المستوى الثاني . كيمياء - الجيولوجيا
كيمياء حيوي - مجموعة البيولوجي - رياضيات بحتة (ر١)

الفرقة: الثانيـــــــــــــة الشعب: كيمياء- كيمياء حيوية -كيمياء/ نبات - كيمياء/حيوان-علوم بيئة-جيولوجيا المادة: ر ٢٠١- رياضيات بحتة	كلية العلوم – قسم الرياضيات	دور مايو ٢٠١٤ الزمن: ساعتـــــــان التاريخ: ٢٠١٤/٦/١٢

أجب على الأسئلة الآتية:

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

[١٠ درجات]

ب. حل مسألة الشرط الابتدائي : $y'=\frac{x+y-4}{x+y+4}$, $y(2)=0$ [١٠ درجات]

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[2]أ. إذا كانت $z=\sec^{-1}\left(\frac{x^5+y^5}{x-y}\right)$ ، فاثبت أن : $x\frac{\partial z}{\partial x}+y\frac{\partial z}{\partial y}=4\cot z$ [١٠ درجات]

ب. إذا كانت $z=f(x+3y)+g(x-3y)$ ، حيث f, g دوال قابلة للاشتقاق مرتين على الأقل

فاثبت أن : $z_{yy}=9\,z_{xx}$. [١٠ درجات]

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[3]أ. اوجد الحل العام للمعادلة التفاضلية : $(\cos 2y-3x^2y^2)dx+(\cos 2y-2x\sin 2y-2x^3y)dy=0$ ، ثم

استنتج الحل الخاص الذي يحقق الشرط : $y(3)=0$. [١٠ درجات]

ب. احسب قيمة التكامل : $I=\int_0^4\int_{x/2}^{2}\cos(y^2)\,dy\,dx$ [١٠ درجات]

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[٤]أ. اوجد الحل العام للمعادلة التفاضلية : $(2xy^5-y)dx+2x\,dy=0$ [١٠ درجات]

ب. اثبت أن قيمة التكامل الخطي: $\int_{(1,1)}^{(2,4)}(2x+4xy)dx+(2x^2+y)dy$

لا تعتمد على المسار الواصل بين النقطتين $(1,1)$ ، $(2,4)$ ، ثم احسب قيمته على الخط الواصل بين النقطتين.

[١٠ درجات]

مع التمنيات بالتوفيق،

المستوى الثاني - كيمياء حيوية - الدم والغدد الصماء ٤ ٢٠١٥

Mansoura University
Faculty of Science
Zoology Department
Date: 5th June 2014
Time: 2 hrs.

Program: Biophysics
Z 225, Blood & Endocrine
Full Mark: 60 Marks

Answer All the following questions:

I. Answer All the following questions: **[20 Marks]**

(I.a.): True or False Questions ..... (10 Marks)

1. Mineralocorticoid hormones are produced in the zona glomerulosa.
2. Most hormones are regulated by a positive feedback mechanism.
3. One of the potential effects of hormones is to activate enzymes.
4. Hormones are secreted from endocrine glands into the bloodstream. Exocrine glands secrete hormones into ducts.
5. The sex hormones are produced in the male and female gonads.
6. Of the three categories of hormones (steroids, proteins, and amines), only the steroids and amines can be administered orally.
7. The presence of specific receptor sites on the cell membrane ensures the correct signaling of hormones to target cells.
8. Hyperglycemia results when alpha cells continuously secrete glucagon.
9. Insulin hormone stimulates the liver to release sugar into the blood.
10. Gastrin, Secretin, cholecystakinin, and entrokinin are hormones secreted by the small intestine.

(I.b.): Choose the correct answer: .....(10 Marks)

1- Parafollicular cells are related to...
a. thyroid gland b. parathyroid gland
c. pituitary gland d. pineal gland.

2- Which is TRUE statement regarding glucagon?
a. secreted by Alpha cells b. reduce blood glucose rate
c. stimulate gluconeogenesis d. promote protein production.

3- A meal rich in proteins but low in Carbohydrates does not cause hypoglycemia because:
a. glucagon secretion is stimulated by hypoglycemic meals .
b. the meal causes compensatory increase in T4 secretion.
c. cortisol in circulation prevents glucose from entering the muscles.
d. the amino acids in the meal are converted to glucose

4- Which of the following is not involved in regulation of plasma Ca++ levels?
a. kidneys. b. skin. c. lungs. d. intestine.

