

بسم الله الرحمن الرحيم

جامعة أسيوط
كلية العلوم - قسم الجيولوجيا

امتحان التحريرى لطلاب كلية العلوم شعب الجيولوجيا والجيوفيزياء والجيوكيمياء

المادة: (G 306) (Field Geology)

الزمن: ساعتان

2016/2015م

الدرجة: 50 درجة

ملحوظة: الامتحان يتكون من صفتين:

أجب عن الأسئلة الآتية: الرجاء توضيح الاجابة بالرسم كلما أمكن:

1- A: Write on three only of the following geological features: (9 Marks)

i- Ripple marks ii- Graded bedding iii- Lamination iv - Columnar jointing

1- B: Explain two only of the following concepts: (6 Marks)

i- Datum section ii- Nonconformity iii- Disconformity

2- A: By using your information about the field trip of Bahariya Oasis, outline in a stratigraphical section the Late Cretaceous geological rock units of the oasis. (Scale not important) (4 Marks)

2- B: Mention two functions only for the following instruments: (4 Marks)

i- GPS ii- Total station iii- Compass iv- Level

2- C: Compare between the following geological structures: (4 Marks)

i- Sill - dike ii- bahoehe lava - Aa lava

2- D: Summarize the main criteria of the faults. (3 Marks)

انظر خلف الصفحة

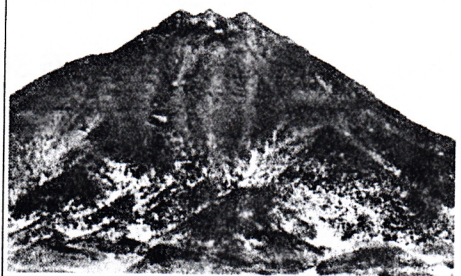
3- Write the geological features of the underlying field photographs then discuss their geological significance.
(20 Marks)



1



2



3



4



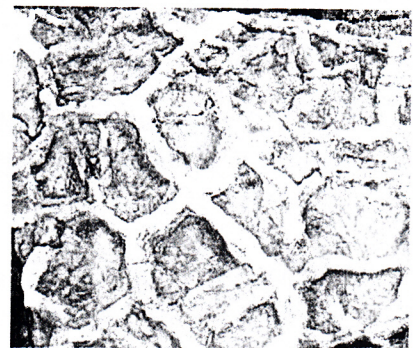
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6



7



8



9



10

Good Luck.

Prof. Dr. Nageh A. Obaidalla

Assiut University
Faculty of Science
Chemistry Department

Time: 3 hours
Date: 2 June, 2016

**Final Examination of Natural Products and Biochemistry
Course for 312C Students**

Answer the following questions:

Section A: Natural Products Chemistry

(33 Marks)

1. Write on the following:

(10 Marks)

- Write by equation, the relationship between the sterols and bile acids.
- Conversion of limonene into carvone.
- Prove by equation that papaverine contains methyl group.
- UV light on ergosterol.

2. Discuss of the following:

(11 Marks)

- Starting with p-toluic acid, synthesis of α -terpineol.
- Prove by equation that cholesterol as saturated hydrocarbon has formula C_nH_{2n-6} .
- Conversion of oestrone into oestriol via Huffman.
- Prove by equation that ephedrine has two structures I and II, and how can you differentiate between them?

3. Explain the following points:

(12 Marks)

- Starting with ethylacetoacetate, synthesis of α -farnesene.
- Prove by equation that piperic acid is methylenedioxy benzoic acid.
- Conversion of DEA into progesterone.
- Starting with ethylacetoacetate, synthesis of hygrine.
- Prove by equation that β -ionone is one of the products from ozonolysis of Vit. A₁.

Section B: Biochemistry I

(17 Marks)

4. Write short notes on *four only* of the following: **(10 Marks)**

- a) Determination of the sequence of amino acids in a polypeptide molecule.
- b) Differentiation between α -D(+) methylglucopyranoside and α -D(+) methylglucofuranoside.
- c) Differentiation between glucose and fructose in dilute solution.
- d) Differentiation between cellobiose and maltose.
- e) Differentiation between acetate and viscose silk.

5. Answer (a) or (b) of the following: **(7 Marks)**

- a) Discuss two different methods for preparation of alanine and what are the products of its reaction with each of the following reagents:
Benzoyl chloride, ethanol/HCl, ninhydrin.
- b) Write the structure of arabic gum which is a polysaccharide that gives on methylation by dimethyl sulphate followed by hydrolysis B-D(+) 2,3-dimethylarbinofuranose units mainly.

GOOD LUCK

Best wishes

أ.د. مرسى محمد على

أ.د. عبدالعال محمد جابر



Assiut University
Faculty of Science
Chemistry Department

Final Examination in Biochemistry and Natural Products (312C) for the 3th Level
Students (Summer Course)

Date: Thursday , 1/09/2016

Time: 3 hours.

Answer Five Only the following Questions:

(50 Mark)

1. Discuss by chemical equations the synthesis of the following:
Adrenalin Hygrine Nicotine
2. a) Starting from Vitamin A1 how can you prepare Vitamin A2?
b) Discuss by equation the elucidation of ring system and function group in cholesterol ?
3. a) Explain by equations the oxidation properties for glucose molecule?
b) Describe by chemical reactions, How can convert Camphor to Bornane?
4. a) Ergosterol present in Yeast, describe its properties ?
b) Starting from p-toluic acid How can you prepare α -Terpenol, then from the later How can you prepare Carvone ?
5. a) Differentiate between α -Farnesene and β - Farnesene , then show by equations the reaction of Farnscene with ozone ?
b) Starting with cholesterol how can you prepare 5 β -cholanic acid and progesterone?
6. a) Discuss by equation the Diel's Alder reaction of Myrcene?
b) Starting from acetone how can you prepare the Citral?

Good Luck

Examiner:
Prof. Dr. Kamal I Aly

Final Exam of (321C)

Section One

I - Question No.One:

(17 marks)

- 1- From your study of the 1st transition elements series complete only four of the following sentences:
- a- Co^{2+} ions are easily oxidized in.....medium.
 - b-solutions should be maintained in brown bottles.
 - c- For silvering , silver separates from.....solution at high potential in compact adherent form.
 - d- Disproportionation of Cu_2O is favoured in presence of.....solution.
 - e- Preparation of MnO_4^{2-} by oxidation of lower state is preferably done in.....solutions.
- 2- Describe a method for preparing only four of the following:
- a- $[\text{Co}(\text{NH}_3)_6]^{3+}$, b- KMnO_4 .
 - c- $[\text{Cu}(\text{NH}_3)_6]_2\text{SO}_4$, d- Pure Ni from Ni S ore. °
 - e- Pure silver from a sample of silver containing Cu.
- 3- Explain the general properties of iron group.
- 4- Give reason(s) for only four of the following :
- a- Zinc oxide is white when cold and yellow when hot.
 - b- Freshly precipitated white manganese (II) hydroxide turns brown on standing.
 - c- ZnCl_2 is used as a condensing agent in preparative organic chemistry.
 - d- $[\text{MnF}_6]^{4-}$ is colourless while $[\text{Mn}(\text{CN})_6]^{4-}$ is highly coloured.
 - e- $[\text{Co}(\text{NH}_3)_6]^{2+}$ is less stable than $[\text{Co}(\text{NH}_3)_6]^{3+}$

