المستوى الثاني - كيمياء حيوي . أنفي الكربوهيدرات . أنفي الليبيدز (٢٠٠٧)

| | | |
|---|---|---|
| **Mansoura university**<br>**Faculty of science**<br>**Chemistry Department**<br><br>**Subject** : BioChem. 275<br>**Course:** Carbohydrates and Lipid Metabolism |  | **Semester**: Second semester<br>**Level:** Second level<br>**Programe:** Biochemistry<br>**Date** : June, 2010<br>**Time Allowed**: 2 hours<br>**Full Mark**: 60 marks |

**Answer the following questions**

Provide your answer with formula, equations, pathways, figures or tables wherever possible

**Q-1-a-What is the biological role of each of the following**: (10 marks)

i. Bile salts
ii. Pancreatic juice
iii. Insulin
iv. Glucagon

**b- Discuss the following:**

i. Regulation of blood glucose levels. (5 marks)
ii. Biosynthesis of ketone bodies. (5 marks)

**Q-2-a- Convert** :Glyceraldehyde 3 phosphate to pyruvate. (8 marks)

**b- Calculate the number of ATP** produced from the oxidation of one molecule of palmitic acid (16 carbon atoms). (12 marks)

**Q-3-a- Complete the following sentences**: (10 marks)

i. The end products of lipid digestion are ....., ....., ....., ....., ..... and ..... .
ii. Glycerol, short and medium fatty acids are directly absorbed from ..... into ..... and are taken to ..... .

**b- Calculate the number of ATP** produced from the oxidation of one mole of glucose to pyurivate. .(10 marks)

Good Luck

Prof.Dr. Mohamed El-Naggar

مستوى ثانى كيمياء حيوية ( انيض الاحماض النووية)

| | | |
|---|---|---|
| **Mansoura University**<br>**Faculty of Science**<br>**Chemistry Department**<br>**Subject: Chemistry**<br>**Course(s):** Nucleic Acid Metabolism | كلية العلوم<br>جامعة المنصورة | **Second Term**<br>**2nd Year Biochemistry Students.**<br>**Date : May 2010**<br>**Time Allowed: 3 hours**<br>**Full Mark: 80 Marks** |

## ANSWER THE FOLLOWING QUESTIONS

**Q-1-** What is the activated reactant in the biosynthesis of each of these compounds? Write the chemical reaction and formula for each.

A- Phosphoribosylamine **(5 marks).**

B- carbamoylaspartate **(5marks).**

C- Orotidine monophosphate **(5 marks).**

D- 5-formaminoimidazole-4-carboxamide ribotide **(5 marks).**

**Q-2-** If we know that intermediate of purine synthesis were costly for the cell to make and metabolic degradation of RNA or DNA is real and there are pathways to recover these bases in the form of nucleotides. Explain the meaning of this statement **(5 marks)** showing the mechanism by which living cells recycle purines **(15 marks).**

**Q-3 A-** Draw a picture of double-stranded RNA composed of 4 nucleotides total (2 nucleotides on each strand). Your drawing must be chemically correct with no short hand notations for any parts except the nitrogenous bases. However, you must label all four bases to show which base you have drawn at each location **(10 marks).**

**Q-3B- As required answer with true (T) or false (F), If false, explain why? Or the correct answer (3 marks each):**

1. Adenine and guanine contain pyrimidine rings.
2. Deoxynucleotides carry no hydroxyl group at the 3' –position of the sugar ring.
3. Cot analysis is a biochemical technique that measures how much repetitive DNA is in a genome.
4. If the $T_m$ of DNA from organism A is lower that of a DNA from organism B, this means A contains a higher proportion of A-T base pairs than organism B.

5. The DNA structure is characterized by being anti-parallel, replicates semi-conservatively, proceeds in a unidirectional with a single replication fork.

