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| | **Assiut University- Faculty of Science**<br>**Second Semester-**<br>**Final Exam 2025-2026**<br>**Chemistry Department** | **Program: Chemistry Science**<br>**Level: (2)**<br>**Date: 1/June/2026**<br>**Time: 2 h** | |
| **Course Title: Green Chemistry for the 2nd Level NanoTech. Students** | | **Code: 311C** | |
| **Instructors: Prof. Dr. Hassan Abdou Kotb Abd El-Aal** | | | |
| **Important: 2 St** | **No. of pages: 3** | **No. of questions: 2** | **Total Mark: 50 degree** |

**Answer all of the following questions? (50 Marks)**

**1- Choose the correct answer for *ALL* of the following? (20×2 = 40 Marks)**

**( ترصد الأجابة النهائية في الجداول بعد كل السؤال )**

**1-Which of the following sentences is *NOT TRUE* for DDE?**

a) Produced slowly during environmental degradation of DDT.
b) Used as a fungicide for cereal crops.
c) Interferes with the enzyme that regulates the distribution of birds, fish and humans calcium.
d) Soluble in fat and animal tissues

**2-Which of the following is *NOT* considered as chemical disposal methods of PCBs?**

a) Substitution of a chloride ion with H by using of NaH
b) Substitution of chlorine by polyethylene glycols for $2h/N_2$
c) Hydrogen cleavage of C-Cl bond and biphenyl nucleus using copper catalyst
d) Uses of $C_{10}H_8Na$ which results in the expulsion of a chloride ion

**3-Which of the following sentence is NOT TRUE for the Troposphere oxidation of Methane?**

a) Soluble in water
b) No multiple bonds
c) Do not absorb sunlight
d) Slow oxidation initiated by $HO^{\bullet}$

**4-Protection mechanism of inorganic active ingredients against UV rays is by ------.**

a) absorbing UV light
b) dissipating UV light
c) reflecting UV light
d) adsorbing UV light

**5-Benomyl can be synthesized by the reaction of ----- with ----- followed by addition of ----- and finally reaction of the later intermediate with -----.**

a) cyanamide & o-$C_6H_4(NH_2)_2$ & methyl chloroformate & $CH_3NCO$
b) cyanamide & methyl chloroformate & o-$C_6H_4(NH_2)_2$ & $C_4H_9NCO$
c) methyl chloroformate & o-$C_6H_4(NH_2)_2$ & cyanamide & PhNCO
d) o-$C_6H_4(NH_2)_2$ & cyanamide & methyl chloroformate & $C_5H_{11}NCO$

**6-What is going on if there is no nitrogen oxides present over antarctic zone?**

a) The $Cl_2$ molecule is broken down by solar radiation producing two chlorine $Cl^{\bullet}$
b) Nitric acid is incorporated into the polar stratospheric clouds (PSC)
c) HCl and $ClONO_2$ react with each other to produce $Cl_2$ and $HNO_3$.
d) Chlorine radicals start a catalytic reaction chains leading to ozone destruction.

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| | | | | | |



ملحوظة: الأختبار مكون من ثلاث صفحات

**7-Which of the following compounds used to prevent fruit drop and increase fruit size in citrus trees?**

a) 2,4-Dichlorophenoxyacetic acid (2,4-D)
b) 2-Methyl-4-chlorophenoxyacetic acid (MCPA)
c) Cinnamic acid
d) Glyphosate

**8-What is the final product of mechanistic routes B&C sequence of the microbial DDT degradation?**

a) 4-Chlorobenzoate
b) 4-Chlorophenyl acetate
c) 4-Chloroacetophenone
d) 4-Chlorobenzaldehyde

**9-In the troposphere $CH_4$-oxidation process, the reaction of $CH_3O^{\bullet}$ with oxygen gave ----- and ------.**

a) $HOO^{\bullet}$ & $CH_2O$
b) $CH_3O^{\bullet}$ & $CH_3^{\bullet}$
c) $HOO^{\bullet}$ & CO
d) $HOO^{\bullet}$ & $CO_2$

**10-Abstractions of loosely oxygen from $O_3$ molecule is a characteristic of all of the following species *EXCEPT* ------.**

a) $NO^{\bullet}$
b) $HO^{\bullet}$
c) Cl
d) $NO_2^{\bullet}$

**11-Select the best condition used in the 2,4-D synthesis?**

a) alkaline solution & 50% excess of 2,3-dicholorophenol
b) alkaline solution & 50% excess of 2,5-dicholorophenol
c) alkaline solution & 50% excess of 2,4-dicholorophenol
d) alkaline solution & 60% excess of 2,4-dicholorophenol

**12-Furans were prepared at a temperature of ----- by strong heating of ----- having boiling point range ----- in the presence of oxygen.**

a) 325-460 °C & polychlorinated biphenyls (PCBs) & 300-310 °C
b) 250-450°C & polychlorinated biphenyls (PCBs) & 325-366 °C
c) 310-370°C & 2,4-dichlorophenoxyacetic acid (2,4-D) & 290-320 °C
d) 300-390°C & chlorinated cyclohexane and cyclopentadiene & 200-300 °C

**13-Effective triazines are obtained if 2-chlorine atom is replaced by ------. Whilst variations in ------ extends the range of biological activities and persistence.**

a) amino-or methyl-group & methyl-or amidic groups
b) methyl-group & alkyl side chains
c) alkyl-amino side chains & methoxy-or thiomethyl groups
d) methoxy-or thiomethyl groups & alkyl amino side chains

**14-Which of the following is *NOT* significant problem in the environmental degradation of PCBs?**

a) Microbes tend to be highly selective in their dehydrochlorinations of DDT
b) Microbes tend to be highly selective in their dechlorination with preference to in the para and meta positions
c) Microbial dechlorination tends to be rather slow acting on PCB as a soil contaminant
d) Transferring a successful laboratory strain to a natural system
e)

**15-In the James Lovelock hypotheses, he demonstrate the destruction of ozone layer by -------.**

a) some chemical reactions contributing to the reduction of the ozone content
b) reactions of nitrogen oxides NO and $NO_2$
c) highly sensitive electron capture detector
d) free chlorine atoms

**16-Define the aerosol radiative forcing effect?**

a) Dark particles tend to scatter light led to warming Earth s atmosphere
b) Dark particles tend to absorb light led to warming Earth s atmosphere
c) Dark particles tend to react with light led to warming Earth s atmosphere
d) Dark particles tend to reflect light led to warming Earth s atmosphere

| 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |



ملحوظة: الأختبار مكون من ثلاث صفحات.

**17-Revolutions of active chlorines from inactive HCl&$ClONO_2$ forms occur at the surface of particles composed by ------.**

a) $H_2O$, $H_2SO_4$ & $HNO_3$
b) $H_2O$, $SO_3$ & $NO_2$
c) $H_2O$, $H_2SO_3$ & $HNO_3$
d) $H_2O$, HCl & $HNO_3$

**18-The CNSL polymer is obtained from roasting of cashew nuts which is riches source with ------ and ------.**

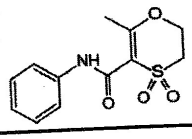
a) carboxylic acids & glycines
b) phenolics & cardinols
c) amines & carbohydrates
d) unsaturated hydrocarbons & amides

**19-Which insecticide is used in household as RAID as well as mosquito coils?**

a) Allethrins
b) Paraquats
c) Atrazines
d) Dioxins

**20-Select the name the following fungicide structure?**

a) Dimethomorph
b) Triadimefon
c) Oxicarboxin
d) Difolpet




| 17 | 18 | 19 | 20 |
|---|---|---|---|
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## 2- Answer *ALL* of the following with either (T) or (F)? (10 Marks)

( ترصد الأجابة النهائية في الجداول أمام السؤال )

1. The fourth condition over the antarctic zone included the reaction of HCl and $ClONO_2$ to produce $Cl_2$ and $HNO_3$. ( )
2. DDT does not dissolve in water but dissolve in oils and fats. ( )
3. Secondary organic aerosol comes from soot from fuel combustion. ( )
4. Ultrasonic waves applied to water soluble PCBs to cause thermolysis and oxidization. ( )
5. Parasitic Fungi lives on decaying matter and largely responsible for the breakdown of animal and plant remains in soil. ( )
6. Thiram is used to control grey mould on lettuce, strawberries and as seed dressing. ( )
7. The major biological source of sulfur containing compounds is dimethyl sulfide. ( )
8. Prochloraz is an example of the pyrimidines-type which is effective against a wide range of diseases. ( )
9. Dissolved $SO_2$ is oxidized by trace amounts of $H_2O$ and $O_2$. ( )
10. Paraquat is a quick-acting, non-selective, and kills green plant tissue on contact. ( )



ملحوظة: الأختبار مكون من ثلاث صفحات

Faculty of Science
Chemistry Department

Allowed Time: 2hrs
June 2026

**C-342 Analytical Chemistry (I) Final Exam**

**Answer The Following Questions:** *(50 marks)*

1. **In Flame Atomic Absorption Spectrometry, what are the basic steps involve in the automization of aqueous solution sample?** *(10 marks)*
2. **What are the main components of the Atomic Absorption Spectrometer?** *(10 marks)*
3. **Sketch a graphical representation for the possible electronic transitions between molecular orbitals.** *(10 marks)*
4. **In a Table choose the correct Answer:** *(10 marks)*

| a | b | c | d | e |
|---|---|---|---|---|
| | | | | |

a. **What happens when a molecule absorbs UV light?**
A. Electrons move to lower energy levels B. Electrons are removed completely
C. Electrons are excited to higher energy orbitals D. Nuclei start vibrating

b. **Which of the following is NOT a type of electronic transition?**
A. $\sigma \rightarrow \sigma^*$ B. $\pi \rightarrow \pi^*$
C. $n \rightarrow \pi^*$ D. $n \rightarrow n^*$

c. **Solvent polarity can:**
A. Have no effect B. Change absorption wavelength
C. Destroy molecules D. Only affect color

d. **conjugated systems absorb at longer wavelengths due to:**
A. decreased energy gap between orbitals B. increased energy gap between orbitals
C. equal energy gap between orbitals D. None of them.

e. **Electric conductivity of an electrolyte solution depends on :**
A. Type of ions B. concentration of ions
C. Mobility of ions D. All of them.