(to be continued)

II - Answer Only Four of the following:

(16 marks)

- 1- Name the 3d transition metals, write their symbols , atomic numbers , electronic configurations and oxidation states .
- 2- Write briefly about four of the general properties of the transition metals.
- 3- Show how can only two of the following be prepared:
 - a- Pure titanium.
 - b- Vanadium and ferrovanadium alloy.
 - c- Chromium and ferrochromium alloy.
- 4- Show by equations:
 - a- Action of conc. HCl on titanium.
 - b- Action of HCl on V_2O_5 .
 - c- Action of Cl_2 on vanadium.
 - d- Action of H_2SO_4 on Na_2CrO_4 .
 - e- Action of Aluminium powder and heat on Cr_2O_3 .
- 5- Give reason for the following:
 - a- Scandium is the only member of its group that forms complexes.
 - b- Titanium shows great resistance to corrosion.
 - c- Pure titanium cannot be prepared by reduction of TiO_2 with carbon.
 - d- Chromium is used to cover iron-made tools.
 - e- Hafnium and zirconium have the same atomic radius.

Section (2)

(17 marks)

Answer the following questions:

- 1- The square planar complex $[Pt(NH_3)_2Cl_2]$ has two isomers,
 - a. Draw the structure of each .
 - b. How can differentiate between them ?
 - c. Describe a method for preparation of each .
 - 2- Write the nomenclature of the following complexes:
 - a. $[Co SO_4(NH_3)_4]NO_2$
 - b. $K_3[Fe(CN)_5 NO]$
 - c. $[Cr Cl_2 en_2]Cl$
 - d. $[(CO)_3Fe (CO)_3Fe(CO)_3]$
 - 3- "The complex $[Ni (CN)_4]^{-2}$ is diamagnetic but $[NiCl_4]^{-2}$ is paramagnetic with two unpaired electrons . likewise, $[Fe(CN)_6]^{-3}$ has only one unpaired electron but $[Fe (H_2O)_6]^{+3}$ has five "
- Explain these experimental observations using valence bond theory .
 (Note : $_{26}Fe \equiv [Ar]3d^64s^2$ $_{28}Ni \equiv [Ar]3d^84s^2$)

GOOD LUCK

Examiners: prof.Dr.magda Mohamed Seleim prof.Dr.Ahmed H.Osman
 Dr.Zaher.A.Khafagy



Assiut University
Faculty of Science
Chemistry Department



August : 2016
Time : 2 hr's

Final Exam. for 3rd Year 211C (Summer Term) (Not Chemistry Students)

Write the name of all compounds

Answer the following questions:

1) *A- What mixing by* :----- (**10** marks)

DMF, DMSO, TFA, TNB, Hydrazone, Anilide, Mezo

B- *Comperative between the following pairs*: (**Four only**)

- | | |
|---|----------------------|
| 1- Mallic acid & Fumaric acid. | 2- amide & emide, |
| 3- Electrophilic & Nuclouphilic substitution. | 4- benzyl & benzoyl, |
| 5- Markonikov & antimarkonikov addition. | |

2) *Give examples for the following reactions* (**Four only**)----- (10 marks)

- | | |
|---------------------------------------|-----------------------------|
| 1- Gabriel synthesis of methyl amine. | 2- Elimination reaction. |
| 3- Esterification reaction. | 4- Polymerization reaction. |
| 5- Re-arrangment reaction | |

B- Compound A its molecular formula C₅H₁₁Cl . Draw the all structural isomers of this compound.

3) *A- How do you convert* : (**Two only**)----- (10 marks)

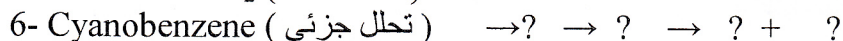
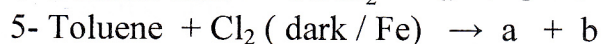
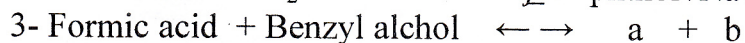
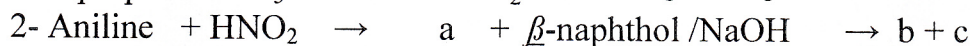
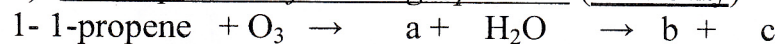
- | | |
|---|---------------------------------------|
| 1- Acetylene → Saccharine. | 2- Aniline → phenol → Salicylic acid. |
| 3- Acetone → Ter.(3°) buotanol by Grinuard reagent. | |

B- *Write on one only*:

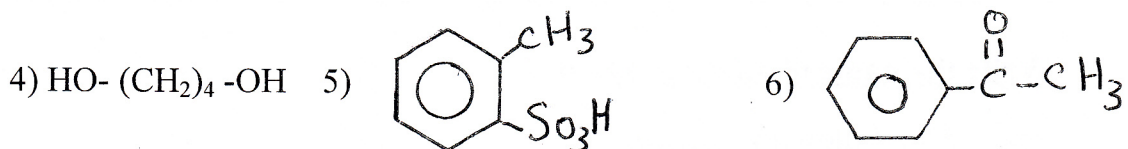
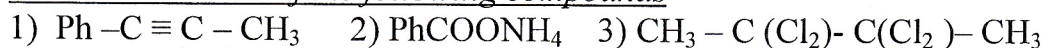
- 1- Kiliani methode to convert aldopentose to aldohexose.
- 2- Vohl' s methode to convert aldohexose to aldopentose.

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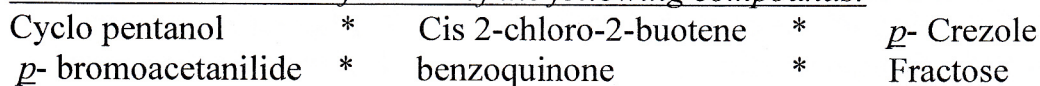
4)- A- complete the following equations (Five only)----- (20 marks)



B- Write the name of the following compounds



C- Draw the structural formula of the following compounds:



Good Luck
Prof. Dr Osama Shehata Moustafa



Final Examination of Inorganic Chemistry 3 (324 CH)

Section (A) (34 Marks)

Answer the following questions:-

I. Choose the correct answer and comment (Five only):-

- i) Which of the following complex ions is tetrahedral? $[\text{PdCl}_4]^{2-}$, $[\text{PtCl}_4]^{2-}$, $[\text{NiCl}_4]^{2-}$
- ii) Which metal complex ion is labile: $[\text{Cr}(\text{H}_2\text{O})_6]^{2+}$, $[\text{Cr}(\text{NH}_3)_6]^{2+}$, $[\text{Cr}(\text{CN})_6]^{3-}$
- iii) Which of the following is π -donor (Cl^- , NH_3 , CO)
- iv) Which is correct: $[\text{Co}(\text{NH}_3)_6]^{3+}$ diamagnetic, $[\text{Zn}(\text{H}_2\text{O})_6]^{2+}$ paramagnetic, $[\text{Co}(\text{F})_6]^{3-}$ diamagnetic.
- v) Which metal complex ion is inert $[\text{Mn}(\text{H}_2\text{O})_6]^{3+}$ or $[\text{Mn}(\text{CN})_6]^{3-}$.
- vi) CFSE for d^4 octahedral complex high spin ($-0.6 \Delta_o$, $-1.8 \Delta_o$, $-1.2 \Delta_o$, $-1.2 \Delta_o + p$)

