الفرقة الثالثة - كيمياء حيوية - كيمياء كهربية (٣٤١)

Mansoura University **Faculty of Science** **Chemistry Department** **Code: Chem.341** **Subject : Electrochemistry**	كلية العلوم جامعة المنصورة	**First Term** **Third Level** **Program : Biochemistry** **Date : January 2012** **Time Allowed : 2 hours** **Full Mark : 60 Marks**

Answer All Questions

First Question : (15 Mark)

[A] Derive an equation for calculating the heat of reaction ΔH and entropy change ΔS from emf measurement. (5 Mark)

[B] Write on each of the following : (10Mark)

(i) Calomel electrode. (ii) The standard hydrogen electrode.

(iii) Metal-insoluble oxide electrode. (iv) Electrode potential.

Second Question : (15 Mark)

[A] Discuss in detail Decomposition potential. (9Mark)

[B] Derive the Nernst equation relating electrode potential with concentration. (6Mark)

Third Question : (15 Mark)

[A] Give Reason : (10Mark)

(i) Glass electrode is preferred than other electrodes for measuring solution pH.

(ii) Maximum emf obtainable from a simple cell does not exceeds 2 V.

(iii) Le Clanche cell is irreversible.

(iv) Selecting Pt electrode as the best choice for the standard hydrogen electrode.

(v) There is no metal giving low oxygen overpotential.

[B] Write on Electrolyte concentration cell without transference. (5Mark)

Fourth Question : (15 Mark)

[A] Deduce mathematically the equation for a polarized electrode (Electrode kinetics for irreversible electrode). Illustrate the form of this equation under conditions of : (i) High overvoltage (η 0.05V, Tafel equation). (ii) Low overvoltage (η 0.02 V). (10 Mark)

[B] The standard Weston-Cadmium cell has a voltage of

$[1.0186 - 4.06 \times 10^{-5} (t-20)]$ volts at 25°C. Calculate:

(i) ΔG, (ii) ΔH, (iii) ΔS in the cell reaction at 25°C. (5 Mark)

Good Luck : Prof. Dr. Ahlam M. A. Helmy

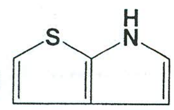
المستوى الثالث. كيمياء حيوية _ كيمياء المركبات (ك ٣٣٧)
ك نبات
ك حيوان

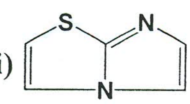
Mansoura University
Faculty of Science
Chemistry Department
Subject: Chemistry
Course(s): Org.Chem.337

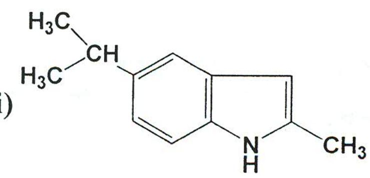
1[st] Term
3[rd] Level Students
Date: 23 / 1 / 2012
Time Allowed: **2** Hours
Full Mark: **80** Marks

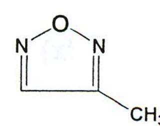
Answer All Questions

1- a) Give acceptable name of each of these heterocycles: **[8 Marks]**

i) 

ii) 

iii) 

iv) 

b) Diagram the following: **[18 Marks]**

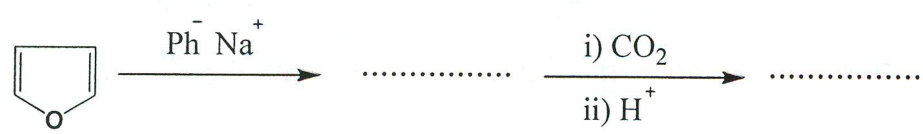
i) Conversion of pyridine to 4-nitropyridine

