

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI
BITS PILANI – DUBAI CAMPUS, DIAC
FIRST SEMESTER 2011 – 2012 II YEAR B.E.(Hons.) BIOTECHNOLOGY
BIO C211 BIOLOGICAL CHEMISTRY
COMPREHENSIVE EXAMINATION (CLOSED BOOK)

Duration: 3 hours

Date: 09.01.2012

Weightage: 40%

Max. Marks: 40

Note: a) Answer all questions, b) answer to the point and c) draw schematic diagram if required.

1. How amino acids are classified? Name any one amino acid in which the R group contains the following: [2.0]
 - a. hydroxyl
 - b. sulfur
 - c. amide and
 - d. branched side chain
2. Write a short note on the following (a-d) with respect to biochemical composition, properties and functions, and give at least one example for each of the following: [2.0]
 - a. Phospholipids
 - b. Steroid hormones
 - c. Sphingolipids
 - d. Glycolipids
3. Name any three examples for essential fatty acids and essential aminoacids and mention their functions. [1.5]
4. Differentiate between cellulose, starch and glycogen with respect to: [3.0]
 - a. Composition
 - b. Glycosidic linkage
 - c. Occurrence
 - d. Functions
 - e. Enzymes which hydrolyze
5. What is the chemical composition of lignin, pectin and chitin? Mention their functions. [1.5]
6. What are the different levels of organization of protein structure? Explain in terms of stabilizing forces, organization and draw schematic diagrams for each. [2.0]
7. What are the different types of enzyme inhibition? Explain in detail with suitable diagram. Give reasons on the study of enzyme inhibitors and its applications. [3.0]
8. What are high energy compounds? Briefly explain any two. [2.0]
9. Explain the following:
 - a. Glycolytic pathway with respect to biochemical reactions involved and enzymes (structure of the molecules not required). Mention the fate of pyruvate. [2.0]
 - b. TCA cycle and the regulatory steps. [2.0]
 - c. Photosynthesis with a suitable diagram on the formation of ATP and NADH. Mention the inhibitors of photosynthesis and its applications. [3.0]
 - d. Ketone bodies and give examples. Mention its clinical relevance. [2.0]
 - e. Importance of glyoxylate pathway and mention the enzymes involved? [2.0]
10. How TCA cycle intermediates are involved in the biosynthesis of macromolecules proteins, lipids and carbohydrates? [2.0]
11. How the different complexes involved in the transfer of electrons from reducing equivalents and explain the electron transport chain with respect chemiosmotic model. Mention the different inhibitors acting on the ETC. Draw suitable diagram. [3.0]

12. How the cytosolic NADH is transported to the mitochondria? Explain at least any one mechanism and mention how it affects the total number of ATP formed. [2.0]
13. Write a short note on urea cycle and mention its significance in biological system. [2.0]
14. What are the precursors for the purine and pyrimidine synthesis? [1.0]
15. What is your understanding of the biochemistry with respect to molecular biology, diseases and health? Justify with your reasons, applications, and prevention methods. Any of the following can be used as an example for illustration. [2.0]
 - a. Diabetes mellitus (DM)
 - b. Coronary Heart Disease (CHD)
 - c. Obesity and Slimming
 - d. Genetic Disorders of Metabolism
 - e. Infectious diseases
 - f. Molecular biology and genetic engineering of animals and plants

**BITS PILANI – DUBAI CAMPUS
DUBAI INTERNATIONAL ACADEMIC CITY
FIRST SEMESTER 2011 – 2012
BIO C211 BIOLOGICAL CHEMISTRY
TEST-II (OPEN BOOK)**

Duration: 50 min.

Weightage: 20%

Date: 11.12.2011

Max. Marks: 20

Note: a) Answer all questions, b) answer to the point and c) draw schematic diagram if required.

