

Department of Biochemistry, Faculty of Pharmacy, Tanta University
Midterm Exam in Biochemistry, First Semester, 2nd Year, November 2014

Model answer
Midterm Exam in Biochemistry

Student Name:

Roll No:

Student Marks:

30

I. Mark the ONE correct answer:

(7 Marks)

(1) Fibrous proteins include all of the following EXCEPT:

- a ✓ Albumin
- b. Elastin
- c. Collagen
- d. Keratin

✓ 74.0

(2) Hydroxylation of proline residues in collagen requires all of the following EXCEPT:

- a. Molecular oxygen
- b. Ascorbic acid
- c. Alpha-ketoglutarate
- d. ✓ glutamate

(3) Accumulation of amyloid in the brain results in:

- a. Orotic aciduria
- b. ✓ Alzheimer disease
- c. Diabetes mellitus
- d. Sickle cell anemia

(4) Prion protein becomes infectious when:

- a. Its gene is mutated
- b. It is converted into globular protein
- c. ✓ It acquires fibrous nature
- d. It precipitates in the joints

(5) Regarding valine, which of the following statements is CORRECT?

- a. It is a cyclic amino acid
- b. It resides mainly on the surface of globular proteins
- c. Its side chain is ionized at physiologic pH
- d. ✓ It is an essential amino acid

(6) The 3D structure of proteins is characterized by all of the following EXCEPT:

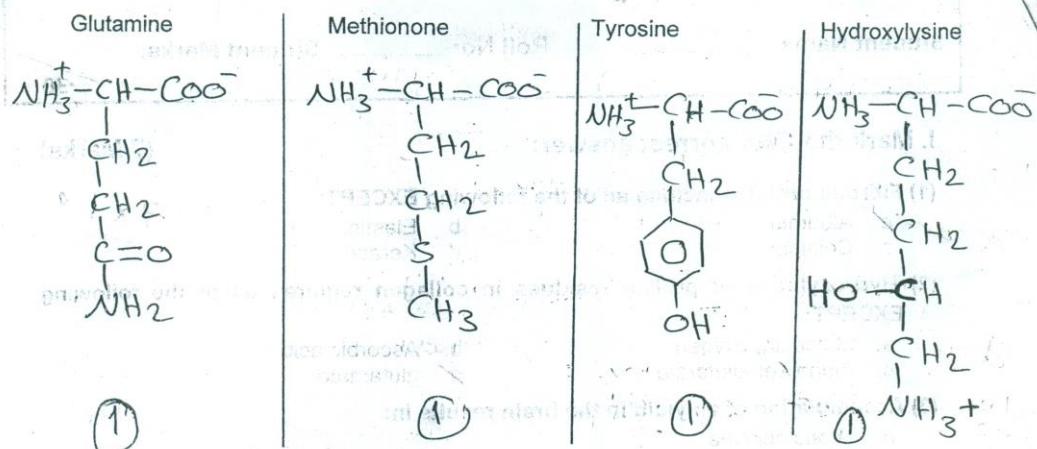
- a. ✓ It is stabilized by disulfide bonds between serine residues
- b. It constitutes domains of alpha helices or beta sheets
- c. Non polar residues associate in the interior
- d. Polar residues can form ionic bonds

(7) The peptide bond in proteins is rigid because:

- a. O & H are *trans* to each other
- b. O is partially negative
- c. ✓ It has a partial double bond character
- d. The six atoms of the peptide bond group are always planar