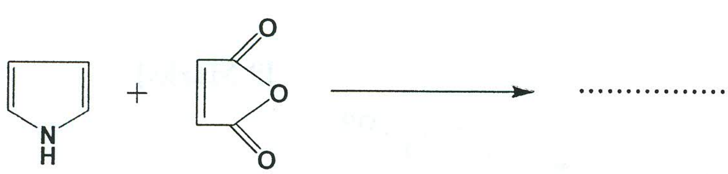
ii) Synthesis of quinoline

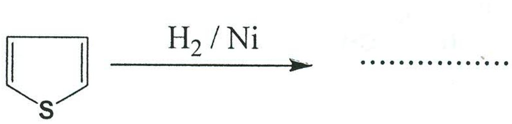
iii) Formation of 3-cyanomethylindole

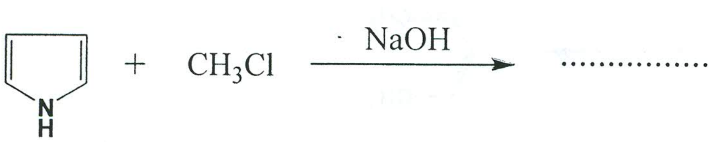
iv) Preparation of 2- chlorothiophene

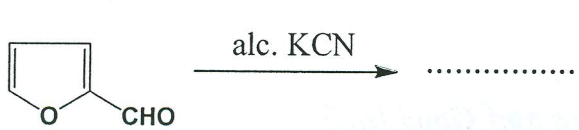
2- Complete these reactions: **[27 Marks]**

i) 

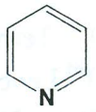
ii) 

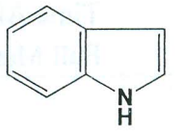
iii) 

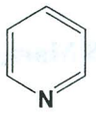
iv) 

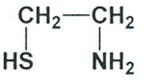
v) 

P. T. O.

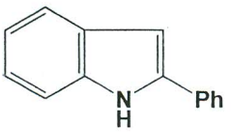
vi)  KOH / heat ⟶ .....

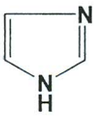
vii)  CH_3CHO / HCl ⟶ .....

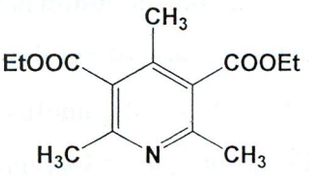
viii)  $PhCO_3H$ ⟶ .....

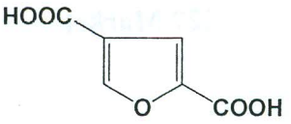
ix)  HCOOEt ⟶ ..... P_2O_5 ⟶ .....

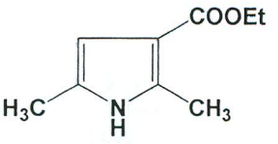
3- a) Design one synthesis of each of the molecules below: **[18 Marks]**

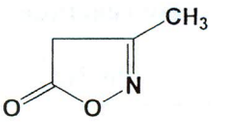
i) 

ii) 

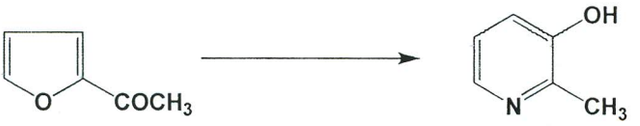
iii) 

iv) 

v) 

vi) 

b) Diagram these conversions: **[9 Marks]**

i) 

ii) 

Best Wishes and Good luck

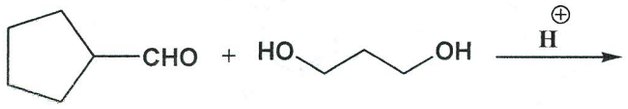
Examiners: Prof. Dr. Ez Kandil, Prof. Dr. Evelin Boshra, A.Prof. Dr. Eman Keshk

Mansoura University Faculty of Science Chemistry Department Subject: Chemistry Course(s): Chem.336 Physical Organic Chemistry	First Term 3rd Level Biochem, Zoology and Botany/ Chem. Students Date: Jan. 2012 Time Allowed: 2 Hours Full Mark: **80** Marks

Answer All Questions

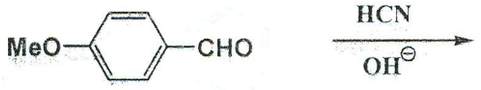
Question 1 (30 marks)

1- **Write the major product(s) of Five only from the following reactions. Explain the suitable mechanism for each one.** **(20 marks)**

a) 

b) 

c) 

d) 

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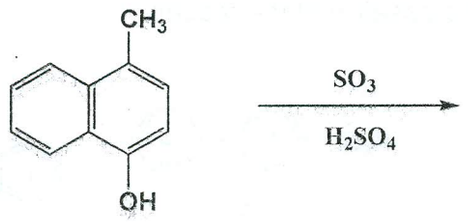
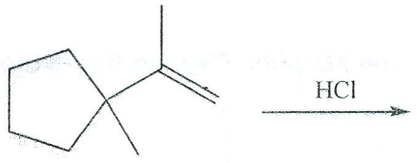
f) 

g) 

2- **Write shortly what you know about two only of the following :** **[10 marks]**

a; Generation and stability of carbocations.