1. How the animals and plants utilize glucose as the energy source? If any oxygen depletion what will happen to the glucose metabolism and explain in terms of ATP. [4.0]
2. What are the similarities and dissimilarities of glycolysis and gluconeogenesis with respect to [5.0]
 - a. Metabolic pathway
 - b. Regulation
3. What are the different 4, 5 and 7 carbon monosaccharides produced in hexose monophosphate shunt? How these are recycled and metabolized? Explain. [4.0]
4. How the pyruvate is converted into acetyl-CoA in Krebs cycle? Explain the biochemical reaction with respect to enzymes, coenzyme and requirements of high energy compounds. [3.0]
5. When the cells have low energy requirements, what will happen to TCA cycle and mention key control points in animals and in bacteria? [4.0]

BITS PILANI – DUBAI CAMPUS
DUBAI INTERNATIONAL ACADEMIC CITY
FIRST SEMESTER 2011 – 2012
BIO C211 BIOLOGICAL CHEMISTRY
TEST-I (CLOSED BOOK)

Duration: 50 min.

Weightage: 25%

Date: 16.10.2011

Max. Marks: 25

Note: a) Answer all questions, b) answer to the point and c) draw schematic diagram if required.

1. What are the major differences between a plant cell and animal cells? Compare with a prokaryotic cell structure. [2.0]
2. Name any two subcellular organelle and give its clinical significance. [2.0]
3. Name any one reducing and non-reducing sugars. Reason out the non-reducing nature of some of the carbohydrates. [2.0]
4. What are glycosides? Name any two glycosides. Mention its significance in biology and biotechnology. [2.0]
5. What are amino sugars? Give any two examples and significance. [2.0]
6. Differentiate between starch and glycogen with respect to biochemical composition, functions, linkages. [2.0]
7. What are glycoproteins? Give a brief account on its functions in biology. [2.0]
8. What are glycosaminoglycans? Name any four and give composition and functions. [2.0]
9. What are polar and non-polar aminoacids? Give two examples for each. [2.0]
10. What are uncommon aminoacids? Mention their functions. [2.0]
11. Write a short note on the following: a. Glutathione, b. pentapeptides. [2.0]
12. Briefly describe on the different levels of organization of protein structure and how these protein structures are stabilized. [3.0]

**BITS PILANI – DUBAI CAMPUS
DUBAI INTERNATIONAL ACADEMIC CITY
FIRST SEMESTER 2011 – 2012
BIO C211 BIOLOGICAL CHEMISTRY
QUIZ-II (CLOSED BOOK)**

Duration: 20 min.

Date: 29.11.2011

Weightage: 7%

Max. Marks: 7

Name

ID No :

Note: a) Answer all questions and b) answer to the point

1. What are lipid soluble vitamins give examples and clinical manifestations of each. [1.0]

2. Name any two metal ions and their role in biochemical reactions. [1.0]

3. Name any two water soluble vitamins and clinical relevance. [1.0]

4. ATP is a high energy compound. Briefly explain the principle of phosphate removal from ATP molecule and energy release. [1.0]

5. What is the composition of Coenzyme A and how CoA is involved in biochemical reactions. [1.5]

6. What are the roles of NADH and NADPH in metabolism? [1.5]

**BITS PILANI – DUBAI CAMPUS
DUBAI INTERNATIONAL ACADEMIC CITY
FIRST SEMESTER 2011 – 2012
BIO C211 BIOLOGICAL CHEMISTRY
QUIZ-I (CLOSED BOOK)**

Duration: 20 min.
Weightage: 8%

Date: 1.11.2011
Max. Marks: 8

Note: a) Answer all questions and b) answer to the point

1. What are acyl glycerol and give any two examples? [1.0]

2. Name three essential fatty acids. [1.5]

3. What are phospholipids and give any two examples. [1.0]

4. List any four functions of lipids. [1.0]

5. How the cofactors are classified and give any one example each? [1.5]

6. What is activation energy and mention the function of enzymes with respect to activation energy? [1.0]

7. What are the three different types of enzyme inhibition? [1.0]