

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: December 31, 2012
Time Allowed: 2 Hours
Full Mark: 80 Marks

Answer All Questions

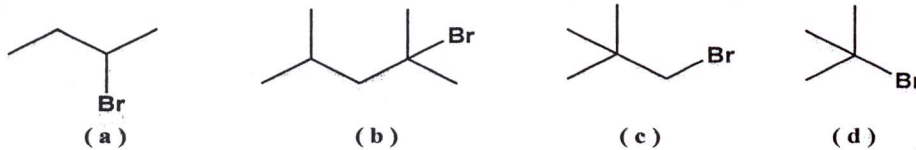
Questions 1 (20 marks)

Answer the following questions. Write short comment about your answer:

A) Rank the following compounds in order increasing the rate of solvolysis (S_N1) in aqueous acetone (slowest \rightarrow fastest).
(CH_3)₂CHCH₂CH₂Br b; (CH_3)₂CHCH(Br)CH₃ c; (CH_3)₂CHCH(Br)C₆H₅

B) The number of possible dichloronitrobenzene isomers is?
a; 3 b; 4 c; 6 d; 8

C) Which of the following alkyl halides would be most likely to give a rearranged product under S_N1 conditions.



D) Which of the following statements pertaining to an S_N2 reaction are true?

- The rate of reaction is independent on the concentration of the nucleophile.
- The nucleophile attacks carbon on the side of the molecule opposite the group being displaced.
- The reaction proceeds with simultaneous bond formation and bond rupture.
- Partial racemization of an optically active substrate results.

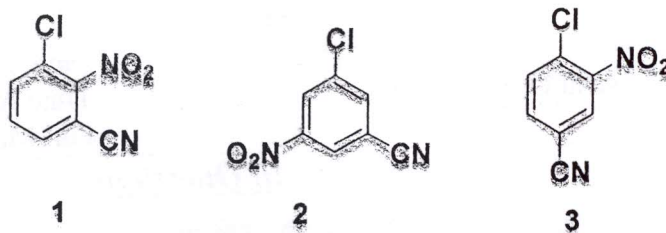
(a) 1,4 (b) 1,3,4 (c) 2,3 (d) All of them.

Questions 2 (20 marks)

A) In each of the following isomeric sets, select one should be the top of stability. Mention the reasons? (10 marks)

(1)				
(2)				

B) Arrange the following in order of their reactivity towards NaOMe? Explain the suitable mechanism for one of them?



Questions 3 (20 marks)

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

a;	
b;	
c;	
d;	
e;	
f;	
G;	

Questions 4 (20 marks)

A; Write shortly what you know about two only of the following: (10 marks)

- Conjugation (mesomeric) and Hyperconjugation effects.
- The effect of substrate structure on both SN¹ and SN² reactions.
- Orientation of monosubstituted benzene.

B; Write equations showing how you could prepare two only of the following compounds from benzene and any necessary organic or inorganic reagents (10 marks)

- Cyclohexyl benzene.
- 3-bromo-4-methylacetophenone
- 2-bromo-4-nitrobenzoic acid

3. **Competitive inhibition can be relieved by raising the**
- Enzyme concentration
 - Substrate concentration
 - Inhibitor concentration
 - None of these
4. **The CK isoenzymes present in cardiac muscle is**
- BB and MB
 - MM and MB
 - BB only
 - MB only
5. **Which one of the following statements is FALSE?**
- Zymogens are inactive precursor proteins that are activated by cleavage of a peptide bond in an irreversible process.
 - Feedback inhibition is a common way to regulate enzyme activity
 - Proteins can be phosphorylated on serine, threonine, and tyrosine residues by enzymes called kinases in the presence of ATP.
 - The phosphorylation of proteins can be reversed
6. **The K_m is-----.**
- equal to the product concentration when V_{max} is reached
 - proportional to the change in standard free energy of the reaction
 - equal to the substrate concentration when the reaction rate is half its maximal value
 - dependent upon the concentration of enzyme
 - always the same for different substrates of the same enzyme
7. **Zymogen is**
- An intracellular enzyme
 - Serum enzyme
 - A complete extracellular enzyme
 - An inactivated enzyme
8. **Cofactor (Prosthetic group) is a part of holoenzyme, it is**
- Inorganic part loosely attached
 - Accessory non-protein substance attached firmly
 - Organic part attached loosely
 - None of these
9. **Example of an extracellular enzyme is**
- Lactate dehydrogenase
 - Cytochrome oxidase
 - Pancreatic lipase
 - Hexokinas
10. **The enzyme hexokinase is a**
- Hydrolase
 - Oxidoreductase
 - Transferase
 - Ligase