II . Give reasons for five only from the following:-

- i) $[\text{Cr}(\text{CN})_6]^{3-}$ is expected to be paramagnetic with $\mu_{\text{eff}} \approx 3.87 \mu_B$
- ii) Ni^{2+} cation is likely to form a square planar complex with a strong ligand.
- iii) $[\text{Co}(\text{CN})_6]^{3-}$ will absorb the shorter wavelength of light than $[\text{CoF}_6]^{3-}$
- iv) $[\text{Fe}(\text{OH}_2)_6]^{2+}$ is attracted most strongly to a magnet than $[\text{Fe}(\text{CN})_6]^{3-}$
- v) $[\text{Cr}(\text{OH}_2)_6]^{2+}$ ion is expected to be distorted than $[\text{Cr}(\text{OH}_2)_6]^{3+}$
- vi) $[\text{Coen}_3]^{3+}$ is likely to be kinetically inert.

III .Answer two only of the following:-

- i) Draw d -orbital splitting diagrams for $[\text{Co}(\text{NH}_3)_6]^{2+}$ and $[\text{Co}(\text{CN})_6]^{3-}$. The Δ_o values for these two complexes are approximately 120 kJ/mol and 270 kJ/mol, respectively. The pairing energy of Co^{2+} is 270 kJ/mol and of Co^{3+} is 210 kJ/mol.
- ii) For complexes with π -bonding give the orbitals of the metal and the six ligands which can form π -bonding molecular orbitals with reference to LMCT and MLCT diagrams.
- iii) Explain on the basis of 'LFT the structures of $[\text{NiCl}_6]^{4-}$ and $[\text{Ni}(\text{CO})_6]$. Explain their magnetic behavior and color.

(A. Wt. Ti=22, V=23, Cr = 24, Mn =25, Fe = 26, Co= 27, Ni =28, Cu = 29, Zn = 30 Pd= 46 ,Pt=78)

See the Next page

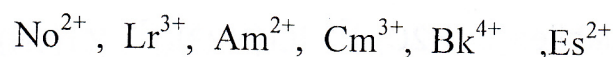
Section (B) (16 Marks)

Answer the following questions:

1-Name either the lanthanide or the actinide elements and give their chemical symbols ,atomic numbers, electronic configuration and oxidation states .

2-(a)What is the lanthanide contraction and what are its consequences?

(b) Work out the number of unpaired electrons in the following ions:



Good Luck

Examiners: Prof. Dr. Amna.S.A . Zidan and Dr.Zaher Abdel Mohsen

بسم الله الرحمن الرحيم

جامعة أسيوط
كلية العلوم - قسم الجيولوجيا

امتحان التحريرى لطلاب كلية العلوم شعب الجيولوجيا والجيوفيزياء والجيوكيمياء
(الفصل الدراسى الصيفى)

المادة: (Field Geology) (306G)

الدرجة: ٥٠ درجة

٢٠١٦/٢٠١٥ م

الزمن: ساعتان

ملحوظة: الامتحان يتكون من صفتين:

أجب عن الأسئلة الآتية:

السؤال الأول: (15 Marks)

1- Write on the following geological features, illustrating your answer by drawing: (9 Marks)

- i- Criteria of unconformity
- ii- Flame structure
- iii- Vesicular structure

2- Explain only two of the following concepts: (6 Marks)
Datum section – dykes – Paraconformity
(Illustrate your answer by drawing)

السؤال الثانى: (15 Marks)

1- By using your information about the field trip, draw a stratigraphic section for the rock units at the iron-ore mine at El-Gadidah in the Bahariya Oasis (scale not important) (5 Marks)

2- Write on the uses of only two of the following instruments: (4Marks)

Tape – Compass – Thodolite

3- Compare between the following geological structures: (6 Marks)

- i- Symmetrical and asymmetrical ripple marks
- ii- Igneous and sedimentary rocks

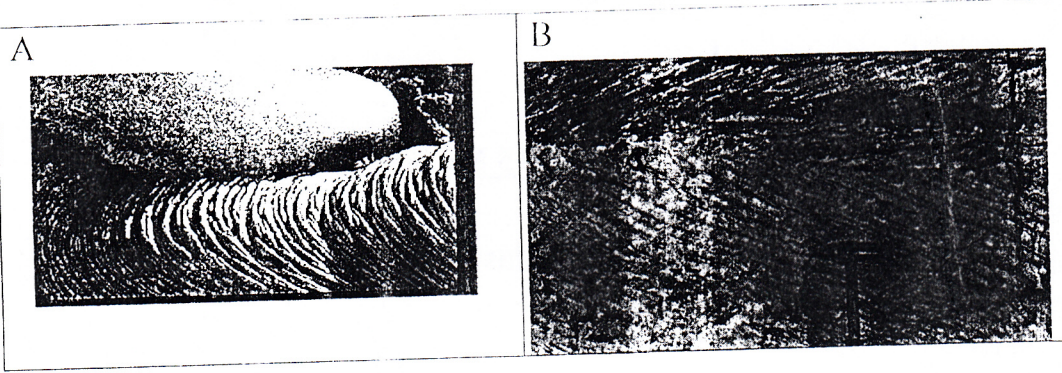
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السؤال الثالث (20 Marks)

1- Discuss the type of contacts between the rock units. (8 Marks)

2- Write the type of structures in the following field photos and explain the reasons of their formation (redraw these photos in your answer).

(12 Marks)



انتهت الأسئلة مع اطيب الأمنيات بالنجاح والتفوق

أ.د/ ناجح عبدالرحمن عبيدالله

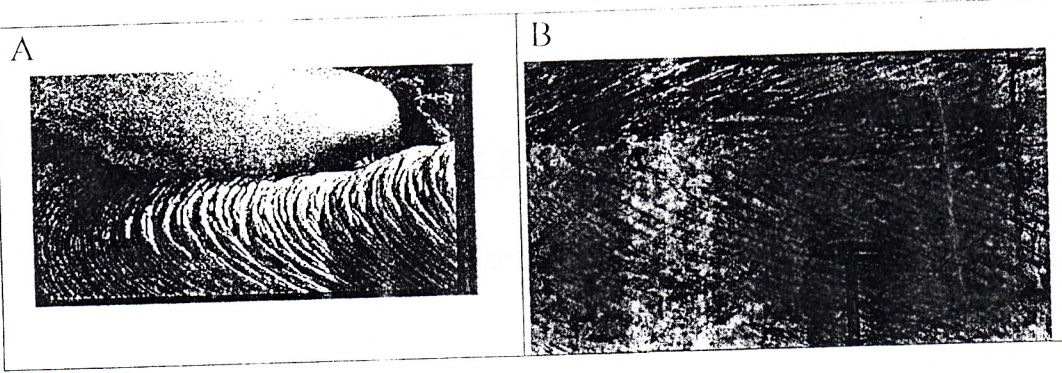
تنبيه هام: امتحان الشفوي بعد الانتهاء من امتحان التحرير مباشرة

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1- Discuss the type of contacts between the rock units. (8 Marks)

2- Write the type of structures in the following field photos and explain the reasons of their formation (redraw these photos in your answer).