5-) Hypopituitarism is characterized by:
a. Infertility b. intolerance to heat. c. weight gain. d. excessive growth of the soft tissue.

6- Excessive growth hormone secretion in adults causes:
a. gigantism. b. acromegaly c. increased entry of glucose in muscles d. hypothyroidism

7- Parathyroid hormone:
a. decreases Ca++ mobilization of bone b. increases Ca++ mobilization from bone. c. decreases circulating levels of free Ca++ d. increases urinary excretion of Ca++

8- Calcitonin
a. increases Ca++ absorption by stomach. b. is secreted by hypothalamus.
c. is secreted by parathyroid gland. d. is secreted by thyroid gland.

9- When would plasma insulin levels be expected to be higher?
a- After intravenous administration of somatostatin.
b- Following a carbohydrate-rich meal.
c- During a surgical procedure. d- Following vigorous exercise

10- ADH travel in the blood to the main target:
a- Hypothalamus b- pituitary c- Collecting ducts d- Renal cortex

(II) Answer the following questions using labeled diagram. (25marks)

(II.a.): Write on the following: .....(10 Marks)

a-The Physiological importance of Testosterone & Oestrogen

b- Diabetes mellitus.

(II.b.): Answer the following questions: .....(15marks)

a) Shortly illustrate the Blood clotting

b) Define **Diapedesis, Leucopenia, polycythemia**

(III) Answer the following items: (15 marks)

a) Briefly illustrate the sites and essential factors of erythrocyte production in the adult human.

b) Calculate the MCV and the MCHC for a subject with a red blood cell count of $4x10^6$ per cubic mm, a hematocrit of 40% and a hemoglobin concentration of 12 g/dl. Describe the subject's red cells: are they normocytic? Normochromic

c) Tabulate a comparison between types of leucocytes with respect to percentages, location and functions.

Best wishes

Prof. Dr. M. Amr El-Missiry & Prof. Dr. Maher Amer

المستوى الثانى - كيمياء حيوى - أمين الأحماض الأمينية والبروتينات ٢٠١٤

	Mansoura University Faculty of Science Chemistry Department
Second Term Second Level Biochemistry Course Title: Amino acids & Proteins Metabolism Code No.: Biochemistry 277	May 2013 Date: 9 / 6/ 2014 Time allowed: 2 hours Full Mark: 80 Marks

Note: Express your answers by formulae, equations, pathways, figures and diagrams wherever possible,

Answer The Following Questions

Question I: ***(30 Marks)***

A- Give a scientific name of the following definitions: ***(12 Marks)***

1- The proportion of essential amino acids in a food relative to their proportion in a protein that will be synthesized in the body.
2- A rare autosomal disorder resulted from a metabolic defect in **reaction 5** of urea biosynthesis.
3- Nitrogen excreted – nitrogen intake = positive value.
4- In contrast to transamination reactions, a reaction results in the liberation of the amino group as free ammonia, replacing the amino group with oxygen from O2.
5- An enzyme can release or incorporate ammonium to or from glutamate.
6- A disease results from a metabolic block at glutamate-γ- semialdehyde in proline catabolism.
7- A metabolic disorder produced from a defect at fumarylacetoacetate hydroxylase (**reaction 4**) in tyrosine metabolism, the untreated acute and chronic cases leads to death from liver failure.
8- Serves as a precursor for methyl transfer reactions e.g. the conversion of norepinephrin to epinephrine.
9- It is the most important route for disposing of nitrogen from the body.
10- An essential amino acid is only required during growth.
11- It is the source in metabolism of: Serine?
12- It is the source in metabolism of: Glycine.

B- Complete the following: ***(10 Marks)***

a- Hydroxylation of peptide-bound prolyl and lysyl residues is catalyzed by ----------and ----------of skin and skeletal muscles.
b- All amino acids except ---------- and ---------- undergo transaminations.
c- The urea cycle is Upregulated by ---------- and ---------- BUT it's Downregulated by----------
d- ----------is allosterically activated by N-acetylglutamate. The latter its synthesis depends on the concentration of ---------- which increases by high rates of amino acid breakdown.
e- Folic acid deficiency can be detected by excretion of N-formiminoglutamate (Figlu) following a dose of ---------- amino acid.

C- Choose the correct answer: ***(8 Marks)***

Don't give more than one answer to a question. – Copy the table in your answer sheet.