6. **1- Orotic acid would be an intermediate in:**
   A. Catabolism of guanine B. Catabolism of uracil
   1. A only 2. B only 3. Both A and B 4. Neither A or B

**7- The major control of *de novo* pyrimidine nucleotide synthesis in man is:**
   A. feedback inhibition of glutamine-PRPP amidotransferase.
   B. feedback inhibition of aspartate transcarbamylase.
   C. availability of N-acetyl glutamate.
   D. substrate availability.
   E. competitive inhibition of carbamoyl phosphate synthetase II.

**8- Which of the following would NOT be expected to contribute to hyperuricemia (gout)?**
   A. Unusually high levels of PRPP. B. Inhibition of xanthine oxidase. C. Unusually high turnover of nucleic acids.
   D. High activity of adenosine deaminase. E. Deficiency of HG-PRT.

**9- Aspartate plays a role in all of the following EXCEPT:**
   A. conversion of UTP to CTP. B. *de novo* synthesis of AMP.
   C. *de novo* synthesis of orotic acid. D. the synthesis of most proteins.
   E. maintenances of the adenine nucleotide pool by a salvage mechanism.

**10- Direct sources of purine ring atoms in the *de novo* synthesis of IMP include:** 1. glutamine. 2. a component of the tetrahydrofolate one-carbon pool. 3. aspartate. 4. glycine.
A. 1, 2 and 3 B. 1 and 3 C. 2 and 4 D. 4 only E. All four.

**Best wishes;**

**أ.د. يحيى اللاذق ، - أ.د. عبد العزيز فتوح ، د. سمير بهجت بندق ، د. منال الفداوى**

(٢٧٧ كم) امين الاحماض الامينية والبروتينات

لمستوى برامج كيمياء حيوية

Mansoura University
Faculty of Science
Chemistry Department
Course : Biochem, 277
Subject : amino acid metabolism

Second Term Examination 2009/2010
Second Year Biochem. Students
Date : 22 June, 2010
Time Allowed : 2 hours
Total Mark : 80 Marks

Answer the following questions
Provide your answer with formula, equations, pathways, figures or tables wherever possible

**Q1:**

A) Write the structure of the following compounds: (5 marks)

1- S-adenosylmethionine
2- Glutathione
3- Anserine
4- Figlu
5- Hippuric acid

B) Give at least THREE metabolic disorders are associated with the reactions of urea cycle? Mention the enzyme deficiency for each disorder? (15 marks)

C) What is the biological importance's of glycine? (5 marks)

**Q2:**

A) Amino acids are transported across cell membranes of various tissues either by $Na^+$-dependent countertransporters or by reacting with glutathione. Compare between two routes and explain how the amino acids transported into the cells? (15 marks)

B) Explain how to synthesize serine from choline. (10 marks)

**Q3:**

A) Define the following metabolic disorders and clarify the enzyme defect for each : (10 marks)

1- Maple syrup urine
2- Phenyl ketonuria
3- Alkaptonuria
4- Hyperammonemia type 2
5- Type-1 hyperlipoprotinemia

B) Explain how arginine and histidine are catabolized into α-ketoglutarate.Pointed out of the metabolic block in each one? (10 marks)

C) Select one from the three branched chain amino acids L-Leucine, L-isoleucine and L-valine and draw the equations how it was catabolized? (10 marks)

Good Luck Prof. Dr. A.F.Abdel-Aziz

**Mansoura University**
**Faculty of Science**
**Chemistry Department**
**Subject: Biochem (278)**
**Course: Vitamins**

**Second Term**
**Level (2) Biochemistry**
**Date: June 2010**
**Time allowed:2 hours**
**Total Marks: 80 marks**

Please: Answer all the following questions.

**Question (1) Complete the following spaces with suitable answer.**

**(20 marks, one mark for each point)**

1) Co enzyme of vitamin B1 is .....and is formed from.....,.....
2) Co enzymes of riboflavin are .....and.....and their function are.....
3) Co enzymes produced from niacin are..... and ....and their function are.....
4) Pantothenic acid is required for synthesis of..... Which is used for.....
5) Co carboxylase enzyme needs .....as a cofactor.
6) Vitamin B6 used as a co enzyme in .....
7) Folic acid formed from.....,.....and.....
8) Dihydrofolate converted to tetrahydrofolate by ..... and needs .....as a coenzyme
9) Vitamin B12 is the cofactor catalyzes the conversion of methylmalonyl CoA to.....
10) Functions of ascorbic acid are .....