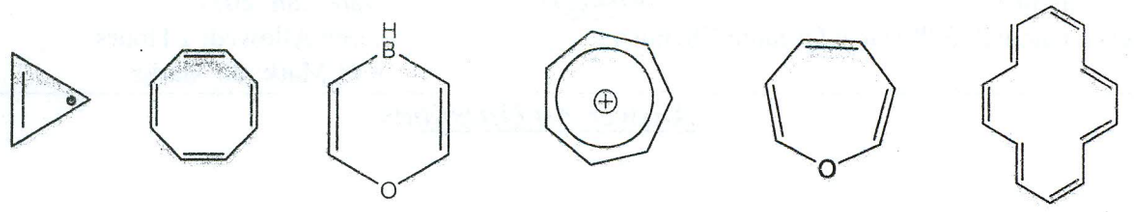
b; Stereochemical mechanism of SN^1 and SN^2 reactions.

c; Orientation of monosubstitued benzene.

Please turn the paper

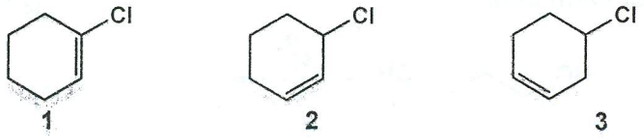
Question 2 [25 marks]

a) Predict with discussion five only of the following structures is aromatic , antiaromatic or nonaromatic. [10 marks]



1 2 3 4 5 6

b) Which of the following isomeric chlorides will undergo SN^1 more readily? Give reasons. [5 marks]



1 2 3

c) Propose with discussion a synthesis of 2-chloro-4-nitro benzoic acid from benzene. [10 marks]

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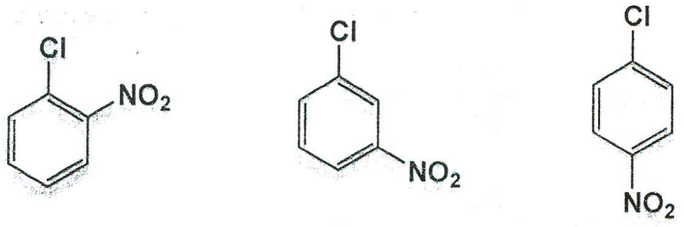
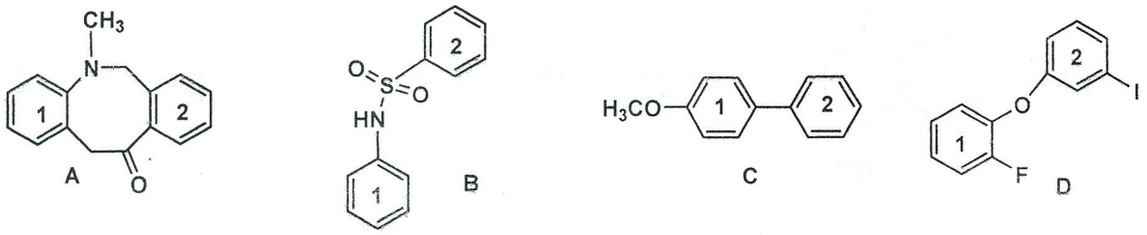
Question 3 [25 marks]

a) Show by mechanism which of the following compounds gives a mixture of three products when treated with NaOH under high temperature and pressure. [10 marks]



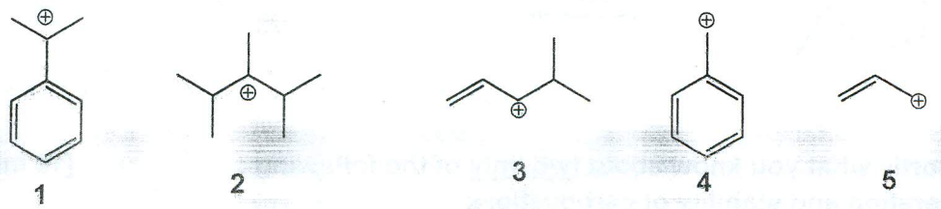
1 2 3

b) Which ring (1) or (2) in the following compounds undergo electrophilic nitration more readily than the other. Indicate with discussion the position of the reactin. [10 marks]



