(i) Lactose; (ii) N-Acetylmuramic acid; (iii) β-D-Mannosamine; (iv) Sucrose; (v) Maltose.

(b) Discuss the function and structural properties of cellulose and chitin. 4

(c) Describe how starch and glycogen serve as storage polysaccharide. 6

(d) How do two monosaccharides form a disaccharide? Give two examples. 2.5
3. (a) What is lipid? Classify lipids with one examples of each class. 5

(b) Briefly explain: (i) Fatty acids are amphipathic in nature; (ii) Oils are generally liquids at room temperature whereas fats are solids. 5

(c) Write down the name and structure of the followings 1.5×3 = 4.5

(i) A steroid present in plasma membrane.

(ii) A choline containing phospholipid.

(iii) A saturated fatty acid.

(d) Write a short note on essential fatty acids. 3

## Part B

4. (a) Write down the structure and name of the followings 5
- (i) Phenyl group containing amino acid.
  - (ii) Imidazole ring containing amino acid
  - (iii) An amino acid not present in protein.
  - (iv) Guanido group containing amino acid.
  - (v) A diamino mono carboxylic acid.
- (b) What is  $P^I$ ? Derivate the equation for determining the  $P^I$  of an amino acid. 4.5
- (c) Briefly explain the titration curve of Histidine. 5
- (d) What are essential amino acids? Name them. 3
5. (a) Write down the classification of protein based on biological function. 4
- (b) Characterize  $\alpha$  helix structure of protein and explain with example. Why some  $\alpha$  amino acids support configuration, others not? 5
- (c) Briefly describe the oxygen saturation curve of hemoglobin. 5
- (d) What is sickle cell anemia? Show its relation with primary structure of hemoglobin? 3.5
6. (a) Discuss the principle of SDS-PAGE and explain its use for determination of the molecular weight of an unknown protein. 6
- (b) Explain how gel filtration techniques can be used for the separation of smaller protein than larger one. 4
- (c) Show two methods for the determination of N-terminal amino acids of a polypeptide. 3
- (d) What do you mean by denaturation and renaturation of polypeptide chain? 4.5