5. **A) In Voltammetry, what is the function of the supporting electrolyte?** *(4marks)*
   **B) State and Sketch the possible curves that may be arise during amperometric titarations.** *(6 marks)*

*Good Luck*

*Prof. Nagwa Abo El-Maali*

Assiut University — Time allowed: 3 H

Chemistry Department — Date: 23/05/2026

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

**********

Answer the following questions:

**Q1: Choose the correct answer; A, B or C (1 Mark each) (20 marks)**

١) Preferential selective of one stereoisomer over another is defined as

A) stereioselectivity B) regioselectivity C) chemoselectivity

٢) Dissolving metal reduction of aromatic compounds is defined as :

A) Shapiro B) Birch C) Swern

٣) Thermodynamic enolate could not be formed using:

A) Strong base B) protic solvent C) high temperature

٤) Diels Alder reaction is a type of

A) stereoselective B) chemoselective C) regioselective

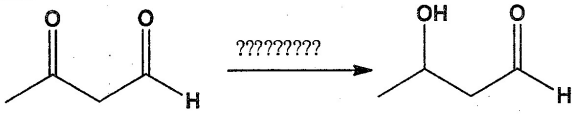
٥) The reaction of benzyl alcohol with jones reagent , gave.

A)benzaldehyde B) benzoic acid C) unreacted

٦) The reaction of methyl bromide with enamine is defined as

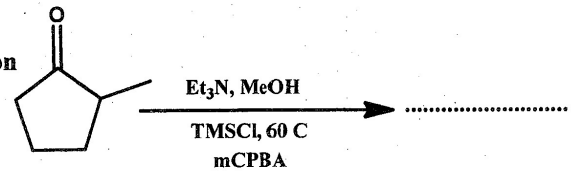
A) electrophilic substitution B) nucleophilic substitution C) electrophilic addition

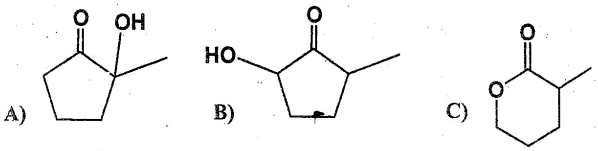
٧) The suitable reagent for this reaction




A) $H_2$/Pd B) Na/ $NH_3$ C) $NaBH_4$/ $CeCl_3$

٨) The main product for this reaction




٩) In Moffatt oxidation the DMSO was activated by

A) Oxalyl chloride B) DCC C) IBX

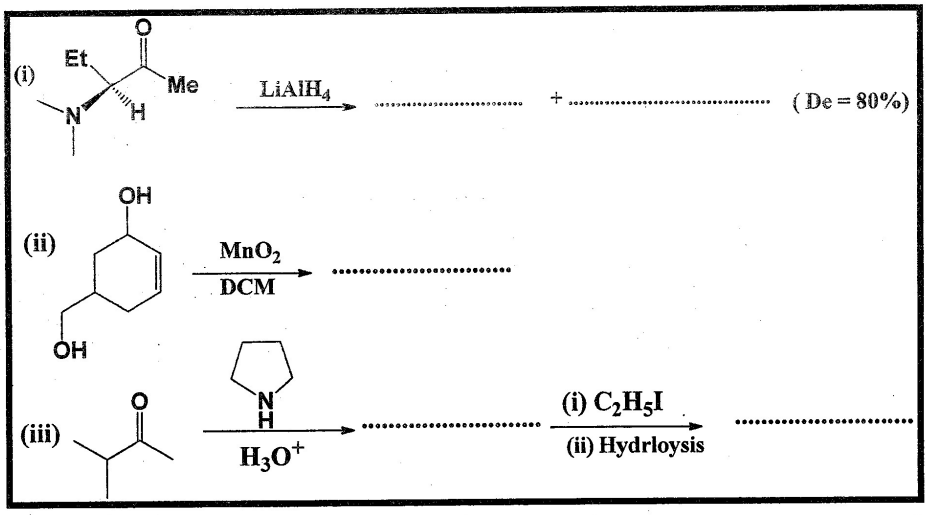
١٠) $NaBH_4$ as a reducing agent is inactive towards

A) Ketones B) Aldehydes C) Nitro group

١١) Hydration of Alkynes to produce carbonyl compounds is a type of

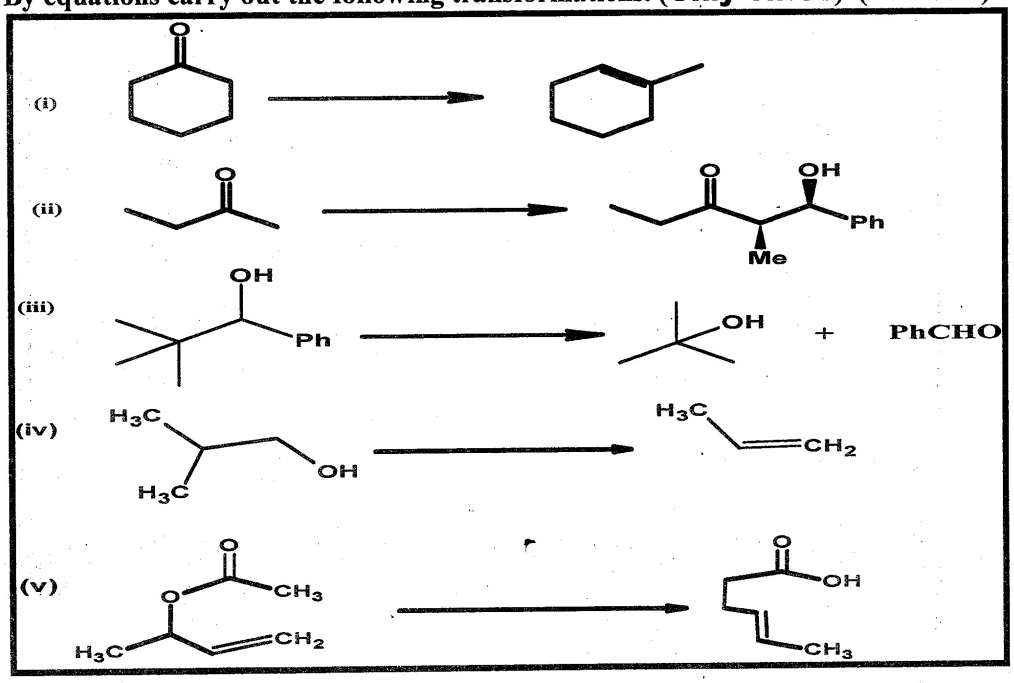
A) stereioselectivity B) regioselectivity C) chemoselectivity)

d- Complete the following Equation. (6 Marks)




**********

**Q3: By equations carry out the following transformations. (Only Three) (15 Marks)**




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*Good Luck*

*Dr. Shawkat*

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|---|---|---|---|
| | Assiut University- Faculty of Science<br>Frist Semester- Final Exam 2025-2026<br>Zoology and Entomology Department | Program: Zoology and Chemistry<br>Level : (3)<br>Date: 3/1/2026<br>Time: 2 h | |
| Course Title: Insect Taxonomy | | | Code: 340 E |
| Instructors: Prof. Dr. Ali Mohamed Ali | | | |
| Important: | No. of pages 7 | No. Of questions 5 | Total Mark:50 degree |

## Δ■ Question 1: Choose the best single correct answer (15 marks)

1. **Cornicls are found in.....**
   a) Leafhoppers b) Whiteflies c) Coccids d) Aphids
2. **Members of Ensifera are.....**
   a) Diurnal b) Nocturnal c) Crepuscular d) Matinal
3. **Sawflies are grouped under the order.....**
   a) Diptera b) Hymenoptera c) Coleoptera d) Plecoptera
4. **Thysanopterans have wings of .....type.**
   a) Hemielytra b) Tegmina c) Elytra d) Fringed
5. **Antennae are clubbed with curved tip in.....**
   a) Skippers b) Moths c) Butterflies d) Housflies
6. **Stridulatory organs are found in.....**
   a) Orthoptera b) Phasmida c) Mecoptera d) Dictyoptera
7. **Rock crawlers are found in .....region.**
   a) Warm b) cool c) Hot d) All
8. **Which one of the following orders lack cerci?**
   a) Hemiptera b) Thysanoptera c) Psocoptera d) All
9. **Ectognathous mouthparts are present in.....**
   a) Zygentoma b) Collembolla c) Protura d) Diplura
10. **The pronotum covers most of the insect head in.....**
    a)Mantis b) Cockroaach c) Grylloblatodea d) Mantophasmatodea
11. **Moniliform antennae are found in the following insects except.....**
    a) Isoptera b) Zoraptera c) Diplura d) Dragonflies
12. **Which of the following is NOT a characteristic of Orthoptera?**
    a) Chewing mouthparts b) Camouflage c) Absence of cerci d) Stridulation
13. **Which one of the following orders is NOT holometabolous?**
    a) Hymenoptera b) Neuroptera c) Siphonaptera d) Phthiraptera
14. **The cerci are asymmetrical in order.....**
    a) Diplura b) Dermaptera c) Ephemeroptera d) Embioptera