A B C D

c) Arrange the following carbocations according the stability. Explain the reasons. [5marks]



1 2 3 4 5

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With Our Best Wishes *Prof. Dr. M. Barghot; Dr. S. El-Desoky ; Dr. A. El-Mekabaty*

٣ كيمياء حيوية - كيمياء العناصر الانتقالية والتناسقية (ك٣٢٧)

Mansoura University
Faculty of Science
Chemistry Department

Course(s):. (323) Biochemistry

First Term, Level Three.
Date : 5 January 2012
Time Allowed : 2 hours
Full Mark : 60 Marks

ANSWER THE FOLLOWING QUESTIONS

1) A- Name the following complexes and indicate the possible isomers: *(15 Marks)*

i) $[Cl_3(NH_3)Fe\text{-}(OH)_2\text{-}Fe(NH_3)(en)Cl]$
ii) $[Pt(NH_3)_4][PtCl_6]$
iii) $[Mn(CN)_6]^{4-}$
iv) $[Zn(pyridine)_2Cl_2]$
v) $[PtCl_2(NH_3)_4]Br_2$

B- Write the structural formula for each of the following compounds: *(5 Marks)*

i- Potassium hexacyanomanganate(III).
ii- Tri μ-carbonylbis(tricarbonyliron(0)).
iii- Pentaminenitritocobalt(III) ion.
iv- Sodium tetraoxochromate(VI).
v- Tetramineplatinium(II) tetrachloroplatenate(II).

2) A- Chose the correct answer: *(10 Marks)*

i- Trans $[PtCl_2(NH_3)_2]$ has dipole moment equal .... **(1, 2, Zero)**
ii- The molar conductivity of $[CoCl(NH_3)_5]Cl_2$ is .... **(Zero, 100, 250)**
iii- Square planar $[Cu(CN)_4]^{3-}$ complex ion has .... magnetic moment **(Zero, normal, subnormal)**
vi- The linear **$[Cl\text{-}Ag\text{-}SCN]^-$** complex ion has .... isomerism **(geometric, linkage, coordination)**
v- The $[Cu(NH_3)_4(H_2O)_2]^{2+}$ complex ion has .... has geometrical shape **(octahedral, tetrahedral, square planar)**

B- Give one example of the following ligands: *(10 Marks)*

i- Binegative bidentate ligand.
ii- Neutral bridging ligand.
iii- Neutral bidentate ligand form five membered ring.
vi- Tridentate ligands.
v- Ambidentate ligands.

3) A- Complete the following reactions: *(10 Marks)*

i- $3Co_3O_4 + 8Al \rightarrow$ .... + ...

ii- $FeCr_2O_4 + C \xrightarrow{\text{electric furance}}$ ----- + ----- + -----

iii- $VCl_4 \xrightarrow{H_2O}$ -------

iv- $Sc + NaOH \rightarrow$ ...... + ...

v- $Sc_2O_3 + C \xrightarrow{1000^\circ C}$ ---- $\xrightarrow{H_2O}$ ----- + -----

B- Which of the following compounds would be paramagnetic? *(10 Marks)*

i- $[Sc(NH_3)_6]^{3+}$ ii- $[Ni(NH_3)_6]^{2+}$
iii- $[Co(NH_3)_6]^{3+}$ iv- $[Fe(CN)_6]^{4-}$

Please turn over →

4) A- Write briefly on the extraction of **Titanium** metal from its ores. ***(10 Marks)***

B- True and false (circulate the correct response): ***(10 Marks)***

i- T - F Vitamin B12 is a Co^{2+} complex and is used for anemia patients.

ii- T - F Ni metal is passive towards aqua regia.

iii- T - F Fehling test is used for detection of sugar in urine by reduction of Cu^{2+} to CuO.

v- T - F TiO_2 is amphoteric.

vi- T - F Fe rusts slowly in air in presence of humidity to Fe_2O_3.