Good luck

Mansoura University
Faculty of Science
Chemistry Department
Course(s): (323) Biochemistry,
Botany and Zoology Programs



First Term, Level Three.
Date : 10 January 2013
Time Allowed : 2 hours
Full Mark : 80 Marks

ANSWER THE FOLLOWING QUESTIONS

1) a- Complete the following sentences: (15 Marks)

- i- d -Block elements are often called ----- because their position in the periodic tables in between the s -block and p -block elements.
- ii- The covalent radii of the elements ----- from left to right across a row in the transition series, until near the end when the size ----- slightly.
- iii- The melting and ----- points of the transition elements are generally -----.
- iv- The color of a transition metal complex is dependent on -----
- v- ----- arises as a result of unpaired electron spins in the atom.
- vi- The permanganate $[\text{MnO}_4]^-$ is a strong ----- agent.
- vii- The coordination number ----- is the most common in the transition metals complexes giving an ----- structure.
- viii- The coordination number ----- is much less common in the transition metals complexes giving ----- structure.
- ix- ----- is the fourth most abundant element by weight, Ti the ----- and Mn the twelfth.
- x- The second and ----- row elements are much ----- abundant than the first row.

b- Chose the correct answer: (5 Marks)

- i- Oxyanion VO_4^{3-} is ----- (tetrahedral or octahedral)
- ii- The molar conductivity of $[\text{CoCl}(\text{NH}_3)_5]\text{Cl}_2$ is ----- (electrolyte or nonelectrolyte)
- iii- Square planar $[\text{Ni}(\text{CN})_4]^{3-}$ complex ion has ----- magnetic moment. (paramagnetic or diamagnetic)
- vi- The linear $[\text{Cl-Au-SCN}]^-$ complex ion has ----- isomerism. (geometric, linkage, coordination)
- v- The $[\text{Co}(\text{NH}_3)_4(\text{H}_2\text{O})_2]^{2+}$ complex ion has ----- geometrical shape. (octahedral, tetrahedral, square planar)
- vi- The $[\text{Co}(\text{NH}_3)_5\text{NO}_2]\text{Cl}_2$ complex has ----- isomerism. (linkage, Coordination, Geometric)

c- Give only one method of the extraction of Vanadium metal from its ores. (5 Marks)

2) a- Name the following complexes and indicate the possible isomers:

- i- $[\text{Ti}(\text{H}_2\text{O})_5\text{Cl}]\text{Cl}_2$ (15 Marks)
- ii- $[\text{Cl}_2(\text{NH}_3)_2\text{Mn}-(\text{OH})_2-\text{Mn}(\text{NH}_3)_2\text{Cl}_2]$
- iii- $[\text{Co}(\text{NH}_3)_6][\text{Cr}(\text{C}_2\text{O}_4)_3]$
- iv- $[\text{Ni}(\text{PPh}_3)_2\text{Cl}_2]$
- v- $[\text{Mn}(\text{CN})_6]^{4-}$
- vi- $[\text{CoCl}_2(\text{en})_2]^+$

b- Write the structural formula of the following compounds:

(10 Marks)

- i- Dichlorobis(triphenylphosphine)nickel(II).
- ii- Tris(ethylenediamine)chromium(II) bromide 4-water
- iii- Sodium tetraoxochromate(VI).
- iv- Tetramineplatinum(II) tetrachloroplatenate(II).
- v- Pentaminenitritonickel(II) ion.

3) a- Complete the following reactions:

(10 Marks)



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.

c- True and false (circulate the correct response):

(10 Marks)

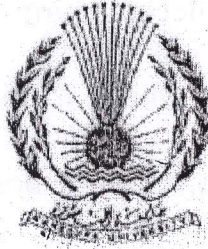
- i- $T-F$ Vitamin B_{12} contains Co(II) complex.
- ii- $T-F$ Mn is prepared by electrolysis in aqueous solution.
- iii- $T-F$ Van Arkel method used Mg for preparation of metals.
- iv- $T-F$ TiO_2 is amphoteric.
- v- $T-F$ Fe rusts slowly in air in presence of humidity to Fe_2O_3 .
- vi- $T-F$ Four series of transition elements are formed by filling the $3d$, $4d$ and $5d$ shells of electron.
- vii- $T-F$ Ni is much more reactive than Pd.
- viii- $T-F$ Mn(IV) is more basic than Mn(VII) .
- ix- $T-F$ V_2O_5 is amphoteric oxide.
- x- $T-F$ Ti is smaller in size than V.
- xi- $T-F$ Hemoglobin contains $\text{Fe}(\square)$