**15. Piercing/Sucking mouthparts are NOT found in.....**

a) Fleas b) Lice c) Flies d) Ants

**16. All ametabolous insects are.....**

a) Exognathous b) Predatory c) Endognathous d) Wingless

**17. The lion aphid and ant aphid belong to order.....**

a) Homoptera b) Hemiptera c) Pscoptera d) Neuroptera

**18. Which of the followings are not belonging to order Coleoptera?**

a) True bugs b) Fire flies c) ladybird beetles d) Weevils

**19. Mantodea, Dermaptera, Blattodea and Isoptera share the following.....**

a) Wingless b) Herbivory c) Chewing mouthparts d) All

**20. The adults only live for 1-2 days and don't feed in.....**

a) Ephemeroptera b) Diptera c) Dermaptera d) Blattodea

**21. Book lice belong (s) to order.....**

a) Phthiraptera b) Siphonaptera c) Zoraptera d) Psocoptera

**22. Which one of the following orders is NOT ametabolous?**

a) Zoraptera b) Protura c) Zygentoma d) Diplura

**23. Which of the following insects go through their immature stage in water?**

a) Damseflies and dragonflies b) Stone flies c) Mayflies d) All

**24. The word Noctuidea is a (an).....name.**

a) Order b) Family c) Superfamily d) Genus

**25. The forelegs are modified into sensory organ in order.....**

a) Diplura b) Protura c) Zoraptera d) Embioptera

**26. Which of the following orders has sucking mouthparts as adults?**

a) Orthoptera b) Coleoptera c) Dermaptera d) Lepidoptera

**27. If two genera are in the same phylum, they must be in the same.....**

a) Order b) Family c) Class d) Kingdom

**28. Halplodiploidy phenomenon is common in.....**

a) Thrips b) Aphids c) Honey bee d) All

**29. Lamellate and flabellate antennae are common in.....**

a)Wasps b) Butterflies and moths c) Beetles d) Ants

**30. Which insect does NOT have wings at any time in its life cycle?**

a) Fleas b) lice c) Springtail d) All

*◊**Question 2: Answer the following questions** **(10 marks)**

**(A) Put True or False**

1- The lady bugs belong to order Heteroptera. ( )

2- All the exopterygotes are hemimetabolous. ( )

3- Both moths and butterflies spin chrysalis. ( )

4- All wasps, bees and white ants have waist. ( )

5- Silverfish and Mayflies undergo molting only during younger stage. ( )

6- Naiads are ecological indicators of good quality water. ( )

7- Tympanum is located in fore tibia in Caelifera. ( )

8- Biting lice are primarily wingless insects. ( )

9- Short-horned grasshopper belongs to family Tettigonidae. ( )

10- Dipterans are the only order having two wings. ( )

■ **(B) Define Four only of the following terms:**

Alate, Paleoptera, Anamorphosis, Dichotomous key, Cornicles

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•◯ **(C) You went in a trip to collect insects with your class mates and you collected many aquatic insects including different kinds of nymphs. How can you distinguish the nymphs of stoneflies, damselflies, dragonflies and mayflies?**

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Δ ■ **Question 4: (A) List the taxonmical differences between each pair of the following (Three only)** **(15 marks)**

| (A) | Suborder Adephaga | Suborder Polyphaga |
|---|---|---|
| 1) | | |
| 2) | | |
| 3) | | |
| 4) | | |
| **(B)** | **Anisoptera** | **Zygoptera** |
| 1) | | |
| 2) | | |
| 3) | | |
| 4) | | |
| **(C)** | **Butterflies** | **Moths** |
| 1) | | |
| 2) | | |
| 3) | | |
| 4) | | |

Δ Remember ■ Understand •Apply ◊Analysis *Evaluate ◯Create

| (D) | White ant | True ants |
|---|---|---|
| 1) | | |
| 2) | | |
| 3) | | |
| 4) | | |

Δ*■ **Question 4: (B):** Give **Five** important taxonomical characters of orders Diptera, Lepidoptera and Orthoptera and list three common families only for each order with examples.

Δ ■ **Question 4: (A) List the taxonmical differences between each pair of the following (Three only):** (15 marks)

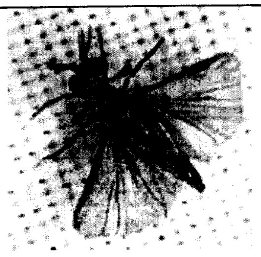
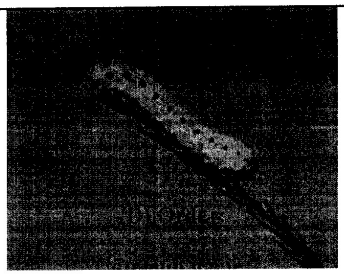
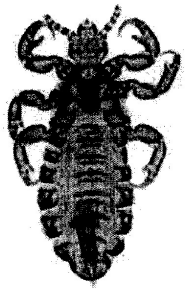
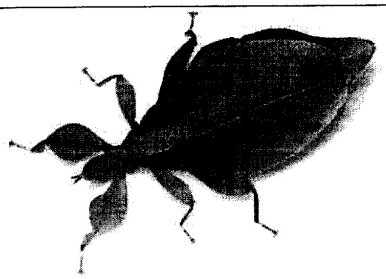
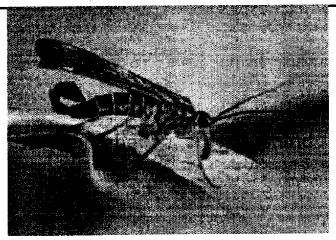
| (A) | Suborder Adephaga | Suborder Polyphaga |
|---|---|---|
| 1) | | |
| 2) | | |
| 3) | | |
| 4) | | |
| **(B)** | **Anisoptera** | **Zygoptera** |
| 1) | | |
| 2) | | |
| 3) | | |
| 4) | | |
| **(C)** | **Butterflies** | **Moths** |
| 1) | | |
| 2) | | |
| 3) | | |
| 4) | | |

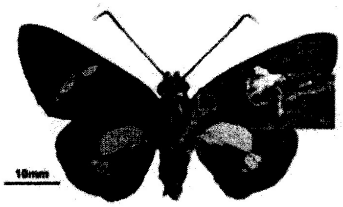
Δ Remember ■ Understand ●Apply ◊Analysis *Evaluate ◯Create

| (D) | White ant | True ants |
|---|---|---|
| 1) | | |
| 2) | | |
| 3) | | |
| 4) | | |

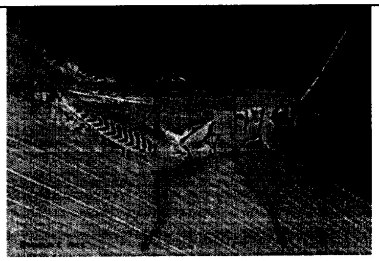
Δ*■ **Question 4: (B):** Give **Five** important taxonomical characters of orders Diptera, Lepidoptera and Orthoptera and list three common families only for each order with examples.

Δ■ **Question 5: Identify the order and/or suborder of the following insects** (10 marks)

| | |
|---|---|
|  **(A) Order:** |  **(B) Order:** |
|  **(C) Order:** |  **(D) Order:** **Common name:** |
|  **(E) Order:** **Common name:** |  **(F) Order:** **Common name:** |



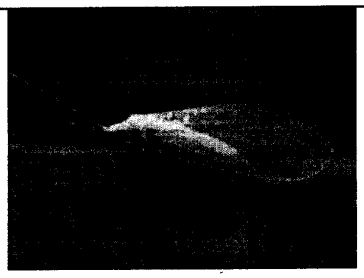
(G) Common name:



(H) Suborder:



(I) Suborder:
Common name:



(J) Order:

Prof. Dr. Ali Mohamed Ali Mahmoud End of Exam & Best Wishes

Δ Remember ■ Understand •Apply ◊Analysis *Evaluate ◯Create

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|---|---|---|---|
| | **Assiut University- Faculty of Science**<br>**Second Semester- Final Exam 2025-2026**<br>**Chemistry Department** | **Program: Applied Industrial Chemistry**<br>**Level : (3)**<br>**Date: 25/5/2026**<br>**Time: 3 h** | |
| **Course Title: Petroleum Chemistry & Petroleum Industry course** | | **Code: 408 Industrial Chemistry** | |
| **Instructors: Prof. Dr. Abdel Aal Mohamed Gaber** | | | |
| **Important:** | **No. of pages : 3** | **No. Of questions 4** | **Total Mark: 50 degree** |

## Answer the following questions: (50 Marks)

**1. Sign (√) and/ or (X) for the following statements and write the correct ones: (10 Marks)**

a. Oil is thermally cracked at 150°F to natural gas ( ).
b. Surfactant was used to reduce corrosion in desalting process ( ).
c. Steam was used in towers at atmospheric distillation fo lower the vapor pressure ( ).
d. The quenching in visbreaking process with cool gas oil to control the heating ( )
e. Cooking process produced straight-run cooker gasoline ( )
f. Rate of decomposition of olefins in catalytic cracking is slightly slower than the thermal cracking ( ).