Best Wishes

Prof. Magdy Bekheit
Prof. Nagwa Nawar
Prof. Sahar Mostafa

^{21}Sc	^{22}Ti	^{23}V	^{24}Cr	^{25}Mn	^{26}Fe	^{27}Co	^{28}Ni	^{29}Cu	^{30}Zn

Mansoura university
Faculty of science
Chemistry Department
Subject : Biochem.3 74
Course : Water & Minerals Metabolism

First Term Exam 2011/2012
Third Level Biochem Students
Date : 9 Jan, 2011
Time Allowed : 2 hours
Total Mark : 60 Marks

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

Q1 : A - Explain how **iron** can absorbed, transported and storage between the different organs and tissues. [8 Marks]

B- What are the types of respiratory acidosis and respiratory alkalosis? Mention the route of compensation with acute respiratory acidosis? [6 Marks]

C- Put (√) for right sentence and put (X) for wrong sentence: [5 marks]

1- Respiratory acidosis is due to decreased ventilation of the pulmonary alveoli, leading to elevated arterial carbon dioxide concentration ($PaCO_2$).
2- Hypercapnia and respiratory acidosis occur when impairment in ventilation occurs and the removal of CO_2 by the lungs is less than the production of CO_2 in the tissues.
3- Aldosteroui8ne inhibits both reabsorption of Na^+ and excretion of K^+ in the late distal tubule.
4- Hyperirritability, means that increased neuromuscular exactability because *Mg* competitively inhibits the entry of *Ca* into neuron.
5- Mg deficiency should suspected to patients with hypokalaemia and hypocalcaemia .

Q2: **A**- What is the effect of PTH on phosphorous. [10 Marks]
B- Give THREE examples of iron-sulfur cluster and mention the biological importance for each one [10 Marks]

Q3: Write briefly on the following: [21 Marks]
1- plasma calcium and hypo- and hypercalcaemia.
2- phosphate binders and function of sodium.
3- causes leading to Hypomagnesaemia.

Prof. A.F.Abdel-Aziz

Mansoura University
Faculty of Science
Chemistry Department
Subject: Biochemistry
Course: Hormones, Biochemistry 372

First Term Examination
3rd Level Students
Date Jan 12, 2012
Time Allowed: Two hours
Full Marks: 60 Marks

Answer the following questions:

I. (15 marks)

a. What is the mechanism of TSH hormone action?
b. Distinguish between goiter and grave disease. Illustrate your answer with graph.
c. Write short notes on type of chemical messenger.

II. (20 marks)

a) What is difference between:
   i. Lipophilic and hydrophilic hormones.
   ii. Antagonists and Agonists.
   iii. Action of epinephrine and insulin on liver cells?
b) What are the effects of growth hormone on bone growth and metabolism?

III. Write short notes on: (10 Marks)

a) Activation of PKA.
b) The Renin-Angiotensin-Aldosterone Pathway.

IV. Choose the best answers :(15 marks, 1 for each)

1. **The sequential steps in the conversion of tyrosine to epinephrine are**
   (A) Ring hydroxylation-decarboxylation-side chain hydroxylation-N-methylation
   (B) Side chain hydroxylation-decarboxylation-ring hydroxylation N-methylation
   (C) Decarboxylation-ring hydroxylation-side chain hydroxylation-N-methylation
   (D) N-methylation-decarboxylation-ring and side chain hydroxylation
2. **The characteristic of hyperparathyroidism is**
   (A) Low serum calcium
   (B) High serum phosphorous
   (C) Low serum calcium and high serum phosphorous
   (D) High serum calcium and low serum phosphate
3. **Action of insulin on lipid metabolism is**
   (A) It increases lipolysis and increases triglyceride synthesis
   (B) It decreases lipolysis and increases triglyceride synthesis
   (C) It decreases lipolysis and decreases triglyceride synthesis
   (D) It increases synthesis of triglyceride and increased ketogenesis
4. **Conversion of testosterone to estradiol requires the enzyme:**
   (A) Aromatase
   (B) Dehydrogenase
   (C) Lyase
   (D) Isomerase
5. **The only correct statement about hormone receptors is**
   (A) Receptors for protein hormones are present in cytosol
   (B) Receptors for steroid hormones are membrane bound
   (C) Hormone-receptor binding is irreversible
   (D) Receptors can undergo down regulation and up regulation
6. **All the following statements about hormones are true except**
   (A) All of them require specific carriers in plasma
   (B) All of them require specific receptors in target cells
   (C) Some of them are subject to feedback regulation
   (D) Some of them increase the transcription of certain genes