(12 Marks)



انتهت الأسئلة مع اطيب الأمنيات بالنجاح والتفوق

أ.د/ ناجح عبدالرحمن عبيدالله

تنبيه هام: امتحان الشفوي بعد الانتهاء من امتحان التحرير مباشرة

Final Examination for 3rd Level Students
Inorganic (3)(C-324)(Group 1)

Answer the following questions:

A) Answer question no.(1) and only three from 2-5:

(17 Marks)

- 1- Many Cu(II)salts and complexes show tetragonally distorted octahedral structures.(Explain)
- 2- When white light is allowed to fall on $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$ ion it absorbs the light of frequency $20,000 \text{ cm}^{-1}$.
Calculate Δ_o and CFSE for this ion. What is the expected colour of this ion?
- 3- Derive the ground terms for the following configurations: $3d^5$ $3d^3$ $3d^9$ (use CFT)
- 4- Find out the value of the expected magnetic moment for tetrahedral Ni^{2+} and square planar Co^{2+} complex ions. (use CFT)
- 5- Consider the species Cr , Cr^{2+} , Cr^{3+} in an octahedral field. Draw the energy level diagram depicting the occupation of energy levels in weak and strong fields around the metal atom or ion.

B) Answer questions no.(1) and only three from 2-5:

(17Marks)

- 1- Sketch Orgel diagrams for weak O_h field complexes with free ion D and F ground terms.
- 2- How does the MO theory covers the π -bonding in metal complexes?
- 3- Calculate the total pairing energy of $[\text{Cr}(\text{H}_2\text{O})_6]^{2+}$ ion in the HS and LS states. Given the mean pairing energy= $23,500 \text{ cm}^{-1}$.
- 4- Magnetic measurements on potassium hexacyanomanganate (III) indicate the presence of two unpaired electrons. Predict on the basis of VBT, whether the given complex is inner orbital or outer orbital octahedral complex.
- 5- Discuss the geometry of $[\text{HgI}_3]^-$ ion on the basis of valence bond theory.

Atomic number: Cu=29 , Ti=22 , Ni=28 , Co=27 , Cr=24 , Mn=25 , Hg=80

أنظر خلفه باقى الأسئلة،،،،،

C) Answer the following questions:

(16 Marks)

1- Name either the lanthanide or the actinide elements and give their chemical symbols , atomic numbers, electronic configuration and oxidation states.

2-a- What is the lanthanide contraction and what are its consequences?

b- Work out the number of unpaired electrons in the following ions: No^{2+} , Lr^{3+} , Am^{2+} , Cm^{3+} , Bk^{4+} , Es^{2+}

Good Luck

Examiners: Prof. Dr.Asmaa Ibrahim

Dr.Zaher Abdel Mohsen

C-342 Final Examination in Analytical Chemistry

Section One

Answer the following questions:

- 1)- a) Answer **Only Two** of the following (10 Marks)
- i- Assume the molar absorptivity of ferrous 2,2- bipyridine is 10500 ($b=1\text{cm}$). If the transmittance of an unknown of the same thickness is 57.5%. What is the concentration of iron in mg/100 ml? (at.wt Fe=55.84).
- ii- Calculate the dissociation constant of 2-nitro-4-chloro-phenol in water at 25°C from the taken at 427 nm. The absorbance of undissociated phenol, measured in 0.01 M HCL was 0.062. The absorbance of the fully ionized phenol measured in 0.01 M NaOH was 0.855. In a buffer solution of PH 6.22, the absorbance was 0.356.
- iii- In a simultaneous determination for cobalt and nickel based upon absorption by their 8- quinolinol complexes, a molar absorptivities are $\epsilon_{\text{Co}}=3529$ and $\epsilon_{\text{Ni}}=3228$ at 365 nm and $\epsilon_{\text{Co}}=428.9$ and $\epsilon_{\text{Ni}}=0$ at 700 nm. Calculate the concentration of nickel and cobalt in a solution has the absorbance value of 0.724 at 365 nm and 0.071 at 700 nm (1.0 cm cells)
- b) Sketch the graph you would expect from each of the following. What is the significance of each plot. (6 Marks)
- Absorbance vs. PH group at λ_{max} of ionized form of an acid-base indicator.
- ii- Job's plot confirming complex formation 2:1 metal to ligand ratio.
- iii- Photometric titration of Fe(III)- Salicylate complex with standard EDTA.
- c) Complete the following sentences..... (5 Marks)
- i- Absorption of electromagnetic radiations occurs if the vibrating molecule produces a change in.....that can interact with the.....of the radiation.
- ii- In mid IR the intermediate frequency range $2500-1540\text{ cm}^{-1}$ is often called.....
- iii- In FTIR, the result of absorption of radiation by the sample is.....
- iv- A beam of only one λ is said to be.....
- v- A bathochromic shift will result by increasing degree of chromophore.
- d) Define or characterize **Only Four** of the following (4 Marks)
- Chromophore - LMCT – incident light – condensation reactions - Transmittance.

C-342 Final Examination in Analytical Chemistry

Section One

Answer the following questions:

- 1)- a) Answer **Only Two** of the following (10 Marks)
- i- Assume the molar absorptivity of ferrous 2,2- bipyridine is 10500 ($b=1\text{cm}$). If the transmittance of an unknown of the same thickness is 57.5%. What is the concentration of iron in mg/100 ml? (at.wt Fe=55.84).
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- v- A bathochromic shift will result by increasing degree of chromophore.
- d) Define or characterize **Only Four** of the following (4 Marks)
- Chromophore - LMCT – incident light – condensation reactions - Transmittance.



Mycology2 (362B)	Final exam (Jun 2016)	Time: 2 h.
Microbiology & Chemistry/Microbiology		3 rd level students

Answer the following questions

I. Compare with illustrations between 4 only of the following:- (20 Marks)

1. Types of basidiomata and ascomata.
2. Groups of uniseriate and biseriate *Aspergilli*.
3. Teleutospores in the Families: Uredinaceae and Ustilaginaceae.
4. Formation of asci and ascospores in a unicellular fungus and a filamentous one.
5. Flowering and seedling infections.

II. Give an account on 4 only of the following:- (10 Marks)

1. Gastromycetes, give an example each.
2. Teleomorphs in *Aspergillus*.
3. Types of spores in rust diseases with long life cycle.
4. Economic importance of yeasts.
5. Classification of *Penicillium*.

III. Write the teleomorphs of 5 only of the following:- (5 Marks)

1. *Alternaria*.
2. *Scopulariopsis*.
3. *Trichoderma*.
4. *Beauveria*.
5. *Fusarium*.
6. *Drechslera*.

IV. Answer 5 only of the following (with one or two words):- (5 Marks)

1. The causal agent of ergot disease.
2. A structure formed in terminal cell of secondary mycelium of Basidiomycetes.
3. A fungus termed as eye lash cup fungus.
4. An ascoma produced by *Talaromyces*.
5. A fungus completes its life cycle on two different hosts.
6. Delicious edible subterranean cup fungi.