No.	1	2	3	4	5	6	7	8	Total Marks = 8
Answer									

1- Nitric oxide and urea have in common the fact that they both have as an intermediate precursor the amino acid:

a) Aspartate. b) arginine.
c) glutamate. d) phenylalanine.

2- The NH3 produced in muscle degradation of nitrogenated compounds is transported through blood to the liver using as carriers:

a) alanine and glutamine. b) urea and alanine.
c) NH4 and glutamate. d) Glutamate and glutamine.
e) Alpha-ketoglutarate and urea.

3- The necessary coenzyme for transamination reactions is:

a) Coenzyme. b) Tetrahydrobiopterin.
c) FMN. d) Folate.
e) Pyridoxal Phosphate. f) Thiamine Pyrophosphate.

4- A person with phenylketonuria cannot convert.....

a) phenylalanine to tyrosine. b) phenylalanine to isoleucine.
c) phenol into ketones. d) phenylalanine to lysine.

5- Lacked argininosuccinate synthase activity leads to <u>one</u> of the following metabolic disorders of urea biosynthesis:

a) Citrullinemia. b) Hyperargininemia.
c) Hyperammonemia Type 1. d) Hyperammonemia Type 2.

6- These are neurotransmitters derived from amino acids, <u>except</u>:

a) Histamine. b) Epinephrine.
c) Dopamine. d) γ-aminobutyrate.

7- The metabolic defect of tyrosine aminotransferase <u>(reaction 1)</u> is detected in.....

a) Neonatal tyrosinemia. b) Tyrosinemia Type 2
c) Tyrosinemia Type 1. d) Alkaptonuria.

8- These are the characteristic features of Maple Syrup Urine Disease, <u>except:</u>

a) Accumulation of branched-chain a as.
b) Accumulation of branched-chain α-keto acids.
c) Deficiency of branched-chain α-keto acid dehydrogenase.
d) Early diagnosis prior to birth is useless.
f) Brain damage, mental retardation and early mortality.

Question 2: ***(30 Marks)***

Give a brief account on:

i- Hartnup disease.
ii- Alkaptonuria.
iii- β-alanyl dipeotides and related disorders.
iv- Biosynthesis of creatine and creatinine.
v- Alternative pathways of phenylalanine catabolism in phenylketonuria.

Question 3: ***(20 Marks)***

Demonstrate the following by chemical equations:

i- Biosynthesis of serotonin and melatonin.
ii- Biosynthesis of epinephrine and norepinephrine from tyrosine.
iii- Two pathways of L-cysteine catabolism.
iv- Biosynthesis of γ–aminobutyrate and related GABA metabolism disorder.

With My Best Wishs ***Examiner: Dr. Nivin A. Salah***

المستوى الثانى كيمياء حيوى . أصول الأحماض النووية ٢٠١٤

Mansoura University
Faculty of Science
Chemistry Department
Subject: Chemistry
Course(s): Nucleic acids Metabolism
Biochem 276

2nd Level Biochemistry Students
Date : May 2014
Time Allowed : 2 hours
Full Mark: 80 Marks

ANSWER THE FOLLOWING QUESTIONS

Express your answer by formulae equations, pathways, diagrams or figures wherever possible.

I. **[30 Marks]**

a) ***True or false*** **[16 Marks]**

1. Dietary purines do not participate in the salvage pathways and converted to uric acid ( )
2. The building block of nucleic acids is nucleotides, which includes nucleosides in addition to a phosphate group ( )
3. Conversion of ribonucleotides to the deoxy forms is catalyzed by ribonucleotide diphosphate kinase ( )
4. If one purine and one pyrimidine formed a base pair their width will fit the DNA double helix ( )
5. Purines bond to the first carbon of the sugar at their N9 atoms, while pyrimidines bond to the sugar at their N1 atoms. ( )
6. Cytarabine is a suicide inhibitor and works through irreversible inhibition of thymidylate synthase ( )
7. Allopurinol inhibits xanthine oxidase and reduces the levels of serum uric acid ( )
8. In marine invertebrates and crustaceans, allantoin is metabolized to ammonia ( )

b) Pyrimidine analogues include several drugs that are useful in treatment of neoplastic diseases. *Comment and describe THREE examples.* **[14 Marks]**

II. Describe the different pathways for purine catabolism. **[26 Marks]**

III. Define the following: **[24 Marks]**

1) Gout.
2) Tautomerization of nitrogenous bases.
3) Folate analogues.

Best wishes for our dear students,

Dr. Amr Negm