7. **Secretion of Insulin-like Growth Factor-I is promoted by**
   (A) Insulin
   (B) Glucagon
   (C) Growth hormone
   (D) Somatomedin C
8. **Acromegaly results from overproduction of**
   (A) ACTH during childhood
   (B) TSH during adult life
   (C) Growth hormone during childhood
   (D) Growth hormone during adult life
9. **Proopiomelanocortin is the precussor of**
   (A) ACTH
   (B) β–tropin
   (C) Endorphins
   (D) All of these
10. **Epinephrine causes in muscle:**
   (A) Gluconeogenesis
   (B) Glycogenesis
   (C) Glycolysis
   (D) Glycogenolysis
11. **Binding of thyroxine to its receptors**
   (A) Activates Adenylate cyclase
   (B) Activates guanylate cyclase
   (C) Activates a stimulatory G-protein
   (D) Increases transcription
12. **All the following statements about hormones are true except**
   (A) All of them require specific carriers in plasma
   (B) All of them require specific receptors in target cells
   (C) Some of them are subject to feedback regulation
   (D) Some of them increase the transcription of certain genes
13. **Glucagon**
   (A) Increases protein synthesis
   (B) Inhibits lipolysis in adipocytes
   (C) Increases gluconeogenesis in liver
   (D) Stimulates muscle glycogenolysis
14. **Epinephrine is rapidly metabolized by**
   (A) Monoamine oxidase
   (B) Deaminase
   (C) Transminase
   (D) Decarboxylase
15. **In Cushing's syndrome-a tumour associated disease of adrenal cortex, there is**
   (A) Decreased epinephrine production
   (B) Excessive cortisol production
   (C) Excessive epinephrine production
   (D) Decreased cortsoil production

Good luck

Examiner: Prof Dr Ibrahim Helmy.

Mansoura University
Faculty of Science
Chemistry Department
Subject: Biochemistry
Course: Enzymes, Biochemistry 371

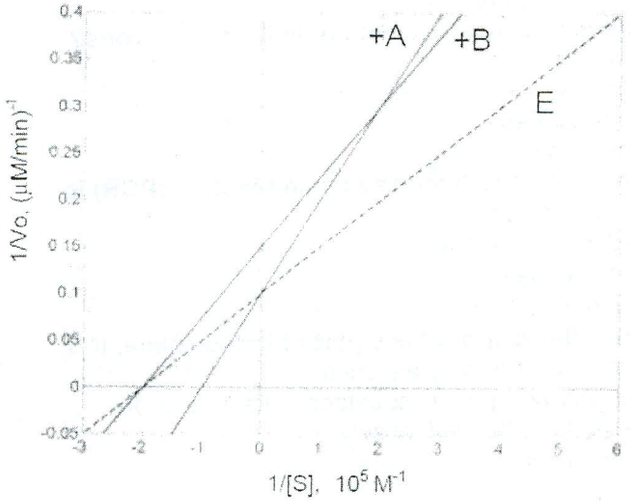
First Term Examination
3rd Level Students
Date Jan 2, 2012.
Time Allowed: Two hours
Full Marks: 60 Marks

Answer the following questions

I. *What is the difference between: (20 Marks)*

a) Enzyme and catalyst.
b) Function and non functional plasma enzymes.
c) Lock &key and induced fit model.
d) Absolute and group specificity.

II. Now you study enzyme inhibition by measuring enzyme kinetics in the presence of 10 mM of inhibitor A or inhibitor B (separately). The Lineweaver-Burk plots in the presence of these inhibitor are indicated by "+A" or "+B" in the Figure below. (10 Marks)



a) From these data determine the type of inhibition and effects on Vmax and Km for A and B.
b) Draw schematically the enzyme kinetic plots (in coordinates Vo vs. [S] on the graph) in the presence of inhibitors A and B.
c) Give example for inhibitor A.
d) Mention how can be used enzyme inhibitor as antitumor drug.

III. *Write short notes on: (20 Marks)*

a) Covalent modification.
b) Sequential order reaction.
c) Restriction enducleases enzymes.
d) Effects of temperature on enzyme activity.