V. Choose the correct answer for 5 only of the following:- (5 Marks)

1. Sexual fruiting body produced by *Claviceps*:
a. Ascoma b. Ascostroma c. Basidiomata
2. A fungus with stalked multicellular teleutospores causing rust of rose:

- a. *Phragmidium* b. *Puccinia* c. *Melampsora*
3. A spore produced in soil by germination of teliospores and infecting lower leaf:
- a. Ascospores b. Basidiospores c. Pycniospores
4. Which of the following fungi produce spores in groups and causing crown rot:
- a. *Ustilago tritici* b. *Urocystis cepula* c. *Tilletia caries*
5. *Peziza* belongs to:
- a. Hypogean fungi b. Coprophilous fungi c. Pezizal fungi
6. The teleomorph of *Polypocladium inflatum*:
- a. *Emertella nicholsonii* b. *Cordyceps subsessilis* c. *Eurocladus rubron*

VI. Write true or false for 5 only of the following and correct the false: (5 Marks)

1. Jelly fungi cause smut diseases for several crops.
2. *Taphrina deformans* is a fungus belonging to Ascomycota and reproduce asexually by forming asconata.
3. *Sclerotinia* is the teleomorph of *Sclerotium*.
4. Synnemata are asexual fruiting bodies formed by some Ascomycetous fungi.
5. Yeasts reproduce asexually only by budding.
6. Earth tongues are a group of Basidiomycetous fungi.

Best wishes

*Prof. Mohamed A. Abdel-Sater
Dr. Nemat A. Hussain*

Answer the following Questions

Question (I) (17 marks)

Answer Six from the following Questions

- 1- Derive collision density of heterogeneous gas starting from its mean free path.
- 2- What is the mean free path, ℓ , of $H_{2(g)}$ molecules of collision diameter, σ , $2.47 \text{ \AA}$ at pressures 2 bar and 0.2 Pa at 27°C ?
- 3- Derive the frequency factor A of the reaction between H_2 and I_2 .
- 4- Calculate the collision density $Z_{a,a}$ and mean free path for Cl_2 at 0°C under pressure 2 bar, the collision diameter, σ , being equal to $5.44 \text{ \AA}$.
- 5- Air contains $N_{2(g)}$ and $O_{2(g)}$ under pressure 1 atmosphere at 27°C . Calculate the collision density Z_{12} and the mean free path. Composition of air is 80% N_2 and 20% O_2 . ($N = 14$, $O = 16$)
Where $\sigma_{N_2} = 3.41 \text{ \AA}$ and $\sigma_{O_2} = 3.61 \text{ \AA}$
- 6- Derive the mean velocity in Space and calculate the mean velocity of O_2 molecule having the kinetic energy 200 kJ mol^{-1} and calculate the temperature at which it has the calculated mean velocity.

Question (II) (17 marks)

Answer Seven From The Following:

- 1- Calculate the force constant of $C^{12}O^{16}$ absorbing at 2143 cm^{-1} in the infrared.
- 2- Calculate the radius of the electron in the first orbit of H.
- 3- Derive the rotational Hamiltonian operator of a rigid rotator of diatomic molecule.
- 4- Calculate the bond length of CO molecule absorbing radar wavelength at 2.603 mm to be promoted from $J=0$ to $J=1$.
- 5- Derive the rotational Eigenfunction $\Phi = Z_\varphi Y_\theta$
- 6- Derive rotational Eigenvalue of rigid diatomic molecules.
- 7- Derive Legendre polynomial and its normalization factor.
- 8- Derive the Radial Eigenfunction of 2P orbit.

$$h = 6.626 \times 10^{-34} \text{ Js} \quad c = 3 \times 10^8 \text{ m s}^{-1} \quad R_\infty = 109737.31 \text{ cm}^{-1}, \quad Cl = 35.5$$
$$N = 6.023 \times 10^{23} \text{ mol}^{-1}, \quad R = 8.31 \text{ J mol}^{-1}, \quad m_e = 9.11 \times 10^{-31} \text{ kg}$$

Prof Dr Anwar El-Shahawy

⇒ Turn Over

Question (III):

(4 X 4 = 16 marks)

Answer Four Only From the Following

1- a) Define and characterize the Ringbom plot.

b) Write on spectrophotometric determination of the stoichiometric ratio of metal chelate by Job's method of continuous variation.

2- Describe the principles of fluorescence. Why is fluorescence generally more sensitive than absorption measurements?

3- a) Briefly describe or define the following:

Internal conversion. , stokes shift

b) The compound $K_3[Fe(CN)_6]$ absorbs at $\lambda = 418\text{nm}$, ($\log \epsilon = 3.01$), experiments are carried out in a cell of path length 1.00 cm.

i) Determine the absorbance of a solution of concentration 6.0×10^{-4} mol/L

ii) What is the absorbance if the concentration is halved ?

4- a) Suggest the type of electronic transitions for the following compounds :

$CH_3CH_2CH_2CH_2CH_3$, $CH_2=CH-CH_2CH_2CH_3$, CH_3CH_2OH ,
 $CH_3CH=CH-CH=CH-CH=CH-CH_3$, CH_3COCH_3

b) Assume the molar absorptivity of Fe^{2+} -2,2'-bipyridine is 10,500 (cell 1 cm path length). If the percentage transmittance (%T) of an unknown is 57.5. What is the concentration of the iron in mg/ml (at wt of Fe=55.5).

5- a) Define and characterize the single and double beam spectrophotometry.

b) Write on photometric titration of mixture of Bi^{3+} and Cu^{2+} with standard EDTA solution. Sketch the graph. The Transmittance for another sample of X is 90.7 %. To what absorbance reading does this correspond ?