**Question(2).which of the following statements is true or false .**

**(20 marks, one mark for each point)**

1) Deficiency of vit.A leads to night blindness & xerophthalmia.
2) Deficiency of vit.K leads to defective in blood coagulation.
3) Deficiency of vit.E leads to reproductive failure, muscular dystrophy.
4) Deficiency of vit.D leads to inadequate bone mineralization & rickets in children.
5) Deficiency of vit.C leads to scurvy.
6) Deficiency of vit.B12 leads to Pernicious anemia.
7) Deficiency of thiamine leads to beriberi.
8) Deficiency of niacin leads to pellagra.
9) Deficiency of folate leads to impairment in dTMP synthesis.
10) Deficiency of choline leads to fatty liver.

**Question (3). Compare between the following compounds with special reference to structure and function.** **(40 marks, 10 marks for each point)**

a) NAD &FAD.
b) Lipoic acid &Folic acid.
c) Thiamine pyrophosphate &Pyridoxal phosphate.
d) Vitamin A and vitamin D.

*Good luck*
*Prof.Dr. El Said El Sherbini*

الفصل الثاني برنامج الكيمياء كيمياء حيوية (الأحماض الأمينية والبروتينات)

**Mansoura University**
**Faculty of Science**
**Chemistry Department**
**Subject: Biochem (279)**
**Course: Amino acids and proteins**

**Second Term**
**Level (2) Biochemistry**
**Date: June 2010**
**Time allowed:2 hours**
**Total Marks: 80 marks**

Please: Answer all the following questions.

**Question (1) Complete the following spaces with suitable answer.**

**(20 marks, one mark for each point)**

1) Sulpher containing amino acids is……,……...and……..
2) Protein bonds is……..…,……..…..,……..…..,……...and……
3) Zwitter ion means……
4) Transdeamination means……
5) L amino acids oxidase needs ……as a co enzyme, while D-amino acids oxidase needs……..as a co enzyme.
6) In oxidative deamination L- glutamate gives ……. and … by enzyme ……..and needs ……..as a co enzyme
7) Amino acids give α- ketoglutrate are ……,……..,…..…..,……..and……..
8) Amino acids give succinyl –Co A are……..,……..and…..……
9) Serine delaminated to pyruvate by ……
10) Creatine is formed from ....., …. and ….Which need …. to give creatine phosphate

**Question(2).which of the following statement is true or false.**

**(20 marks, one mark for each point)**

1) Glycine is formed from serine.
2) Albinism is due to defective in melanin synthesis.
3) Classic PKU is due to a defect in phenylalanine hydroxylase enzyme.
4) Tyrosine is hydroxylated to dihydroxy phenylalanine by tyrosine hydroxylase.
5) Histadine is decarboxylated to histamine by histadine decarboxylase.
6) Melatonin is produced from N-acetylation of serotonin..
7) Lysine is the precursor of carnitine.
8) Deficiency of tryptophan lead to deficiency of nicotinic acid.
9) Insulin is inactivated by hepatic glutathione insulin trans hydrogenase.
10) Glutamine is hydrolysed to glutamate and NH3 by glutaminase enzyme.