**2. Choice the correct answer from the following false or true sentences (15 Marks)**

**a) Aniline point is related to**
a) Octane number
b) Diesel number
c) Smoke point
d) Pour point

**b) Which of the following highest-octane number?**
a) n-butane
b) i-pentane
c) Octane
d) Toluene

**c) In Alkylation process, which of the following is not used as catalyst?**
a) HF
b) $H_2SO_4$
c) Solid acid catalyst
d) Mixed acid ($H_2SO_4$ and $HNO_3$)

**d) Gum formation in stored gasoline is mainly due to the**
a) Oxidation & polymerization of unsaturates
b) presence of sulphur
c) alkylation of unsaturated.
d) higher aromatic content

**e) Catalytic cracking compared to thermal cracking of residue of vacuum distillation of crude oil**
a) gives higher yield of petrol.

b) lower octane number of petrol.
c) higher sulphur content in the product.
d) higher gum forming material in petrol

**f) Cetane number of diesel used in trucks may be about.....**

a) 85
b) 35
c) 14
d) 25-45

**g) Solution used in Doctor's treatment for *the removal of mercaptans* Is.....**

a) Sodium plumbite
b) Sodium hydroxide
c) Cupric chloride
d) Potassium isobutyrate

**h) Which of the following has the lowest viscosity (at a given temperature) of all?**

a) Naphtha
b) Kerosene
c) Diesel
d) Lube oil

**i) Diesel index is defined as**

a) ($^0$API) x (Aniline Point, $^0$ F)/100
b) ($^0$API) x (Aniline Point,$^0$ C)/100
c) ($^0$API) x (100)/Aniline Point,$^0$F
d) ($^0$API) x (100)/Aniline Point,$^0$C

**j) Sweetening of petroleum product means the removal of**

a) Sulphur & its compounds
b) Water
c) Organic impurities
d) Wax

**k) The main reaction in reforming is the**

a) Dehydrogenation of naphthenes
b) Hydrogenation of naphthenes
c) Hydrocracking of paraffins
d) Saturation of olefins

**l) Petroleum is believed to have originated from _____Sources.**

a) Vegetable
b) Animal
c) Both A & B
d) Neither A nor B

**m) In sweetening process, solutizing agent used with caustic alkali is**

a) Potassium Chloride

b) Sodium plumbite
c) Methanol
d) Phenol

**n) Sulphuric acid treatment of petroleum products removes the-------- materials.**

a) Gum forming
b) Color forming
c) Emulsions forming
d) All of the above

**o) Fuel oil is subjected to visbreaking to reduce its**

a) Pour point
b) Viscosity
c) increase the yield of gasoline and naphtha
d) All of the above

**3- I- Discuss four *only* of the following points:** **(12.5 Marks)**

a) Aromatic hydrocarbons as chemical composition of petroleum Crude.
b) Effect of hydrotreating on kerosene and lube oil.
c) Cetane number and its additives and uses.
d) Copper sweeting process and its regeneration.
e) Hybrid base as composition of residue.

**II-** Draw and discuss Phillips as alkylation process and the difference between $H_2SO_4$ and HF acids as catalysts for this process.

**4- I- Explain *four only* of the following:** **(12.5 Marks)**

*a)* write by equations, hydrotreament for Indole and quinolone
*b)* Effect of sulfur on mazout in boiler houses
c) Significant of visbreaking processes
d) Smoke and pour points and their significant.
e) $H_2SO_4$ as solvent extraction method for desulfurization and its problems.

**II-** Draw and discuss of delayed cooking process and Decoking mechanically and hydraulic methods.

أنتهت الأسئلة

مع تحياتى بالنجاح والتوفيق
أ.د. عبدالعال جابر

| | | | |
|---|---|---|---|
| | **Assiut University- Faculty of Science**<br>**Second Semester- Final Exam 2025-2026**<br>**Chemistry Department** | **Program:**<br>**Chemistry**<br>**Level : (3)**<br>**Date: 24/5/2026**<br>**Time: 3h** | |
| **Course Title: Photochemistry and Intermediates Reactions** | | | **Code: (313 C )** |
| **Instructors: Prof. Dr. Kamal Ibrahim Aly** | | | |
| **Important: NA** | **No. of pages: 1** | **No. of questions: 11** | **Total Mark: 50 degree** |

**Answer TEN Only from the following:** **(50 points)**

1) Compare between the properties of Excited state and Ground state.
2) What differences are between Luminescence and Slow Fluorescence.
3) Discuss the storage of Solar Energy in Inorganic Compounds
4) Compare between Phosphorescence and Slow Fluorescence.
5) Explain the difference between Photo- reactions and Thermal reactions.
6) Describe briefly the physical fate of Photoexcited molecules.
7) Explain briefly the photosensitization process on the light of the photodimerization of 1,3-butadiene.
8) Compare between the electronic configuration of singlet and triplet carbenes.
9) Methyl carbocation is less stable than tert-butyl carbocation. Explain this statement.
10) The trifluromethyl and cyclopropyl radicals are σ radicals, while the ethyl and cyclohexyl radicals are π radicals. (Explain this statement).
11) A carbon radical has seven electrons in its valence shell, while carbocation has only six. (Explain this statement).

**Good Luck**

**Examiner:**

**Prof. Dr. Kamal Ibrahim Aly**

| | | | |
|---|---|---|---|
| | Assiut University- Faculty of Science<br>Second Semester- Final Exam 2025-2026<br>Chemistry Department | Program: Industrial Chemistry<br>Level : (2)<br>Date: 24/5/2026<br>Time: 2 h | |
| Course Title: Analytical Chemistry | | Code: 204 C | |
| Instructors: Dr. Noura Mossaed Saleh | | | |
| Important: | No. of pages 2 | No. Of questions 2 | Total Mark: 50 degree |

## Answer the following questions:

### *Question No.1* (Answer only five): *(25 Marks)*

1. Write on the different methods of complexometric titration using EDTA, including direct titration, back titration, and indirect titration.

2. A 20.00 mL sample of 0.100 M silver nitrate ($AgNO_3$) is titrated with 0.100 M sodium chloride (NaCl) solution. Calculate the concentration of silver ions, $[Ag^+]$, and the corresponding pAg at the following volumes of NaCl added: 0, 10, 20, and 25 mL. ($K_{sp} = 1.8 \times 10^{-10}$)

3. Discuss the different types of impurities in precipitates, including:
   - Included impurities.
   - Occluded impurities.

4. Explain the concept of concentration cells and their relation to electrode potential. What happens to the cell potential when the concentrations of the two half-cells become equal?

5. What is a standard solution? Distinguish between primary standards and secondary standards.

6. For the titration of 25 mL of 0.25 M NaOH with 0.34 M HCl, calculate the pH after the addition of 0.0, 10, 18.38, and 25 mL of HCl.

***Question No.2* (Answer only five):** ***(25 Marks)***

1. Define an oxidation–reduction (redox) reaction and explain the meaning of oxidation and reduction. Explain the terms oxidizing agent and reducing agent with reference to redox reactions.

2. Write on the argentometric methods of titration, namely Mohr's method, Volhard's method, and Fajans' method.

3. A 3 g calcium sample was dissolved, and calcium was precipitated as 0.7 g of calcium oxalate. Calculate:
   a) Percentage of Ca in the sample
   b) Percentage of CaO in the sample
   (At.Wt. of Ca = 40, O = 16, and C = 12)

4. Write on types of ligands according to denticity, with examples and their suitability in complexometric titration.

5. Define equivalence point and end point in volumetric analysis. Explain the difference between them.

6. For the titration of 50 mL of 0.1 M $CH_3COOH$ ($K_a = 1.8 \times 10^{-5}$) with 0.1 M NaOH, calculate the pH after addition of 0.0, 25, 50, 60, and 75 mL NaOH.

***End of Exam***

***Best Wishes Dr. Noura Mossaed***

| | | | |
|---|---|---|---|
| | **Assiut University- Faculty of Science**<br>**Frist Semester- Final Exam 2025-2026**<br>**Chemistry Department** | **Program: Industrial Chemistry**<br>**Level : (3)**<br>**Date: 10/6/2026**<br>**Time: 2h** | |
| **Course Title: Polymer Industry** | | **Code: (304 Chem. )** | |
| **Instructors: Prof. Dr. Kamal Ibrahim Aly** | | | |
| **Important: NA** | **No. of pages: 1** | **No. of questions: 7** | **Total Mark: 50 degree** |

**Answer Six Only from the following questions:**

1) Explain the term "vulcanization of rubber". What are the differences between natural rubber and vulcanized rubber?
2) What is a peptide linkage? Illustrate your answer with 2-amino-ethanoic acid?
3) How does urea-methanal differ from nylon, Kevlar and Dacron, even though all of them are condensation polymers?
4) Why would a hole appear when a dilute alkali is spilt on a fabric made of Kevlar, discuss by mechanism equations?
5) Compare between Thermosets and Thermoplastics Materials, showing examples of thermoplastics?
6) What are the three main types of degradable plastics? Why are they degradable?
7) What are the two types of polyethene? What is the structural difference between them?

