BITS Pilani, Dubai Campus

1st Semester 2013-2014

Biological Chemistry BIOT F211

Compre Exam

Date: 29/12/13 (Su) Duration: 3 hours Weightage: 40% (Max Marks 40)

Answer all the questions in a sequence. Draw structures wherever necessary.

Q1a. Explain the transamination reaction along with the cofactors involved. [2]
b. How are steroid hormones different from the non steroid hormones? [2]
c. Explain the synthesis of AMP from IMP. Mention the cofactors and enzymes involved in the synthesis reaction(s). [2]
d. What are uncouplers? Give an example of an uncoupler. [2]
e. Complete the following table [2]

Precursor	Vitamin	Role	Source	Deficiency
Ascorbic acid				
Folic acid				

Q2a. What are ketone bodies? How and when are they formed? [2]
b. Give the salient features of the Urea cycle. [3]
c. What are the three irreversible reaction of the glycolytic pathway? [3]
d. Differentiate between competitive and non competitive inhibitors. [2]

Q3a. Explain the reactions involved in the β-oxidation of fatty acids. [4]
b. Give the salient features of the light dependent reactions of photosynthesis. [2]
c. Describe the chemiosmotic theory of Peter Mitchell. [4]

Q4a. Explain the activation of adenylate cyclase by heteromeric G proteins. [3]
b. Describe complex II of ETC. [3]
c. Why do photosynthetic prokaryotes other than cyanobacteria do not produce oxygen? [1]
d. What are steroids? Give example of any two steroids and mention their roles. [3]

**********ALL THE BEST **********

BITS Pilani, Dubai Campus
1st Semester 2013-2014
Biological Chemistry BIOT F211
Test – 2 (Open book)

Date: 21-11-13 (Th) Duration: 50 minutes Weightage: 20% (Max Marks 20)

Answer all the questions in a sequence

1a. Justify, Pyruvate dehydrogenase is a holoenzyme. [2]

b. In many cases biochemical reactions are coupled. In these cases, where does the energy come from to drive endergonic reactions? [2]

c. Insulin facilitates energy storage in liver. Which enzymes of carbohydrate metabolism are coordinately regulated in liver in response to insulin signaling? Justify. [2]

2a. Why is it essential for humans to have a constant supply of vitamins in the body? Explain with examples. [2]

b. Triose phosphate isomerase catalyzes the conversion of dihydroxyacetone-P to glyceraldehyde-3-P. The ΔG° for this reaction is +7.6 kJ/mol. However, the observed free energy change (ΔG) for this reaction in erythrocytes is +2.4 kJ/mol. Assume that T = 300K and R = 8.31 $Jmol^{-1}K^{-1}$. Calculate the ratio of glyceraldehyde-3-P to dihydroxyacetone in erythrocytes. [3]

c. Glycogen anabolim makes use of a unique dimeric protein. Explain the role of this protein in glycogen anabolism. [2]

3a. What is the role of Vitamin B9? [2]

b. Justify the formation of lactic acid in the muscle cells during rigorous exercise. [2]

c. Which is the pathway that contributes towards the anabolic reaction of the cell? Give its significance. [3]

****

BITS Pilani, Dubai Campus

Instructions Division

1st Semester 2013-2014

Biological Chemistry BIOT F211

Test – 1 (Close book)

Date: 26/9/13 (Th) Duration: 50 minutes Weightage: 25% (Max Marks25)

Answer all the questions in a sequence

Q1a. Explain in brief the functions of any five membrane bound cell organelles. (Tabulate your answers) [5]

b. What is meant by the term isoelectric pH? How can you determine the isolectric pH of any amino acid? [3]

c. What are Ramachandran angles? What is the significance of these angles in protein study? [2]

Q2a. Give any two examples of following [4]

i. amino acids with a positively charged R-group
ii. Organelles not bound by a cell membrane
iii. peptide with nine amino acid residues
iv. fatty acid esters of phosphatidic acid

b. Justify, 'Amino acids possess at least two pK values'. [2]

c. Diagrammatically explain the Greek Key motif. [2]

Q3a. What is the role of sphingolipids in plants and animals? [2]

b. Explain the different forces that stabilize the tertiary structure of proteins. [4]

c. What are allosteric proteins? [1]

**********ALL THE BEST**********

BITS PILANI, DUBAI CAMPUS
DUBAI INTERNATIONAL ACADEMIC CITY
FIRST SEMESTER 2013-2014
QUIZ-2 [28.11.13]

COURSE NO.: BIOT F211 MAXIMUM MARKS:7
TITLE: BIOLOGICAL CHEMISTRY DURATION: 20 min.

Name: ID NO.

.....

1. List any two electron carries that form semiquinone radical. [1]

2. What is the unique feature of Heme a? [0.5]

3. _____ is the inhibitor of complex I and _____ is the inhibitor of complex III of the ETC. [1]

4. Name the enzyme that catalyzes the following reaction: [0.5]
QH_2 + 2 ferricytochrome c $\leftrightarrow$ Q + 2 ferrocytochrome c + 2 H^+

5. What are the coupling sites for ATP synthesis in ETC? [1]

6. What are the materials required for light independent reactions? [1]

7. What is photorespiration in C3 plants? [1]

8. In the C3 pathway, what are the reactions that take place in the mesophyll region of the plants? Mention the enzymes that take part in the reactions. [1]

BITS PILANI, DUBAI CAMPUS
DUBAI INTERNATIONAL ACADEMIC CITY
FIRST SEMESTER 2013-2014
QUIZ-1 [24.10.13]

COURSE NO.: BIOT F211 MAXIMUM MARKS:8
TITLE: BIOLOGICAL CHEMISTRY DURATION: 20 min.

Name: ID NO.

.....

1. What are enantiomers? Give an example. [0.5]

2. What is the induced fit hypothesis? [1]

3. Give the Haworth's projection of α-D-glucose in the pyranose form. [0.5]

4. What are isozymes? Give an example. [1]

5. What are reducing sugars? Mention a test for detecting the presence of reducing sugars. [1]

6. What are allosteric enzymes? What is their importance in biological processes? [1]

7. Mention the monomeric units and the linkage involved in the formation of chitin and Glycogen. [1]

8. Give the Michaelis Menten equation and explain the importance Km and Vmax. [2]