**Question (3). Compare between the following with special reference to biosynthesis and structure** **(40 marks, 10 marks for each point)**

a) Urea cycle & glucose alanine cycle
b) Phenyl ketonuria & Alkaptonuria
c) Polyamines & Catecholamines.
d) Skatole & Indole

*Good luck*
*Prof.Dr. El Said El Sherbini*

المستوى الثالث - برنامج كيمياء حيوية

مادة كيمياء فيزيائية (٢٤١) - ديناميكا حرارية

| | | |
|---|---|---|
| Mansoura University<br>Faculty of Science<br>Chemistry Department<br>Subject : Chem. 241<br>Course(s): Chemical thermodynamics | كلية العلوم<br>جامعة المنصورة | Second Term<br>Year: 2rd Biochemistry students<br>Date : 15/6/ 2010<br>Time Allowed : 2 hours<br>Full Marks : 60 Marks |

**Answer the following questions:**

**1) Which one of the following thermodynamic quantities is not a state function?** *(3 marks)*

**a) P b) T c) q d) q + w e) ΔH**

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**2) When one mole of gas condenses to water, the entropy:** *(3 marks)*

**a) Increases b) decreases c) stays the same d) equals zero e) is a negative value**

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**3) If the work has a negative value in a reaction, we can deduce that:**

**a) Work is done by the surroundings b) work is done on the system c) the reaction must not be spontaneous d) $\Delta n_{gas}$ is less than zero for the reaction.** *(3 marks)*

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**4) In which reaction is $\Delta S^o$ expected to be positive?** *(3 marks)*

**a) $A_{2(g)} \rightarrow A_{2(s)}$ b) $X_{(l)} \rightarrow X_{(s)}$ c) $O_{2(g)} + 2SO_{(g)}$ d) none of these**

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**5) Which of the following is true?** *(3 marks)*

**a) When a gas is compressed, W is negative b) Temperature is an extensive property c) the melting of ice is an exothermic process d) ΔH is the same as heat of constant volume e) ΔE is the same as heat of constant pressure.**

---

**6) If a reaction has positive ΔS, then:** *(3 marks)*

**a) The disorder of the system increases b) the reaction is exothermic c) the Gibbs free energy is negative d) the reaction is non- spontaneous e) heat goes from the system into the surroundings**

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**7) Fill in the blanks:** *(3 marks)*

**a) if $\Delta G^o$ less than zero, $K_{eqm}$ is ..... b) if $\Delta G^o$ more than zero, $K_{eqm}$ is ..... c) if $\Delta G^o$ equals zero, $K_{eqm}$ is .....**

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8) For the following reaction $\Delta G^{\circ}$ is 2.6 kJ/mol at 25 °C. The equilibrium constant at 25°C is: $H_{2(g)} + I_{2(g)} \leftrightarrow 2HI_{(g)}$ *(3 marks)*

a) 2.86 b) 0.999 c) 0.35 d) $1.05 \times 10^{-3}$ e) 1.05

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9) a- Derive the efficiency of an engine in terms of temperature of sink and source?

b- Show how $\Delta S$ can be determined from the 3rd law of thermodynamics? and write on the formulation of the 3rd law

c- Prove $PV^{\gamma}$ = constant

*(12 marks)*

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10) One mole of monoatomic ideal gas at 27 °C, expands isothermally and reversibly from 5 liters to 15 liters. Calculate W in joule, q in joule, $\Delta E$ in joule, $\Delta H$ in joule, $\Delta S$ in joule/K , $P_{initial}$ and $P_{final}$ in atm. *(14 marks)*

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11) Estimate the boiling point of $H_2O_2$. The heat of vaporization for $H_2O_2$ is 51.5 kJ/mole and the entropy of vaporization is 123.4 J/mole/K. *(5 marks)*

a) 67.6 °C b) 144 °C c) 26.2 °C d) -11.4 °C e) 118 °C

---

12) At 25 °C, $\Delta H$ = 128.9 kJ /mole, $\Delta S$ = 320 j/K/mole for a reaction. Above what minimum temperature will this reaction becomes spontaneous? *(5 marks)*

a) 298K b)332K c) 403K d) 530K e) 1150K

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Good Luck

*Prof.Dr.Abd El-Aziz S. Fouda*

المستوى الثاني بوالج (ك - ع - ك ح - ك ف ح - علوم بيئة - ج)
رياضيات بحتة (ر ٢٠١)

| | | |
|---|---|---|
| الفرقة: الثانية<br>المادة: ر ٢٠١ – رياضيـــات بحتة<br>(تفاضل عالي ومعادلات تفاضلية) | كلية العلوم – قسم الرياضيات | دور مايو ٢٠١٠<br>الزمن: ســـــــاعتان<br>التاريخ: ٢٠١٠/٦/١٧ |