Good luck

Prof. Dr. Elham Y. Hashem

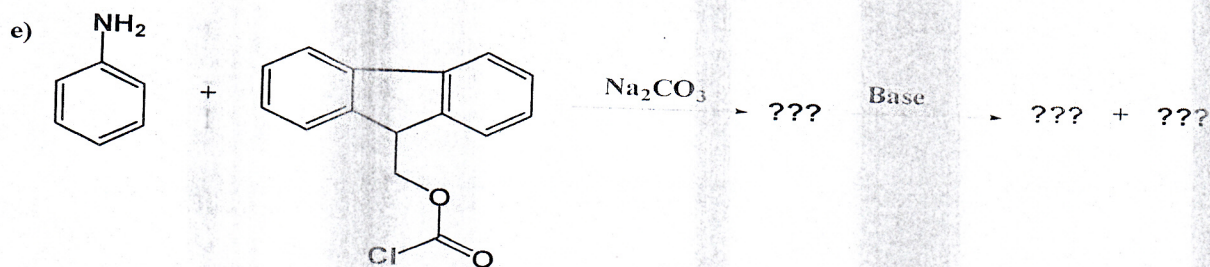
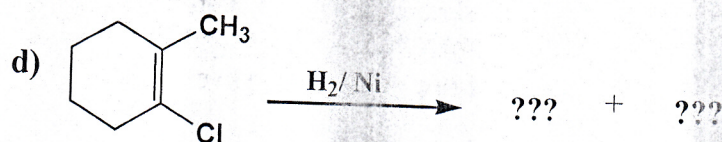
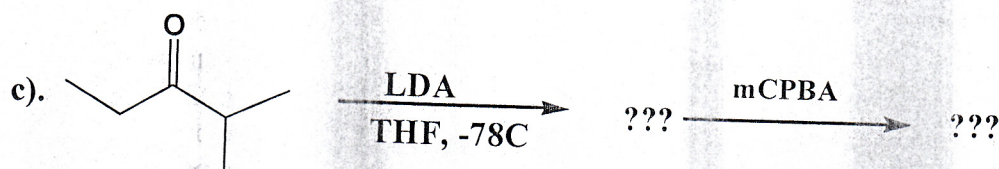
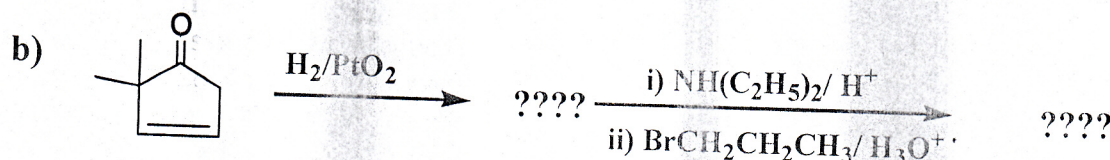
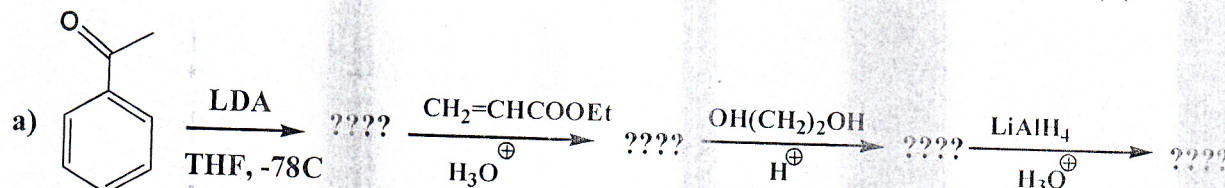
Final Exam of advanced synthetic Organic Chemistry for 3rd chemistry students (314 C)

Answer the following questions:

Q1) Put the sign (✓) in the front of correct statement and (X) in the front of wrong statement . (10 Marks)
(Correct the wrong statement)

- Na/ NH₃ is a reagent to reduce alkyne to E-alkene.
- Aldol reation of achiral dicyclohexyl Boron enolate with benzaldehyde give the **Anti** adduct as Major.
- Wilkinson catalyst is a type of homogenous catalyst.
- TMS enol ethers are much more electrophilic than boron or lithium enolates.
- The reaction of aldehydes or ketones with primary amines give imines
- NH=NH and heat was used to convert 2-cyclopentenone to 2-cyclopentenol
- In the addition to Ketones the smaller nucleophile give rise to greater distereoselectivity.
- Heterogenous catalyst is easier to remove from the reaction mixture.
- Friedel-Crafts reaction is an example of chemoselectivity.
- Phthalimide is a reagent to protect alcohol groups.

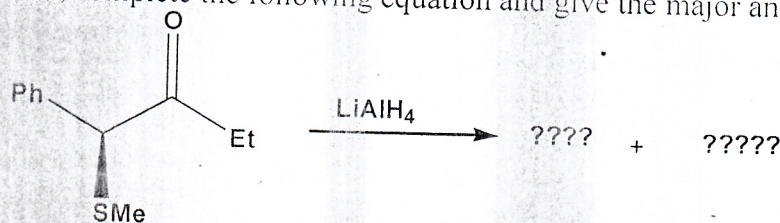
Q2) Complete the following equations (draw the stereochemical in products if found) (10Marks)



Q3) Write by equations on the following:

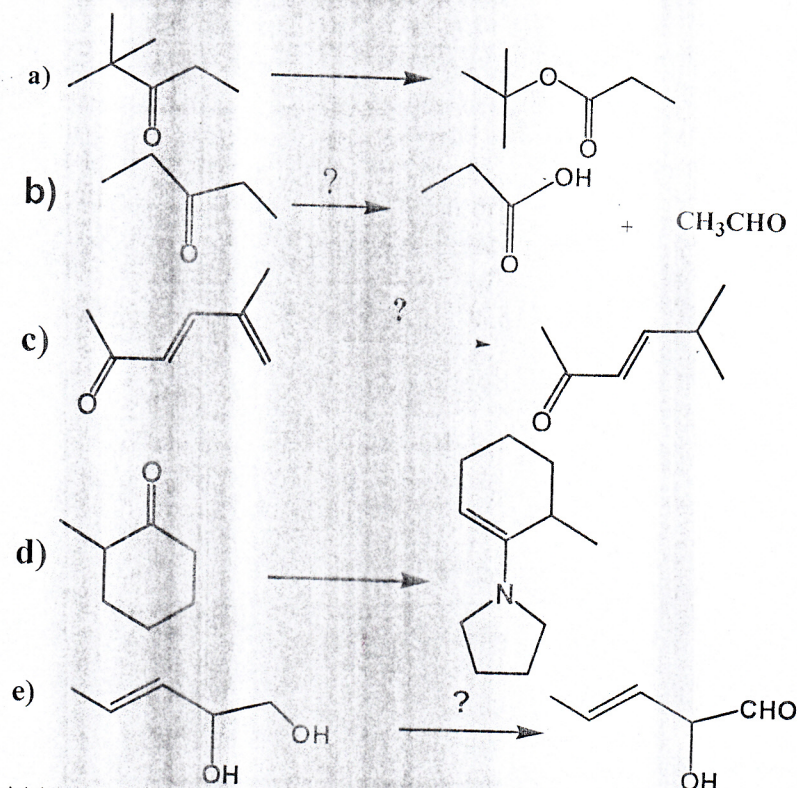
(10 Marks)

- Define the diastereoselectivity in organic synthesis and give example.
- Pfitzner-moffat method for oxidation of n-propanol
- Three methods for the protection of hydroxyl groups.
- By using Felkin-ahn model, complete the following equation and give the major and minor products

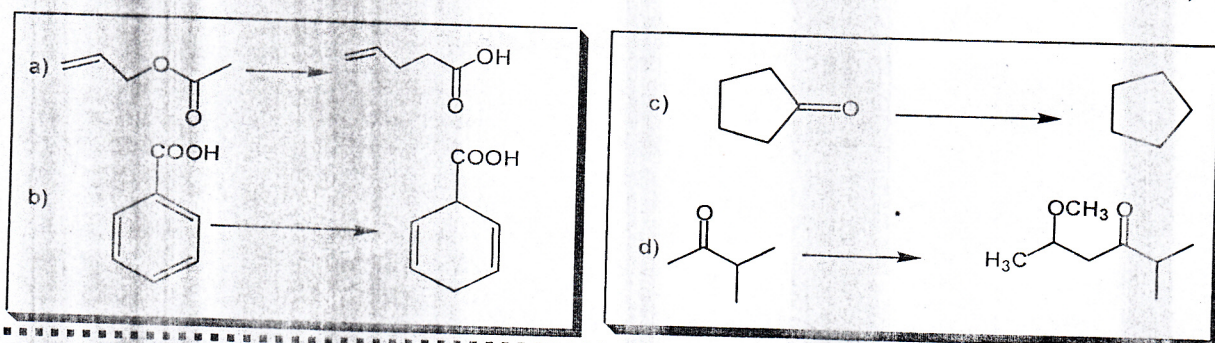


e- Heterogenous catalysts and give the mechanism of addition.