**Good Luck**

**Examiner:**

**Prof. Dr. Kamal Ibrahim Aly**

| | | | |
|---|---|---|---|
| | Assiut University- Faculty of Science<br>First Semester- Final Exam 2025-2026<br>Chemistry Department | Program: Industrial Chemistry<br>Level : (3)<br>Date: 2/1/2026<br>Time: 2 h | |
| Course Title: Nuclear and Radiochemistry | | | Code: 301 C |
| Instructors: Prof. Dr. Refaat Mahfouz | | | |
| Important: | No. of pages 6 | No. Of questions 5 | Total Mark: 50 degree |

## Answer the following questions:

### *Question No.1:* *(25 Marks)*

**Chose the correct answer:**

**1) A radioactive sample has an initial activity of 28 dpmin, ½ h later the activity is 14 dpmin. The number of atoms of the radioactive were there originally ($\lambda\ T_{1/2} = 0.693$) are**

A) 1000 atom B) 1200 C) 800 D) 700

**2) The activity of 30 μg of Cm-247 is 2.8 nCi .The half-life of Cm -247 is**

A) $1.5 \times 10^7$ y B) $2.0 \times 10^7$ C) $3.5 \times 10^5$ D) $2.5 \times 10^5$

**3) The half-life of K-40 is $1.28 \times 10^9$ y. the mass of nuclide has an activity of 1.00 μCi is**

A) 0.143 g $^{40}K/\mu ci$ B) 1.250 C) 0.156 D) 0.181

**4) From the following nuclides $^{208}_{82}Pb$, $^{8}_{5}B$ , $^{150}_{67}Ho$ , $^{30}_{13}Al$, $^{120}_{50}Sn$ and $^{94}_{36}Kr$. The probably β⁻emitter are**

A) $^{30}_{13}Al$ , $^{94}_{36}Kr$ B) $^{30}_{13}Al$ , $^{208}_{82}Pb$ C) $^{150}_{67}Ho$ D) $^{120}_{50}Sn$

**5) The missing particle in the following nuclear reaction $^{9}_{4}Be\ (p, \alpha)$ is**

A) $^{6}_{3}Li$ B) $^{4}_{2}He$ C) $^{14}_{7}N$ D) $^{3}_{2}He$

**6) The missing nuclide in a typical neutron – initiated fission**

$^{235}_{92}U + {}^{1}_{0}n \rightarrow {}^{97}_{42}Mo + \ldots\ldots + 2\ {}^{1}_{0}n$ **is**

A) $^{137}_{50}Sn$ B) $^{130}_{50}Sn$ C) $^{138}_{51}Sb$ D) $^{137}_{51}Sb$

**7) The linear attenuation coefficient of 300 KeV gamma ray for tissue is 0.12 $cm^{-1}$.The half thickness value for the tissue is**

A) 5.77 cm B) 57.5 C) 2.18 D) 3.29

**8) The annual dose for a worker who spend a full working year (say 2000 h) in an area where the average dose rate is 2.5μSv/h is**

A) 5000 μSv B) 4000 C) 1000 D) 3000

**9) The approximate dose rate at a distance of 2m from a 240 –MBq cobalt -60 source (Co-60 emits two γ-rays/disintegration of 1.17 and 1.33 MeV) is**

A) 10 μSv/h B) 20 C) 25 D) 5

**10) From the following nuclides. The isotones are**

$^{40}_{18}Ar$, $^{41}_{19}K$, $^{40}_{21}Sc$, $^{41}_{21}Sc$ **and** $^{90}_{40}Zr$

A) $^{40}_{18}Ar$ , $^{41}_{19}K$ B) $^{40}_{21}Sc$ , $^{90}_{40}Zr$ C) $^{41}_{19}K$ , $^{40}_{21}Sc$ D) $^{90}_{40}Zr$ , $^{40}_{18}Ar$

**11) In the reaction $^{32}$S ( n,γ) $^{33}$S with slow neutrons , the γ is produced with an energy of 8.65 MeV. The nuclide mass of $^{33}$S is**

A) 32.97144 u B) 31.8529 C) 33.0112 D) 32.15432

(The mass of $^{32}$S = 31.97207 , mass of $^{1}_{0}$n = 1.00866 )

**12) The particle needed to complete the nuclear reaction**

$^{63}_{29}Cu$ **(p, ...)** $^{62}_{29}Cu$ ***is***

A) $^{2}_{1}H$ B) $^{4}_{2}He$ C) $^{3}_{1}H$ D) $^{3}_{2}He$

**13) By natural radioactivity, $^{238}_{92}U$ emits an α. The heavy residual nucleous is called $UX_1$. $UX_1$ in turn emits $\beta^-$ particles. The heavy residual nucleous from this process is called $UX_2$. The $UX_2$ nuclide is**

A) $^{234}_{91}Pa$ B) $^{234}_{90}Th$ C) $^{239}_{92}U$ D) $^{235}_{90}Th$

**14) If $^{127}$I is irradiated with protons in a cyclotron and three neutrons are emitted from the nucleous. The product of the nuclear reaction is**

A) $^{128}_{53}I$ B) $^{127}_{52}Te$ C) $^{125}_{54}Xe$ D) $^{125}_{53}I$

**15) $^{210}_{83}Bi$ decay to $^{210}_{84}Po$ . The mode of $^{210}_{83}Bi$ decay is**

A) $\beta^-$ emission B) $\beta^+$ C) α D) γ

**16) Of the three isobars $^{114}_{48}Cd$, $^{114}_{49}In$, $^{114}_{50}Sn$. The isobar likely to be radioactive is**

A) $^{114}_{48}Cd$ B) $^{114}_{49}In$ C) $^{114}_{50}Sn$ D) none of these

**17) For the nuclear reaction $^{50}_{24}Cr$ (α,n) the product nuleous is**

A) $^{52}_{25}Mn$ B) $^{53}_{26}Fe$ C) $^{51}_{24}Cr$ D) $^{53}_{27}Co$

**18) The emitted particle in the decay of $^{106}_{47}Ag$ to give $^{106}_{48}Cd$ is**

A) $\beta^-$ B) $\beta^+$ C) p D) α

**19) The mass of $^{12}$C nucleous is exactly 12 amu. The packing fraction is**

A) 7.68 Mev B) 9.22 C) 3.89 D) 4.61

**20) The isotope $^{232}_{90}Th$ ($T_{½}$ = 1.41 x $10^{10}$ y) undergoes α decay .The disintegration / second (dps) would b produced in a sample containing 1.0 g of $^{232}_{90}Th$ is**

A) 4.0 ×$10^3$ dps B) 2.0×$10^3$ C) 4.0×$10^2$ D) 2.0×$10^4$

**21) The rate of α decay/sec (dps) would be emitted from 4×$10^{-12}$ g of $^{210}Po$ ($T_{1/2}$=138 d) is**

A) -666.94 dps B) -555.21 C) -421.51 D)-602.23

**22) The missing nuclide in the following nuclear reaction $^{24}_{12}Mg$ (d, α) is**

A) $^{22}_{11}Na$ B) $^{13}_{13}Al$ C) $^{28}_{15}P$ D) $^{25}_{14}Si$

**23) $^{165}_{67}Ho$ nuclide is**

A) $\beta^-$ emitter B) $\beta^+$ C) α D) stable

**24) $^{172}_{68}Er$ decay by $\beta^-$ emission ($T_{1/2}$=49.5 h) .The product nuclide is**

A) $^{172}_{70}Yb$ B) $^{172}_{69}Tm$ C) $^{172}_{67}Ho$ D) $^{172}_{66}Dy$

**25) A/Ao where A and Ao are activities, the m /mo where m and mo are masses of the same nuclide, which of the following relations is correct?**

A) A/Ao > m /mo B) A/Ao < m /mo C) A/Ao = m /mo D) nothing of these relations is correct.

***Question No.2:*** ***(10 Marks)***

From the following nuclear data given below

| |
|---|
| Ar41 |
| 1.83 h |
| $B^-$ |
| Y=1294 |
| σ 0.5 |

A. Sketch the decay scheme of $Ar^-41$. ***(2 Marks)***

B. Write the complete decay equation of Ar-41. ***(2 Marks)***

C. How many atoms are present in 1 mCi of Ar-41 activity? ***(2 Marks)***

D. Insert spin and parity of the parent and of the daughter nuclei. ***(2 Marks)***

E. What is the specific activity of carrier free Ar-41? ***(2 Marks)***

***Question No.3:*** ***(5 Marks)***

If the activity of $^{197}Hg$ ($T_{1/2}$ =65 hr) is 100 mci (3.7 GBq) on Wednesday noon. What it is activity at 8 AM the Tuesday before?

***Question No.4:*** ***(5 Marks)***

For the treatment of a thyroid patient, 100 mci (3.7 GBq) $^{131}I$ is required ($T_{1/2}$=8 d). What amount of $^{131}I$ should be shipped if transportation takes 3 days?

*(5 Marks)*

***Question No.5:***

How much time would it take for the decay of 8/9 of a sample of $^{68}Ge$ ($T_{1/2}$=280 d)?

$1Ci = 3.7x10^{10}$ Bq , $1b = 1x10^{-24}$ $cm^2$, $N_A = 6.003X10^{23}$ $mole^{-1}$ , $m_p = 1.00727u$ ,

$m_n = 1.00866$ u, , mass of $^{3}He = 3.0160293$, mass of $^{4}He = 4.0026032$.