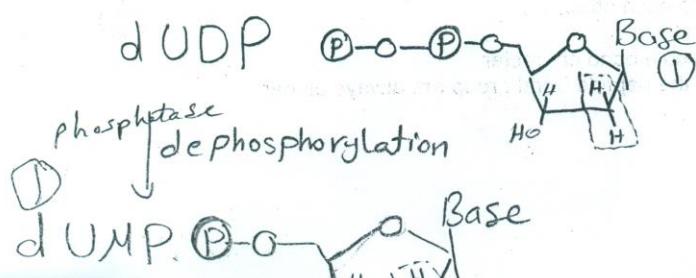
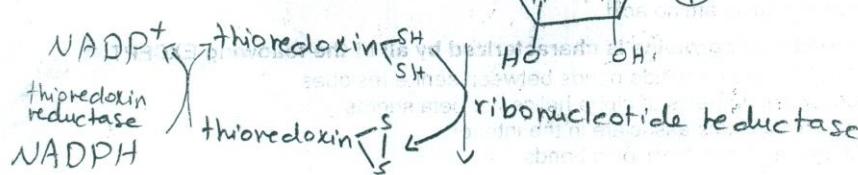
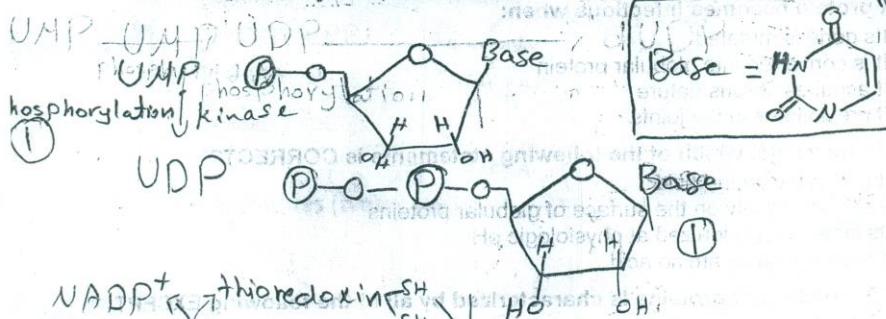
Department of Biochemistry, Faculty of Pharmacy, Tanta University
Midterm Exam in Biochemistry, First Semester, 2nd Year, November 2014

II. Draw the chemical structure of each of the following biomolecules:
(4 Marks)



III. Starting from UMP illustrate by structural chemical equations how the cells can synthesize dUMP

(4 Marks)



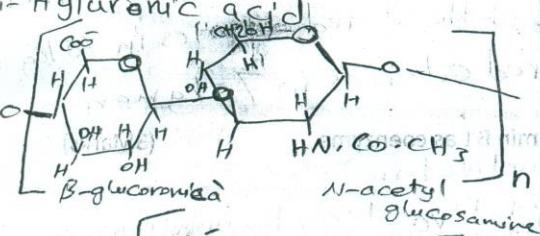
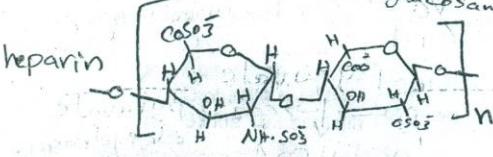
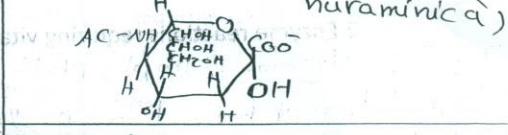
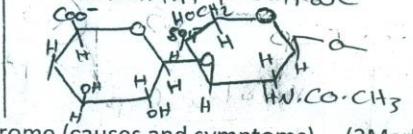
Department of Biochemistry, Faculty of Pharmacy, Tanta University
Midterm Exam in Biochemistry, First Semester, 2nd Year, November 2014

IV. Compare between each pair of the following:

2 (1 def, 1 Str) 2

- 1- Proteoglycans and Glycoproteins (definition and chemical structure of one example for each)

(4 Marks)

<u>Proteoglycans</u>	<u>Glycoproteins</u>
<p>They are predominantly carbohydrate but also contain proteins</p> <p>- Hyaluronic acid</p>  <p>heparin</p> 	<p>They are proteins containing branched or unbranched oligosaccharide chains.</p> <p>ex- Sialic acid (α-acetyl neurameric acid)</p>  <p>ex- chondroitin 4-sulfate</p> 
<p>2- Pellagra and Wernicke-Korsakoff syndrome (causes and symptoms)</p> <p><i>pellagra</i></p>	<p><i>Wernicke-Korsakoff syndrome</i></p>