Q4) Write the suitable reagents for the following reactions and draw the mechanism (if any) for (10 Marks)



Q5) Write by equations and mechanism how you can carry the following transformations (10 Marks)



Good Luck

Dr. Shaukat

Answer Five only from the following:

Q1 a) What are the possible cathodic reactions which might occur during corrosion? (4 marks)

b) Calculate the emf of the following cell at 25°C: Pt; Fe³⁺ (a₊=0.0001), Fe²⁺ (a₊=0.01), Ag⁺ (a₊=0.1); Ag Write the spontaneous reaction of the cell, which electrode is anode? (6 marks)

$$E^{\circ}_{Fe^{3+}/Fe^{2+}} = 0.771V, \quad E^{\circ}_{Ag^{+}/Ag} = 0.779V$$

Q 2 a) How dust particles enhance atmospheric corrosion rate? (4 marks)

b) Define the Pourbaix diagram and explain its applications and limitations in the corrosion field. (6 marks)

Q3 a) Explain by using examples how galvanic coupling between two different metals is beneficial or detrimental in the corrosion process. (5 marks)

b) On cathodic polarization at 0.001 A cm⁻² the hydrogen overvoltage $\eta_{H_2} = -0.467$ V. What is the polarization potential of a steel specimen $E_{pol} = ?$ V vs. SCE in a solution of pH 3.

Given $E_{sat, calomel} = 0.241$ V vs. SHE. (5 marks)

Q4 a) Define the following terms: Sensitization – Graphitization- Hydrogen embrittlement (4.5 marks)

b) The corrosion current of iron rod in an aqueous solution is 15 μA cm⁻², the rod is 2 cm diameter and is immersed to 20 cm in the solution. Calculate the corrosion rate in cm day⁻¹. (m_e of iron = 0.2893 mg/C, density = 7.8 g cm⁻³) (5.5 marks)

Q5 a) Explain by using examples the classes of inhibitors. (4 marks)

b) Calculate the theoretical tendency of zinc to corrode with evolution of hydrogen when immersed in deaerated aqueous solution. Assume that Zn corrode to Zn(OH)₂ having a solubility product of 1.2×10^{-17} . Given $E^{\circ}_{Zn^{2+}/Zn} = -0.76$ V, $P_{H_2} = 1$ atm. (6 marks)

Q6 a) Discuss how alterations of environment decrease the chance of corrosion. (5 marks)

b) Indicate the following i) Types of polarization (ii) Factors affecting the magnitude of the exchange current. (5 marks)

مع اطيب التمنيات بالتوفيق..

الدكتور / مصطفى حسن وهذان

الاستاذ الدكتور / أبو الحجاج عبدالعزيز هرماس

Photochemistry and Reactive Intermediates (313C)

Final Examination (Summer Semester)

Answer on the Following Two Sections: (50 Marks)

Section A : Photochemistry: (25 Marks)

Answer the Following Questions:

I]- Answer **only three** of the following : (2 X 3 = 6 Marks)

- 1- What is the Origin of Solar Radiations ?.
- 2- Compare between luminescence and Fluorescence.
- 3- What are the different types of electron excitation ?.
- 4-Discuss the possible Norrish types I & II cleavages of 3-Heptanone.

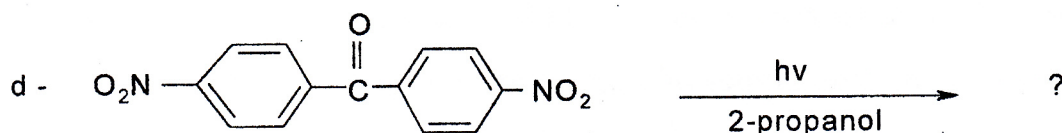
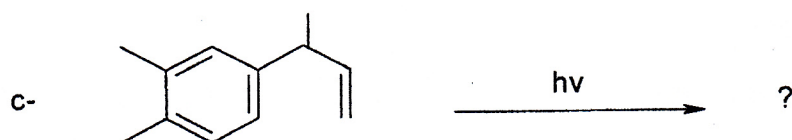
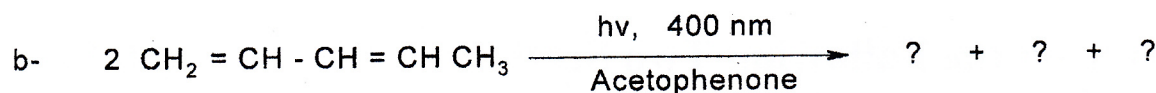
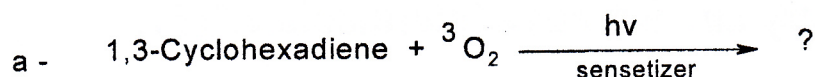
II] – Mark right ($\sqrt{}$) or wrong (X) on **only Five** of the following statements, and explain your answer : (2 X 5 = 10 Marks)

- 1- Liquid filters absorbing ≥ 300 nm radiations can be used in Visible light photolysis of organic compounds. ()
- 2- Promotion to lower vibrational levels does not result in bond Cleavage. ()
- 3- Singlet $\rightarrow$ Triplet transition is a Symmetry Forbidden transition. ()
- 4- Photopolymerization of Styrene can be carried out successfully in the presence of Oxygen. ()
- 5-Vision is a photochemical process initiated by Emission of light. ()
- 6-Microwaves is an Electromagnetic Radiations of wavelength ranges from 1 - 20 nm. ()

III] Complete **only Three** of the following reactions and discuss the reaction

mechanism:

[3X 3 = 9 Marks]

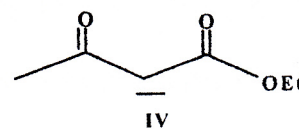
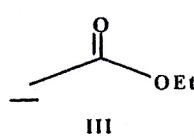
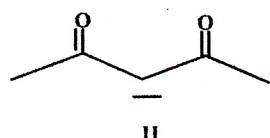
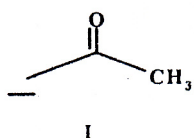


Section (B) : Reactive Intermediates :

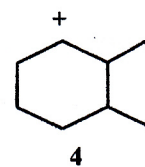
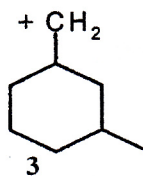
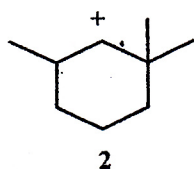
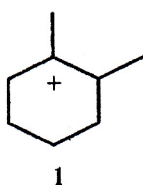
(25 Marks)

Answer the following questions:

- 1- Arrange the following carbanions in **ASCENDING** order (weakest first) according to their relative **basicity** (4 Marks)