الشُعب : كيمياء–كيمياء حيوية–كيمياء ونبات–ميكروبيولوجيا–كيمياء وحيوان–علوم البيئة –جيولوجيا

*أجب على الأسئلة الآتية*: (٢٠ درجة لكل سؤال)

[1]أ اختبر وجود النهايات المتكررة و النهاية العامة للدالة $f(x,y)=\dfrac{x^2-y^2}{x^2+y^2}$، وذلك عندما $(x,y)\to(0,0)$

ب. باستخدام نظرية أويلر للدوال المتجانسة اثبت أنه إذا كانت $u(x,y)=\tan^{-1}\left(\dfrac{x^3+y^3}{x-y}\right)$

، فإن : $x u_x + y u_y = \sin 2u$ .

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[2] حقق نظريـــــة "جرين" للتكامل : $\oint_c (x^2-y)\,dx+(x-y^2)\,dy$ حيث c هو المنحنى المحصور

بين المستقيم $y=x$ و القطع المكافئ $y^2=x$ مأخوذاً في الاتجاه ضد عقارب الساعة .

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[3]أ. إذا كان $I_n=\int_0^{\pi/2}\sin^n x\,dx$ ، فاثبت أن: $I_n=\dfrac{n-1}{n}I_{n-2}$ , $(n=2,3,4,...)$ ،

ومن ثم استنتج قيمة التكامل: $\int_0^{\pi/2}\sin^6 x\,dx$ .

ب. حل مسألة الشروط الابتدائية: $y(1)=1$ , $xy'-y^2=1$ .

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[4] حل المعادلات التفاضلية الأتية :

(i) $\ln(y^2+1)\,dx+\dfrac{2y(x-1)}{y^2+1}\,dy=0$

(ii) $4xy'-y=4xy^5\ln x$

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مع التمنيات بالتوفيق ☺

المستوى الثاني
برنامج كيمياء حيوي - علم الحيوان الكيمياء الحيوية (ج ١٠٥)

Mansoura University
Faculty of Science
Zoology Department
El- Mansoura, Egypt

جامعة المنصورة
كلية العلوم
قسم علم الحيوان
المنصورة - مصر

**Second Semester May 2010**

**Educational year: Second Level** | **Program: Biochemistry**
**Time: 2hr** | **Subject: Blood &endocrine**
**Date: 13/6/2010** | **Course (s): Z 125**
**Full Mark: 60**

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## Answer all the following questions

**Q1: A- Compare between each of the following:** **(10 marks)**

1- Cretinism and Graves disease
2- Cushing, syndrome and Addison disease
3- Insulin and glycogen referring to their mode of action

**B- Discuss the following items:** **(4 marks)**

1- The mechanism of steroid hormones
2- Both kidney and heart act as endocrine glands

**C-Mention the target organs for the following hormones:**
Estrogen– $T_3$ – $T_4$ – Progosterone – Calcitonine – LH **(3 marks)**

**D-Complete the following sentences:** **(3 marks)**

1-TSH and oxytocin hormones secreted from ----**1**-------,------**2**-----respectively.
2-The adrenal cortex is composed of ----**3**-----, ------**4**--------;-------**5**-------layers.
3-Parathyroid hormone is secreted in response to------**6**-----and-------**7**---------
4- -----**8**--- secreted from delta cell of pancreatic islets and responsible for---**9**--
5- ----**10**-----stimulates pancreatic juice, while -----11------stimulates bile juice

**Q2: A-The biochemical analysis of adult patient blood sample recorded four negative results as follow:-** **(10 marks)**

1- Decreasing in parathyroid hormone
2- Decreasing iodine
3- High level of thyroxin
4- Increasing in blood glucose
5- Increased catecholamines

**Give a possible diagnosis of the above results and suggest treatment from your opinion**

**B - Discuss briefly <u>four only</u> of the following:** **(10 marks)**

a- Fate of erythrocytes.
b- Steps of hemoglobin synthesis.
c- Dietary factors affecting erythropoiesis
d- Polycythemia
e- Two methods of plasma proteins separation.