Best Wishes

Prof. Magdy Bekheit
Prof. Nagwa Nawar
Dr. Ahmed Lutfi

^{21}Sc	^{22}Ti	^{23}V	^{24}Cr	^{25}Mn	^{26}Fe	^{27}Co	^{28}Ni	^{29}Cu	^{30}Zn
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Mansoura University
Faculty of Science
Chemistry Department
Subject: Chemistry
Course(s): Hormones
Biochem 372



3rd Level Biochemistry Students
Date : Jan. 2013
Time Allowed : 2 hours
Full Mark: 60 Marks

ANSWER THE FOLLOWING QUESTIONS

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

I. Define the following:

[15 Marks]

- | | | |
|-----------------------------|------------------------------|--|
| a) Hormone Response Element | b) second messenger | c) preprohormone |
| d) Cretinism | e) Reverse tri-iodothyronine | f) Myxedema |
| g) Target Cell | h) Addison's disease | i) Hypothalamus-Pituitary-Endocrine Axis |

II.

[20 Marks]

- a) *True or false? and correct if statement is false*

[10 Marks]

1. Aldosterone stimulates K^+ and water reabsorption from the gut, salivary and sweat glands. ()
2. Parathyroid hormone enhances the absorption of sodium in the intestine by increasing the production of activated vitamin D. ()
3. Growth hormone is a lipophobic hormone which requires kinase or phosphatase cascade as a second messenger. ()
4. Amylin inhibits the secretion of glucagon and reduces the level of blood glucose ()
5. Zona glomerulosa is the main site for production of mineralocorticoids, while Zona fasciculata is responsible for producing glucocorticoids. ()
6. Somatostatin acts on hypothalamus gland to stimulate the release of thyroid-stimulating hormone. ()
7. Adrenocorticotrophic hormone acts on the cells of the adrenal cortex, stimulating them to produce mineralocorticoids. ()

Best wishes for our dear students,

Dr. Amr Negm

ياقى الأسئلة فى الخلف

8. The rate limiting step in catecholamine biosynthesis is hydroxylation of phenyl alanine. ()
9. Glucagon acts on the liver where it stimulates the conversion of glucose into glycogen.
10. Kisspeptin stimulates the secretion of gonadotropin-releasing_hormone (GnRH) at puberty. ()

b) *Complete the missing parts in the following statements:* [10 Marks]

- i. Hormones can be classified in several ways according to... [1]..., ... [2]..., ... [3]..., ... [4]..., ... [5]....
- ii. Parathyroid hormone reduces the reabsorption of ... [6] ... from ... [7]..., and it enhances its uptake from ... [8] ... into ... [9]
- iii. Aldosterone is produced in the cortex of the adrenal_gland and its secretion is mediated by ... [10]

III.

[25 Marks]

a) **Describe the mechanism of the secretion of insulin and briefly discuss its cellular action.** [8 Marks]

b) **Compare between the following:**

[9 Marks]

- 1) Hypoparathyroidism & Hyperparathyroidism.
- 2) Thyroglobulin & Calmodulin.
- 3) Follicle-Stimulating Hormone & Luteinizing Hormone

c) **Briefly explain the steps of the synthesis of thyroid hormones.** [8 Marks]

Best wishes for our dear students,

Dr. Amr Negm

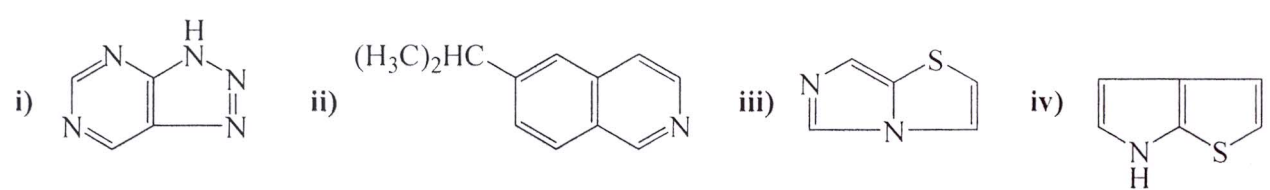
Mansoura University
 Faculty of Science
 Chemistry Department
 Subject: Chemistry
 Course(s): Org.Chem.337