Causes:- deficiency of niacin

Symptoms:- three Ds:

Diarrhea, dementia

dermatitis and if left untreated, death

* Causes:- thiamine deficiency (thiaminealcoholism)

or due to dietary insufficiency or impaired intestinal absorption

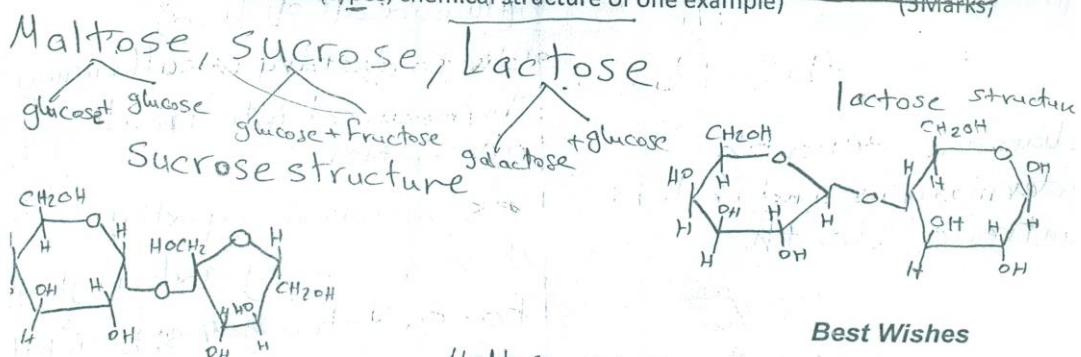
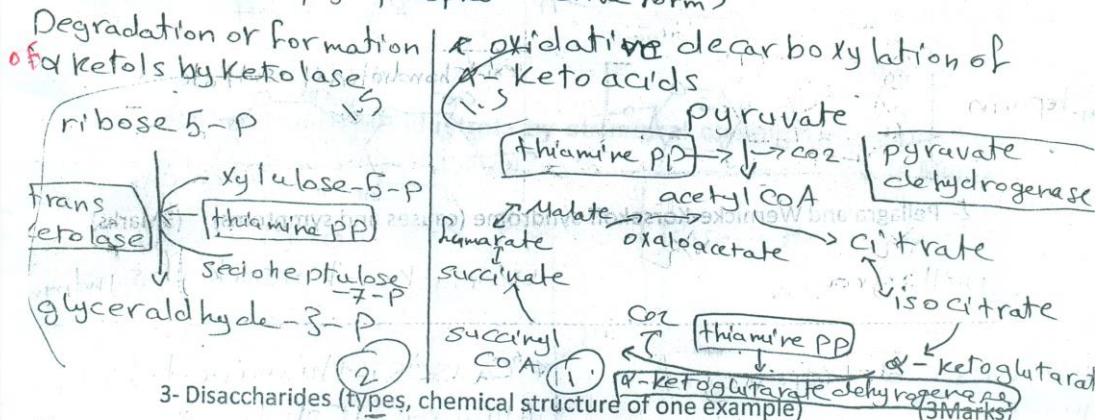
* Symptoms:- apathy, loss of memory and arrhythmic to-and-fro motion of eyeballs

Department of Biochemistry, Faculty of Pharmacy, Tanta University
Midterm Exam in Biochemistry, First Semester, 2nd Year, November 2014

V. Illustrate each of the following:

- 1- Body fuel stores (types, percentage and values) (2 Marks)
- 1) Triglycerides - in the average 70 kg man, 85% of the stored calories are in adipose tissue.
- 2) Glycogen - Liver (0.2% of the stored calories in 70 kg man)
muscle (0.4% of the stored calories in 70 kg man)
- 3) Protein - 14.5% of the stored calories in 70 kg man

2- Enzyme reactions requiring vitamin B1 as coenzyme
Vitamin B₁ (Thiamine Pyrophosphate active form) (3 Marks)



Best Wishes

4

Invert sugar - hydrolyzed into mixture of glucose and fructose which is called Invert sugar

evorotatory Fructose into dextrorotatory