End of Exam

Best Wishes Prof. Dr. Refaat Mahfouz

Δ Remember ■Understand •Apply ◊Analysis *Evaluate ◯Create

*(5 Marks)*

***Question No.5:***

How much time would it take for the decay of 8/9 of a sample of $^{68}Ge$ ($T_{1/2}$=280 d)?

$1Ci = 3.7x10^{10}$ Bq , $1b = 1x10^{-24}$ $cm^2$, $N_A = 6.003X10^{23}$ $mole^{-1}$ , $m_p = 1.00727u$ ,

$m_n = 1.00866$ u, , mass of $^{3}He = 3.0160293$, mass of $^{4}He = 4.0026032$.

End of Exam

Best Wishes Prof. Dr. Refaat Mahfouz

Chemistry Department

Faculty of Science

Assiut University

May 2026

Time:2h

**Final exam of course 310 C (glass industry) for the third level students of the industrial program.**

**الامتحان يقع في صفحتين**

## Part I (33 Marks)

**1. Give reasons for seven of the following (14 Marks)**

a) Glass is sometimes called a supercooled liquid.
b) Too hot and too long firing of glass cause devitrification.
c) Use of CaO and MgO in glass industry.
d) Addition of borax to the glass melt in tank furnace.
e) Use of waste glass (cullet) as a raw material in glass industry.
f) Addition of arsenic oxide to the glass melt in tank furnace.
g) Polyester resin is preferred for wetting the chopped strand mat (CSM).
h) Using of gelcoat in fiberglass molds.

**2. Choose the correct answer (7 Marks)**

1. **Which ingredient is added to reduce the melting temperature of sand?**

a) Limestone b) Soda Ash c) Alumina d) Manganese dioxide

2. **"Lead glass" (Crystal) is known for having a high:**

a) Melting point b) Refractive index c) Hardness d) Electrical resistance

3. **Cobalt oxide (CoO) is added to glass to produce a ..... color.**

a) Red b) Deep Blue c) Green d) Brown

4. **The furnace used for continuous, high-volume glass production is the:**

a) Pot furnace b) Tank furnace c) Muffle furnace d) Drying oven

5. **The process of slow cooling to relieve internal stress in glass is called:**

a) Tempering b) Annealing c) Devitrification d) Shaping

6. **Glass is considered an "Amorphous" solid because it lacks:**

a) Hardness b) Transparency c) Long-range crystalline order d) Viscosity

انظر خلف

7. **Which material acts as a "stabilizer" to make glass water-insoluble?**

a) Soda Ash b) Limestone CaO c) Potash d) Silica

**2. Write on Two only of the following (6 Marks)**

I. The chemical reactions involved in glass industry.
II. Typical glass manufacture sequence
III. Radial and concentric cracks of glass fracture

**3. Complete the following (6 Marks)**

a) Colour in glass can be obtained by....., ...or .....
b) The major component in glass industry is .....
c) Repairing of devitrification in glass can be achieved by ....., .....or .....
d) E-glass is a type of glass that can be regarded as.....
e) The crucibles of pot furnace are made of .....or.....
f) Beck line appears inside the glass fragment when the refractive index of liquid (in which the fragment is immersed) is ..... than that of the glass.
g) D-glass is a borosilicate glass with high .....

## Part II (17 Marks)

**1.Write on the following (12 Marks)**

a) The basic components of the float process used for production of float glass . Draw the system used and comment.
b) The environmental impact of glass production due to $CO_2$, $SO_2$ and NOx emissions.
c) Potash-lime and borosilicate glass: properties and uses.
d) Tinted glass and its manufacture.

**2. Complete the following (3 Marks)**

a) E-glass production processes are the same as that of the float glass except that the furnace temperature of E-glass is about.....$^{o}$C lower.
b) Piece ware shaping processes include spinning, pressing,....., and.....
c) Toughened or tempered glass is a glass processed by controlled.....and.....treatments.

**3. Choose the correct answer in the following (2 Marks)**

i) 99.5% silica glass becomes transparent when it is heated to:
a) Its melting point b) higher than its melting point
c) lower than its melting point d) at any of the mentioned items.
ii) Alkali-silicate glass is manufactured from only two components:
a) sand and sodium carbonate b) sand and calcium carbonate
c) sand and potassium carbonate c) sand and lithium carbonate.

Good Luck

Examiners: Prof. Dr. Aref A. M. Aly
Dr. Hanan Mosbah Khalaf

| | | | |
|---|---|---|---|
| | Assiut University- Faculty of Science<br>Frist Semester- Final Exam 2025-2026<br>Chemistry Department | Program: -Science<br>Level : (3)<br>Date: 30/12/2025<br>Time: 3 h | |
| Course Title: Inorganic II | | | Code: 321C |
| Instructors: Prof. Dr..Said Ibrhaim ; Prof. Dr.Mohamed Abd Elhakim Prof. Dr.Asmaa Mohamoud | | | |
| Important: - | No. of pages 2 | No. Of questions 3 | Total Mark:50 degree |

Section I: (17mark)

A) Write the IUPAC name of the following complexes and show the kinds of isomerism they possess. (6marks)

( i) [ $PdI_2(ONO)_2$] ( ii) $[Co(NH_3)_5Br]Cl$ ( iii)$K_2[Pt(NH_3)_2Cl_4]$

B) Write the formula of the following complexes. (3 marks)

(i) μ -dihyroxobis[tetraaquairon(III)] sulphite

(ii) TrisethylenediamineCo(III) sulfate (iii) tetraaquadichlorochromium(III) chloride

C) Put (√) or (x ) in front of the following: (8 marks)

(i) The compound $[Co(NH_3)_5Cl]Cl_2$ contains 4 charges and 3 ionizable Cl

(ii) The oxidation number of nickel in the complex $K_4$ [Ni(CN)$_4$] is zero.

(iii) The number of charges in a solution of the complex $[Pt(NH_3)_2Cl_2]$ is zero.

(iv) A solution of the complex [ $Co(NH_3)_6]Cl_3$ contains 6 charges and 4 particles.

(v) Chiral complexes possess superimposable mirror image isomers.

( vi) The reaction $AlI_3$+ 3NaF ═══ $AlF_3$+3Na I goes to the right direction.

(vii) The reaction $CoF_2$+ $HgBr_2$ ═══ $CoBr_2$+$HgF_2$ goes to the left direction

(viii) A solution of the compound $K[(NH_3)_2(NO_2)_2]$ gives 2 charges and 2 particles.

Section II: (17 Mark)

A) Explain why: (6 Marks )

i- HCl and $H_2SO_4$ are not uses in the equilibrium between dichromate and chromate ions

ii- When reaction $Cl^{-1}$ ions with hexaaqua Co(II) ions the shape change to tetrahedral

iii- By using potassium ferrocyanide how to use to differentiate between $Fe^{+2}$ and $Fe^{+3}$ions

iv- Ni(II) inos are more stable than Pt(II) inos while Pt(IV) ions more stable

v- $(NH_4)_2$[ $CuCl_4$] is square planar but $Cs_2[CuBr_4]$ is tetrahedral

vi- $FeI_3$ does not excite

B) Four only compare between: ( 6Marks)

i- $Fe(CN)_6]^{-4}$ and $[Fe(CN)_6]^{-3}$ in number of unpaired electrons and spin

ii- Reactions of $[Co(H_2O)_6]^{+2}$; [ $Fe(H_2O)_6]^{+3}$ and $[Cu(H_2O)_6]^{+2}$ with $OH^-$ ; $CO^{-3}$ and $Cl^{-1}$ ions

iii- Zinc oxide and cadmium oxide

iv- Effect of temperature on hydrate ferric oxide and ferrous oxalate

v- Reaction of Cu metal with non-oxidizing and oxidizing acids

C) Describe a method for preparing of the following : (5 Marks)

i- $Cr_2O_3$ from potassium dichromate ii-Cu metal from copper pyrite

iii- Disodium pentacyanonitrosyl ferrate (II) from ferrous sulphate

iv- potassium zincate v- sodium dichromate

Section III: (16Mark)

1-Give reason(s) of the following:

i- Transition metals show high melting points and act as good catalysts.

ii- The acidity of metal oxides increases with increase of oxidation states.

iii -$KMnO_4$ is a coloured compound although it has $3d^0$ configuration.

2-Complete the following with explanations:

i- In the formation of steel the malleability and ductility of iron are ..... to a great extent.

ii-Ionization energy of d- block elements is ..... than that of s-block metals.

iii-The density of transition metals ..... in a group from top to bottom.

iv-Transition metals exhibit variable ..... states.

3- Answer *two only* of the following:

A) i- Define what is meant by interstitial compounds and alloys, give examples.

ii- cobalt(II) complex measured at 298K has volume susceptibility $5.50\times10^{-4}$, molecular weight equals 310 g/mol, density 30 g/cm$^3$ and total magnetic correction $1.50\times10^{-12}$. Find the effective magnetic moment and number of unpaired electrons.

B) i- $[Co(NH_3)_5(H_2O)]^{3+}$ complex ion shows maximum absorption at 500 nm, calculate the energy of the absorbed light and show its observed colour.

ii- Write briefly on the different types of magnetic behaviour of transition metals.

C)- i- What is the important ores of titanium? Explain the method of production of pure metal.

ii- Write on vanadium ions existing in aqueous solution in different oxidation states.