IV- *Choose the best answer: (10 Marks, 1 for each)*

1. Serum alkaline phosphatase level increases in
   (A) Hypothyroidism
   (B) Carcinoma of prostate
   (C) Hyperparathyroidism
   (D) Myocardial ischemia

2. **Coenzymes combine with**
   (A) Proenzymes
   (B) Apoenzymes
   (C) Holoenzymes
   (D) (D) Antienzymes
3. **Competitive inhibition can be relieved by raising the**
   (A) Enzyme concentration
   (B) Substrate concentration
   (C) Inhibitor concentration
   (D) None of these
4. **The isozyme CK-MB is specifically increased in the blood of patients who had**
   (A) Skeletal muscle disease
   (B) Recent myocardial infarction
   (C) Infective hepatitis
   (D) Myxoedema
5. **When [s] is equal to K_m, which of the following conditions exist?**
   (A) Half the enzyme molecules are bound to substrate
   (B) The velocity of the reaction is equal to Vmax
   (C) The velocity of the reaction is independent of substrate concentration
   (D) Enzyme is completely
6. **Which enzyme is concerned with transfer of electrons?**
   (A) Desmolase
   (B) Hydrolase
   (C) Dehydrogenase
   (D) Transaminase
7. **The enzyme used in polymerase chain reaction (PCR) is**
   (A) Taq polymerase
   (B) (B) RNA polymerase
   (C) Ribonuclease
   (D) (D) Endonuclease
8. **Cofactor (Prosthetic group) is a part of holoenzyme, it is**
   (A) Inorganic part loosely attached
   (B) Accessory non-protein substance attached firmly
   (C) Organic part attached loosely
   (D) None of these
9. **Urease is a**
   (A) Lyase
   (B) (B) Ligase
   (C) Isomerase
   (D) (D) Hydrolase
10. **The enzymes that catalyze reactions 1, 2, and 3, respectively are called:**

$A+B \leftrightarrow A-B$	$\begin{matrix} X\ Y & Y\ X \\ \| \ \| & \| \ \| \\ A-B & \leftrightarrow A-B \end{matrix}$	$A-B+H_20 \leftrightarrow A-H+B-OH$
(1)	(2)	(3)

A) ligase, transferase, oxidoreductase
B) ligase, isomerase, hydrolase
C) ligase, lyase, hydrolase
D) transferase, lyase, hydrolase
E) transferase, isomerase, oxidoreductase

.

Good luck

Examiner: Prof Dr: Ibrahim Helmy

Mansoura University
Faculty of Science
Chemistry Department
Subject: Biochemistry
Course: Enzymes, Biochemistry 371

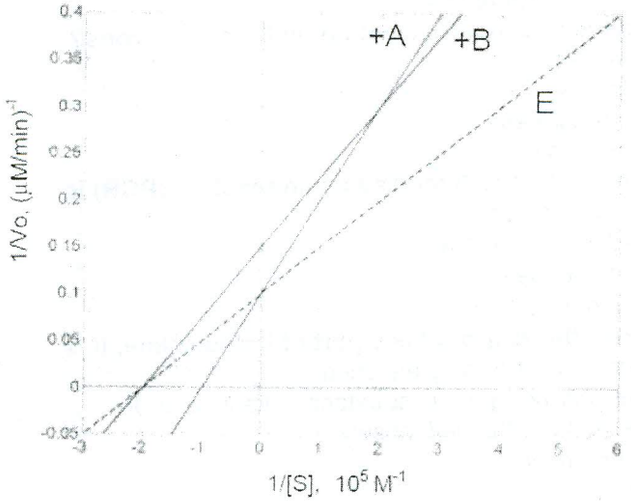
First Term Examination
3rd Level Students
Date Jan 2, 2012.
Time Allowed: Two hours
Full Marks: 60 Marks

Answer the following questions

I. *What is the difference between: (20 Marks)*

a) Enzyme and catalyst.
b) Function and non functional plasma enzymes.
c) Lock &key and induced fit model.
d) Absolute and group specificity.

II. Now you study enzyme inhibition by measuring enzyme kinetics in the presence of 10 mM of inhibitor A or inhibitor B (separately). The Lineweaver-Burk plots in the presence of these inhibitor are indicated by "+A" or "+B" in the Figure below. (10 Marks)



a) From these data determine the type of inhibition and effects on Vmax and Km for A and B.
b) Draw schematically the enzyme kinetic plots (in coordinates Vo vs. [S] on the graph) in the presence of inhibitors A and B.
c) Give example for inhibitor A.
d) Mention how can be used enzyme inhibitor as antitumor drug.

III. *Write short notes on: (20 Marks)*

a) Covalent modification.
b) Sequential order reaction.
c) Restriction enducleases enzymes.
d) Effects of temperature on enzyme activity.

IV- *Choose the best answer: (10 Marks, 1 for each)*

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Good luck

Examiner: Prof Dr: Ibrahim Helmy