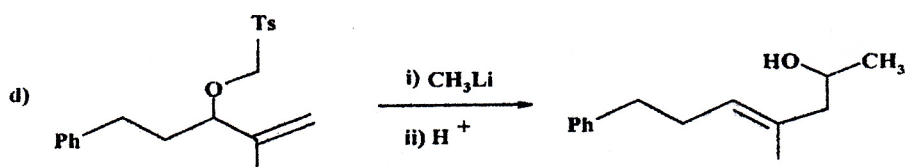
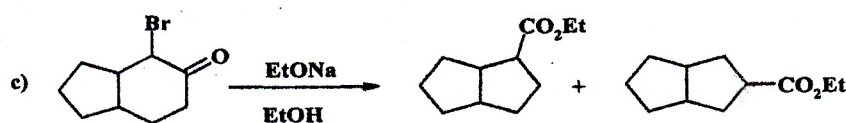
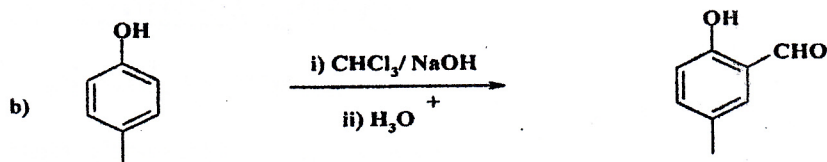
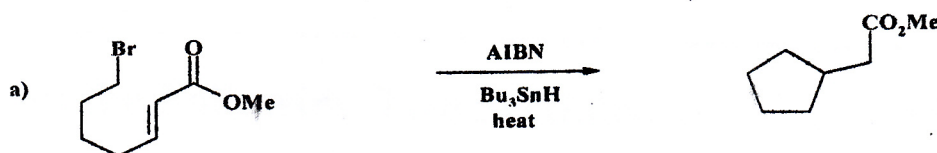


- 2- Arrange the following carbocations in **ASCENDING** order (weakest first) according to their relative **stability** (4 Marks)

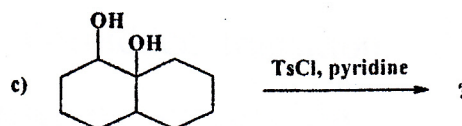
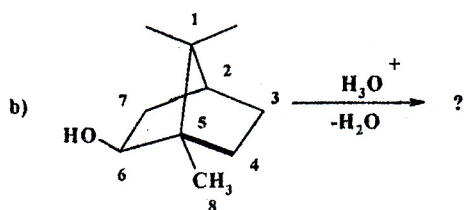
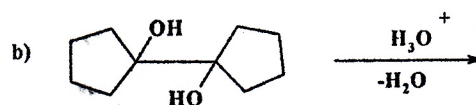


3- Discuss the mechanism for formation of dimeric compounds upon oxidation of phenol (2Marks).

4- Suggest the suitable mechanism for **THREE ONLY** of the following reaction. Write each step clearly by using arrows: (3 x 3 Marks)



5- Complete **THREE ONLY** of the following equations: (6 Marks)



Good Luck

Prof. Dr. A. A. Abdel-Wahab & Dr. R. M. Asal

(3) Write on the following:

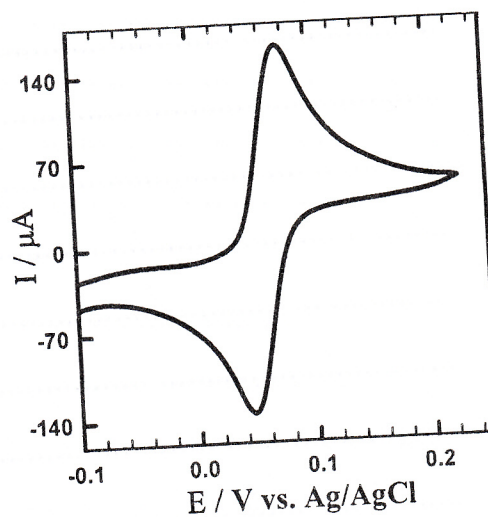
(a) Ilkovic equation

(b) Randles-Sevcik equation

(4) (a) The following cyclic voltammogram was recorded for a reversible couple.

Calculate the following:

- i) number of electrons transferred ii) the formal potential for the couple
iii) the anodic peak current iv) the cathodic peak current



Second Question: Answer Only Two from the following: (12.5 Marks)

(1) Mark (✓) for the correct statement and (X) for the wrong statement

- a) Supporting electrolyte is a reactive electrolyte used in electrochemical cells.
- b) Due to Hg is oxidized; it restricts the use of electrode as cathode.
- c) Current is sampled twice in differential pulse polarography.
- d) Heyrovsky-Illkovic equation determines the number of electrons from the intercept.
- e) The principle function of a potentiostat is to control potential and measure current.
- f) Migration is the movement of oppositely charged ions towards electrode due to electrostatic attractions, minimized by adding a supporting electrolyte to the test solution.
- g) For reversible systems E_{p_a} and E_{p_c} are dependent of the scan rate.

a	b	c	d	e	f	g

(2) (a) The principle of electrochemical biosensor (Give an example).

(b) The drug Clonazepam (CZP) gives an adsorptive stripping voltammetric peak at a carbon-paste electrode. A 50.0 mL sample containing CZP yielded a peak height of $0.37 \mu\text{A}$. When 2.0 mL of $3.0 \mu\text{M}$ CZP was spiked to the sample, the peak increased to $0.80 \mu\text{A}$. Find the concentration of Clonazepam in the sample.

(3) Write on the following:

a) Amperometry

b) Anodic stripping voltammetry

c) Adsorptive stripping voltammetry

Assiut University
Faculty of Science
Geology Department
Geology/Chemistry group

Time allowed: two hours

Answer **only twenty five** questions from the following (each question earn one mark)

- 1) What is the natural process that control groundwater with surface water?
- 2) Groundwater is a renewable resource **F** **T**
- 3) Groundwater is not a significant source of water supply **F** **T**
- 4) All glass food and beverage containers can be recycled **F** **T**
- 5) Why the Cement Industry is entirely environmentally destructive?
- 6) Write a short account on Cement Production Process and explain in which stage pollution to the environment take place
- 7) Why test burns in the cement industry is not reliable?
- 8) Define what's meant by the Cement Kiln Dust CKD, it's composition how it is collected, how many tons are disposed each year and how much they are relative to the clinker and whether they are recycled or not.
- 9) Why scrap tire incineration is destructive to the environment?
- 10) "Abandoned wells pose one of the greatest threats to groundwater" Why ?

- 11) What are the sources of nitrates and copper in drinking Water ?
- 12) What are the harmful effects of over pumping of aquifers ?
- 13) What are the consequences of removing salt from seawater
- 14) How can we use freshwater more sustainably ?
- 15) What are the Exposure Routes of Lead in the environment?
- 16) What are the Sources of Radium in water and its effect on health
- 17) Coal, crude oil, natural gas and uranium are renewable or non- renewable fossil fuels
- 18) Mention the good and bad things about the sustainability of fossil fuels
- 19) Where are the conventional and non conventional natural gas found?
- 20) Make an assessment of the liquefied petroleum gases LPG compared with other Fossil fuels and its usage alongside renewable technologies

21) How soils are remediated from pollution with heavy metals?

22) What is the source of cosmic radiation?

23) Write an account on the "Degradation mechanisms to reduce toxicity of Cyanide"

24) What is the environmental Impacts of Plastic incineration

25) Hazardous Health Effects for glass and plastic

26) Write about the Fermentation process that produce Ethanol and how it is converted to energy