(Atomic NO. Ti=22; V=23 ; Cr=24; Mn=25; Fe=26 ; Co=27 ;Ni=28; Cu=29 ;Zn=30)

End of Exam

Best Wishes

Prof. Dr.Said Ibrhaim ;Prof. Dr.Mohamed Abd Elhakim ; Prof. Dr.Asmaa Mohamoud

**Assiut University**

**Faculty of Science**

***final exam(2025-2026)***

**Technical Reports Writing**

**Level 3 industrial chem. program**

**Time: 2 hrs.**

**Tuesday, 02 June 2026**

***The exam is five questions in six pages* (50 marks)**

## *Question* No.1 *(10 marks):*

**In the front of the following statements, mark (√) for True statement and (x) for False ones.**

1 All formal reports have only one format. ( )

2 Abstract - An author's statement of thanks to people and organizations who helped during the preparation of a report. ( )

3 Correspondence materials include technical letters, emails and memo. ( )

4 Using figures and tables conveys information in most effective way for communication. ( )

5 The preliminaries pages include: introduction, recommendation and discussion ( )

6 Typically, you write memos to people outside your place of work, and you write letters to people within your place of work. ( )

7 Index- An alphabetical list of items discussed in a report together with their page and/or paragraph numbers. ( )

8 Questionnaire - A method of gathering information by questioning respondents. ( )

9 Posters are important documents in engineering. They are Written as a plan for solving a problem. ( )

10 References are an optional section in technical report. ( )

## *Question* No.2 *(10 marks):*

**Select one of the best answers:**

1 A type of report which gives an account of a test or experiment together with findings and conclusions.

a) Internet b) Flowchart c) Scientific report d) Agenda

2 There are many classes of illustrations such as:

a) Figures b) Drawings c) Tables d) All of the above

3 The way that you express a thought in words and images is: -

a) Agenda b) Style c) Format d) Abstract

4 ---------- - Maximum information with minimum words

a) Abstract b) Introduction c) Conclusion d) All of the above

5 Revision the rough draft includes:

a) the materials b) style & format c) spelling & grammar d) All of the above

6 The writings constraints include:

a) Posters b) Proposals c) Instruction sheets d) none of the above

7 The distinct audience includes:

a) non- technical b) general technical c) specific technical d) All of the above

a) Transparencies b) Slides c) Computer-generated images d) All of the above

8 The writing constraints include:

a) Audience b) Purpose c) Writing Techniques d) All of the above

9 Technical writing conveys:

a) information b) facts c) data d) All of the above

10 ---------- are important documents in engineering. They are Written as a plan for solving a problem.

a) Proposals b) Posters c) papers d) All of the above

***Question* No.3 *(10 marks):***

**3-a- State the general attributes of Technical Writing** **(5 marks)**

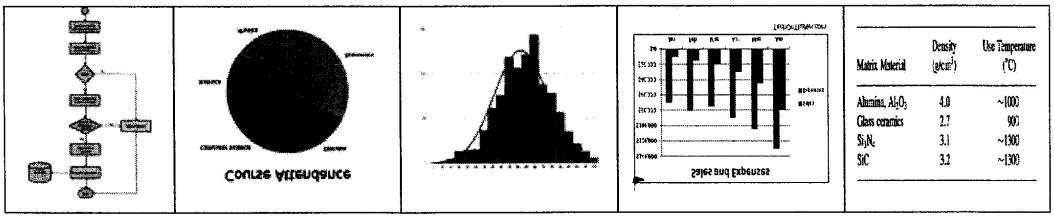
**3-b- The last stage of report preparation, revising the rough-draft …discuss** (5 marks)

*Question* No.4 *(10 marks):*

**4-a- Define the proposal and state the elements of successful proposal?** (5 marks)

**4-b-Below there are five different types of visual aids, determine the following:** (5 marks)

Name and describe each one of them



| Matrix Material | Density ($g/cm^3$) | Use Temperature (°C) |
|---|---|---|
| Alumina, $Al_2O_3$ | 4.0 | ~1000 |
| Glass ceramics | 2.7 | 900 |
| $Si_3N_4$ | 3.1 | ~1300 |
| SiC | 3.2 | ~1300 |

*Question* **No.5** ***(10 marks):***

**Design a cover page and list of contents for a technical report (choose title)**

**My best wishes**

*Prof.Dr. Atef El Sayed Mahmoud*

Assiut University

Applied Industrial Chemistry Program
2025-2026 Final Exam
Course Title : Instrumentation &Process Control
Course Code: Eng 300
Time: 2 H  Final Mark:50
Date:4 /6/2026

Faculty of Science
Chemistry Department

## Answer The Following Questions

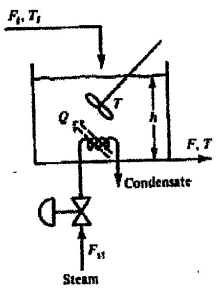
**Important Note!!** Use net sketches and diagrams to illustrate your answers
**ملحوظة مهمة!!** كلما أمكن إستخدم المخططات والرسومات الواضحه و المنظمه لتوضيح اجاباتك
الاجابه عن الاسئله باللغه الانجليزيه

### Question No. 1 (15 Marks).a=3;b=3;c=3;d=3;e=3

**a.** What are the basic components of chemical sensors?
**b.** List the types of chemical sensors with examples.
**c.** Explain the working principles and state applications of chemical sensors.
**d.** What are the classifications of chemical sensors?
**e.** State only *without explanation* the requirements must be satisfied during the chemical plant operation.

### Question No. 2 (15 Marks).a=3;b=4;c=8

**a.** Why is process control essential for modern chemical manufacturing?
**b.** What is the main difference between feed-forward and feedback control schemes?
**c.** Consider the tank heater system shown in the Figure.

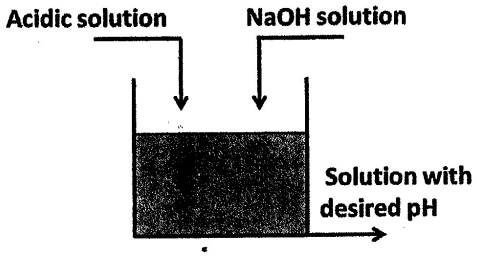



***Draw the block diagram of the following:***

i. Feedback level control for a tank heater scheme.
ii. Feed forward temperature control for a tank heater scheme.
iii. Explain the operation principles of each sensor that you used.

### Question No. 3 (10 Marks).a=2;b=2;c=6

**a.** What is meant by smart chemical sensors?
**b.** Compare between chemical sensors and biosensors with real life examples.
**c.** Describe the steps that you would go through in designing a control system for maintaining the pH of the liquid in a stirred tank (see the Figure) at a desired value? What questions must you resolve) Develop both feedback and feedforward control configurations for this system



Assiut University

Applied Industrial Chemistry Program
2025-2026 Final Exam
Course Title : Instrumentation &Process Control
Course Code: Eng 300
Time: 2 H  Final Mark:50
Date:4 /6/2026

Faculty of Science
Chemistry Department

## Answer The Following Questions

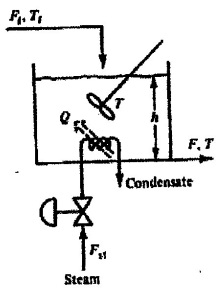
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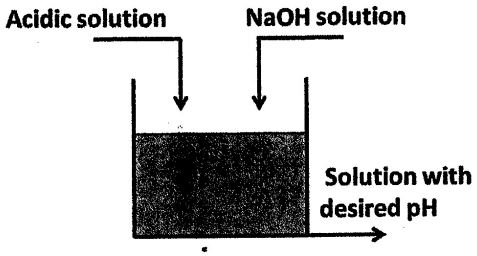



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**Question No. 4 (10 Mark)a=4;b=6**

**a.** Name each of the objects shown and explain its operation principles. State an application for each object in chemical process control.

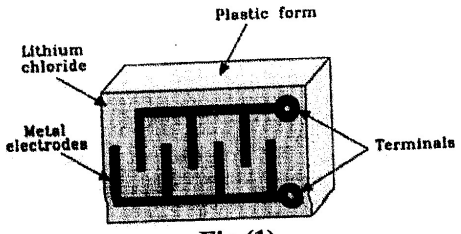



**Fig.(1)**

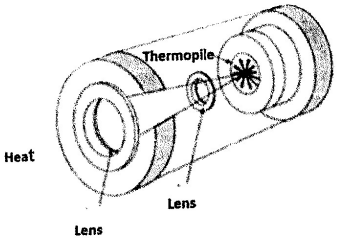



**Fig.(2)**

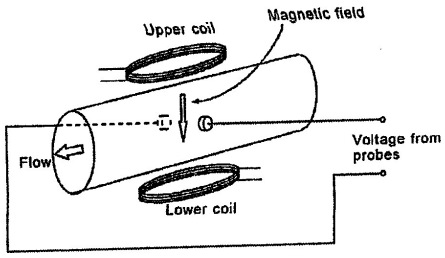



**Fig.(3)**

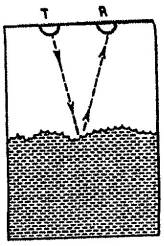
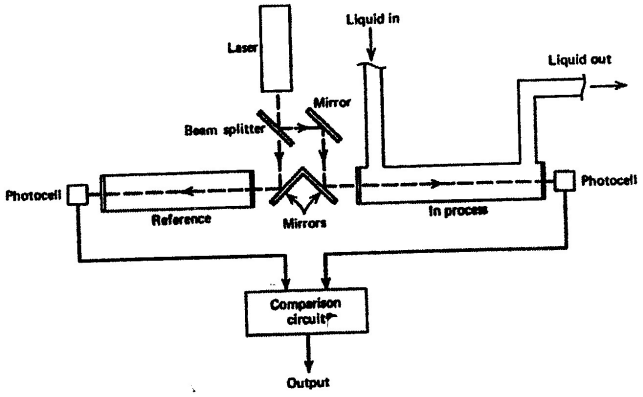