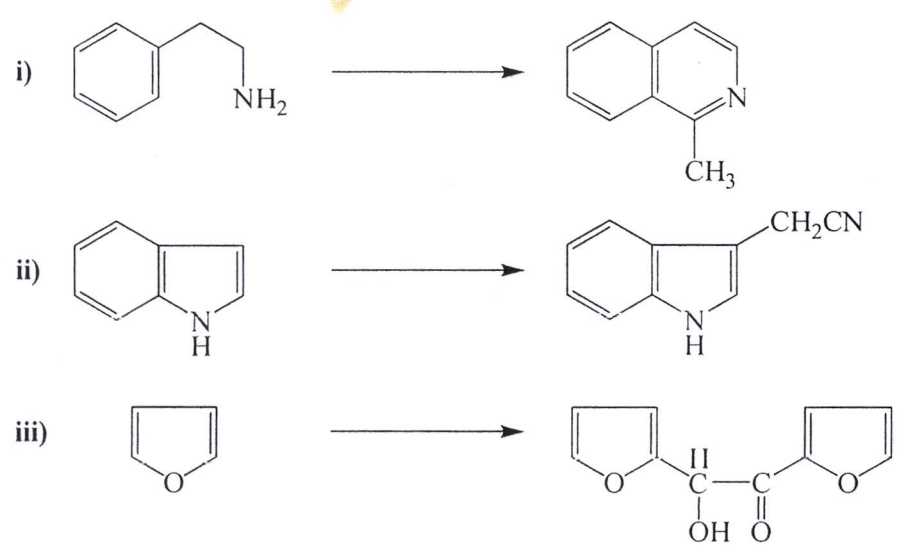
1st Term
 3rd Level Students
 Date: 21 / 1 / 2013
 Time Allowed: 2 Hours
 Full Mark: 80 Marks

Answer All Questions

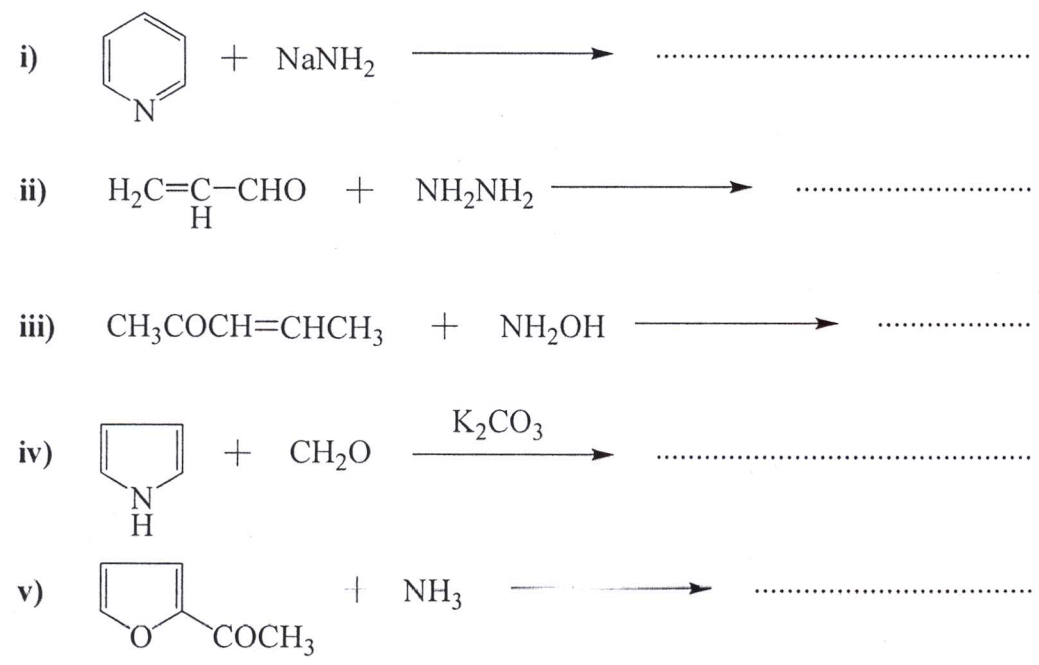
1- a) Give acceptable name of each of these heterocycles: [8 Marks]