**Q3- A- Choose the correct answer of the following:** **(15 marks)**

1 - Hypoxia induces the kidney to produce ---------- , which stimulates the production of ----------
a- platelets ; RBCs b- erythropoietin ; RBCs
c- fibrinogen ; WBCs d- erythropoietin ; platelets

2- The first phase of hemostasis is ----------
a- separation of globin and heme b- activation of prothrombin
c- platelet aggregation d- vascular spasm

3- ---------- are the most numerous WBCs, an active phagocyte that increases rapidly during acute infections?
a- monocytes b- eosinophils c- neutrophils d- lymphocytes

4- Which sequence is correct for the following events?
1. fibrinogen → fibrin 2. clot retraction
3. formation of thromboplastin 4. prothrombin → thrombin
a- 1,2,3,4 b- 3,4,1,2 c- 4,3,1,2 d- 3,2,1,4

5- The process by which WBCs move into and out of the blood vessels is called ------
a- phagocytosis b- passive transport c- endocytosis d- diapedesis

6- The rapid sequence of vascular spasm, platelet plug formation and coagulation is known as ----------
a- hemostasis b- hematopoiesis c- erythropoiesis d- hemophilia

7- Which of the following organs produces all plasma proteins except the gamma globulins?
a- kidney b-spleen c- liver d- small intestine

8- Antibody B is present in the blood plasma of individuals with blood ----------.
a- types A and O b- type B c- types B and A d- types Band O

9- Anemia can be caused by all of the following except ----------
a- nutritional deficiency of vitamin B12 and iron
b- failure of gastric production of intrinsic factor
c- kidney failure
d- hypoxemia from smoking or air pollution

10- Which cell stage in the formation of RBCs has lost its nucleus and yet retains a fine network of endoplasmic reticulum?
a- reticulocyte b- erythroblast c- proerythroblast d- normoblast

11- Which of the following anemia types is an example of a genetic disorder?
a- Sickle cell b- iron deficiency c- hemorrhagic d- all of the above

12-The fluid present outside the cells and separated from the ICF by the cell membranes is the ----------
a- extracellular fluid b- intracellular fluid
c- interstitial fluid d- total body fluids

13- Cells in the red bone marrow that give rise to all of the formed elements of the blood are called ----------

a- megakaryoblasts b- proerythroblasts c- fibrinogen d- stem cells

14- These leukocytes produce heparin and histamine; they play a role in inflammatory and allergic reactions.

a- basophils b- eosinophils c- lymphocytes d- monocytes

15- Using the dye method, if you know that:

i- amount of the dye injected = 45 mg ii- hematocrit value = 40%

iii-concentration of the dye in the plasma = 0.015 mg/ml

The blood volume = -------- ml

a- 2000 b- 5000 c-6000 d- 3000

## B- Fill in the Blanks: (5 marks)

i- The indicator substance used in the measurement of the body fluids must be:

---------(1) ---------- ----------(2)----------

ii- From the general functions of the blood, it regulates:-------(3)-------, -----(4)----

iii- Two main factors affecting blood viscosity are: -------(5)-------- , -------(6)------

iv- Hematocrit value is used in: -------(7)---------- , ----------(8)----------

v- Two functions of erythrocyte membrane are: -------(9)--------- , --------(10)------

vi- The types of normal hemoglobin in adult blood are:

--------(11)------, --------(12)-------- , ------(13)----------

vii- Two types of granulocytes are: ------(14)-------- , --------(15)----------

مع تمنياتنا للجميع بالتوفيق

د السيد الحبيبى

دهناء على حسن