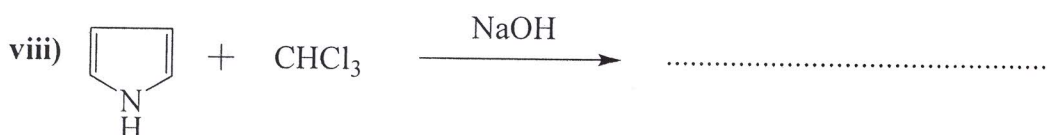
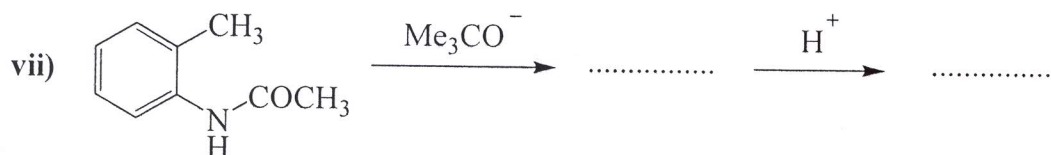
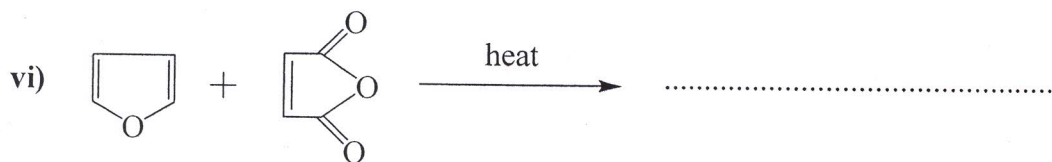


b) Diagram these conversions: [18 Marks]



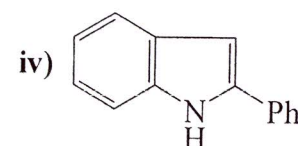
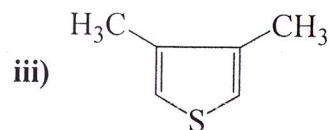
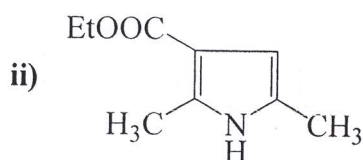
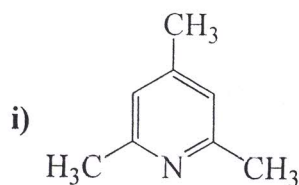
2- Complete these reactions: [27 Marks]





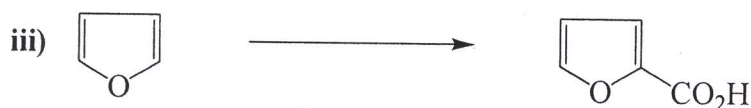
3- a) Design one synthesis of each of the molecules below:

[15 Marks]



b) Diagram the following:

[12 Marks]



Best Wishes and Good luck

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

المستوى الثالث - كيمياء - كيمياء كهرلية (٢٤١)
كيمياء صلبة

Mansoura University Faculty of Science Chemistry Department Subject :Physical Chemistry (1) Course(s): Electrochemistry,		Second Term Year: 3 rd Chem./Zoology Date : 17 / 1 / 2013 Time Allowed : 2 hours Full Marks : 60 Marks
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Answer the following questions:

1) a- Illustrate the relation between electrode potential and concentration (10 marks)

b- Given the cell: Ag/AgBr/KBr/Hg₂Br₂/Hg (10 marks)

i-Complete: The type of the cell is ----- because -----

ii- Deduce in details the cell emf.

c) Write on: (10 marks)

i- Liquid junction potential ii- Gas electrodes

2) a- Taking the following standard electrode potentials: (10 marks)

$$E^{\circ}_{Zn^{2+}/Zn} = -0.76 \text{ V}, \quad E^{\circ}_{Cu^{2+}/Cu} = 0.337 \text{ V}, \quad E^{\circ}_{Ag^{+}/Ag} = 0.80 \text{ V}$$

$$E^{\circ}_{Cd^{2+}/Cd} = -0.403 \text{ V}, \quad E^{\circ}_{Cl_2/Cl^{-}} = 1.36 \text{ V}, \quad \text{Construct cells of the following}$$

electrode pairs: i- Zn²⁺/Zn and Cu²⁺/Cu ii- Cd²⁺/Cd and Cl₂/Cl₂

iii- Cu²⁺/Cu and Ag⁺/Ag. In each cell write the electrode reaction, cell reaction and calculate E^o, ΔG^o and equilibrium constant (K).

b- Give the reason: (10 marks)

i- Saturated KCl solution is preferred in salt bridge

ii- The decomposition potential of acids except halogen acids is 1.7 V

iii- Selecting Pt as the best choice for the standard H₂ electrode

3) Complete: (10 marks)

a- Maxwell-Boltzman distribution law given by the relation -----

b- The overpotential necessary for electrolysis of water is -----

c- In Cadmium-Weston cell ----- is the positive electrode but ----- is the negative electrode

d- The exchange current (i₀) is -----

e) When the electrode is polarized the overpotential plays two roles: (i) -----

(ii)-----

Good Luck

Examiners: Prof.Dr.A.S.Fouda and Prof.Dr.A.Helmy