**Fig.(4)**

**b.** Explain the operation principles of the process shown below. State its application.




*Best Wishes*

*Dr.-Eng.: Amer Abdelfattah Noureldin*

| | | | |
|---|---|---|---|
| | Assiut University- Faculty of Science<br>First Semester- Final Exam 2025-2026<br>Chemistry Department | Program: Special Chemistry<br>Level : (3)<br>Date: 2/1/2026<br>Time: 3 h | |
| Course Title: Nuclear and Radiochemistry | | Code: 333 C | |
| Instructors: Prof. Dr. Refaat Mahfouz | | | |
| Important: | No. of pages 6 | No. Of questions 5 | Total Mark:50 degree |

## Answer the following questions:

### *Question No.1:* *(25 Marks)*

**Chose the correct answer:**

**1) A radioactive sample has an initial activity of 28 dpmin, ½ h later the activity is 14 dpmin. The number of atoms of the radioactive were there originally ($\lambda\ T_{1/2} = 0.693$) are**

A) 1000 atom B) 1200 C) 800 D) 700

**2) The activity of 30 μg of Cm-247 is 2.8 nCi .The half-life of Cm -247 is**

A) $1.5 \times 10^7$ y B) $2.0 \times 10^7$ C) $3.5 \times 10^5$ D) $2.5 \times 10^5$

**3) The half-life of K-40 is $1.28 \times 10^9$ y. the mass of nuclide has an activity of 1.00 μCi is**

A) 0.143 g $^{40}$K/μci B) 1.250 C) 0.156 D) 0.181

**4) From the following nuclides $^{208}_{82}Pb$, $^{8}_{5}B$ , $^{150}_{67}Ho$ , $^{30}_{13}Al$, $^{120}_{50}Sn$ and $^{94}_{36}Kr$. The probably β⁻emitter are**

A) $^{30}_{13}Al$ , $^{94}_{36}Kr$ B) $^{30}_{13}Al$ , $^{208}_{82}Pb$ C) $^{150}_{67}Ho$ D) $^{120}_{50}Sn$

**5) The missing particle in the following nuclear reaction $^{9}_{4}Be$ ( $p$ , $\alpha$ ) is**

A) $^{6}_{3}Li$ B) $^{4}_{2}He$ C) $^{14}_{7}N$ D) $^{3}_{2}He$

**6) The missing nuclide in a typical neutron – initiated fission**

$^{235}_{92}U + {}^{1}_{0}n \rightarrow {}^{97}_{42}Mo + .....+2\ {}^{1}_{0}n$ **is**

A) $^{137}_{50}Sn$ B) $^{130}_{50}Sn$ C) $^{138}_{51}Sb$ D) $^{137}_{51}Sb$

**7) The linear attenuation coefficient of 300 KeV gamma ray for tissue is 0.12 $cm^{-1}$.The half thickness value for the tissue is**

A) 5.77 cm B) 57.5 C) 2.18 D) 3.29

**8) The annual dose for a worker who spend a full working year (say 2000 h) in an area where the average dose rate is 2.5μSv/h is**

A) 5000 μSv B) 4000 C) 1000 D) 3000

**9) The approximate dose rate at a distance of 2m from a 240 –MBq cobalt -60 source (Co-60 emits two γ-rays/disintegration of 1.17 and 1.33 MeV) is**

Δ Remember ■Understand •Apply ◊Analysis *Evaluate ◯Create

| | | | |
|---|---|---|---|
| | Assiut University- Faculty of Science<br>First Semester- Final Exam 2025-2026<br>Chemistry Department | | Program: Special Chemistry<br>Level : (3)<br>Date: 2/1/2026<br>Time: 3 h |
| Course Title: Nuclear and Radiochemistry | | | Code: 333 C |
| Instructors: Prof. Dr. Refaat Mahfouz | | | |
| Important: | No. of pages 6 | No. Of questions 5 | Total Mark:50 degree |

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A) 5000 μSv B) 4000 C) 1000 D) 3000

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Δ Remember ■Understand •Apply ◊Analysis *Evaluate ◯Create

A) 10 μSv/h B) 20 C) 25 D) 5

**10) From the following nuclides. The isotones are**

$^{40}_{18}Ar$, $^{41}_{19}K$, $^{40}_{21}Sc$, $^{41}_{21}Sc$ **and** $^{90}_{40}Zr$

A) $^{40}_{18}Ar$ , $^{41}_{19}K$ B) $^{40}_{21}Sc$ , $^{90}_{40}Zr$ C) $^{41}_{19}K$ , $^{40}_{21}Sc$ D) $^{90}_{40}Zr$ , $^{40}_{18}Ar$

**11) In the reaction $^{32}$S ( n,γ) $^{33}$S with slow neutrons , the γ is produced with an energy of 8.65 MeV. The nuclide mass of $^{33}$S is**

A) 32.97144 u B) 31.8529 C) 33.0112 D) 32.15432

(The mass of $^{32}$S = 31.97207 , mass of $^{1}_{0}$n = 1.00866 )

**12) The particle needed to complete the nuclear reaction**

$^{63}_{29}Cu$ (p, ...) $^{62}_{29}Cu$ *is*

A) $^{2}_{1}H$ B) $^{4}_{2}He$ C) $^{3}_{1}H$ D) $^{3}_{2}He$

**13) By natural radioactivity, $^{238}_{92}U$ emits an α. The heavy residual nucleous is called $UX_1$. $UX_1$ in turn emits $\beta^-$ particles. The heavy residual nucleous from this process is called $UX_2$. The $UX_2$ nuclide is**

A) $^{234}_{91}Pa$ B) $^{234}_{90}Th$ C) $^{239}_{92}U$ D) $^{235}_{90}Th$

**14) If $^{127}$I is irradiated with protons in a cyclotron and three neutrons are emitted from the nucleous. The product of the nuclear reaction is**

A) $^{128}_{53}I$ B) $^{127}_{52}Te$ C) $^{125}_{54}Xe$ D) $^{125}_{53}I$

**15) $^{210}_{83}Bi$ decay to $^{210}_{84}Po$ . The mode of $^{210}_{83}Bi$ decay is**

A) $\beta^-$ emission B) $\beta^+$ C) α D) γ

**16) Of the three isobars $^{114}_{48}Cd$, $^{114}_{49}In$, $^{114}_{50}Sn$. The isobar likely to be radioactive is**

A) $^{114}_{48}Cd$ B) $^{114}_{49}In$ C) $^{114}_{50}Sn$ D) none of these

**17) For the nuclear reaction $^{50}_{24}Cr$ (α,n) the product nuleous is**

A) $^{52}_{25}Mn$ B) $^{53}_{26}Fe$ C) $^{51}_{24}Cr$ D) $^{53}_{27}Co$

**18) The emitted particle in the decay of $^{106}_{47}Ag$ to give $^{106}_{48}Cd$ is**

A) $\beta^-$ B) $\beta^+$ C) p D) α

**19) The mass of $^{12}$C nucleous is exactly 12 amu. The packing fraction is**

A) 7.68 Mev B) 9.22 C) 3.89 D) 4.61

**20) The isotope $^{232}_{90}Th$ ($T_{½}$ = 1.41 x $10^{10}$ y) undergoes α decay .The disintegration / second (dps) would be produced in a sample containing 1.0 g of $^{232}_{90}Th$ is**

A) $4.0 \times 10^3$ dps B) $2.0 \times 10^3$ C) $4.0 \times 10^2$ D) $2.0 \times 10^4$

**21) The rate of α decay/sec (dps) would be emitted from $4 \times 10^{-12}$ g of $^{210}Po$ ($T_{1/2}$=138 d) is**

A) -666.94 dps B) -555.21 C) -421.51 D)-602.23

**22) The missing nuclide in the following nuclear reaction $^{24}_{12}Mg$ (d, α) is**

A) $^{22}_{11}Na$ B) $^{13}_{13}Al$ C) $^{28}_{15}P$ D) $^{25}_{14}Si$

**23) $^{165}_{67}Ho$ nuclide is**

A) $\beta^-$ emitter B) $\beta^+$ C) α D) stable

**24) $^{172}_{68}Er$ decay by $\beta^-$ emission ($T_{1/2}$=49.5 h) .The product nuclide is**

A) $^{172}_{70}Yb$ B) $^{172}_{69}Tm$ C) $^{172}_{67}Ho$ D) $^{172}_{66}Dy$

**25) A/Ao where A and Ao are activities, the m /mo where m and mo are masses of the same nuclide, which of the following relations is correct?**

A) A/Ao > m /mo B) A/Ao < m /mo C) A/Ao = m /mo D) nothing of these relations is correct.

***Question No.2:*** ***(10 Marks)***

From the following nuclear data given below

Ar41
1.83 h
$\beta^-$
Y=1294
σ 0.5

A. Sketch the decay scheme of Ar-41. ***(2 Marks)***
B. Write the complete decay equation of Ar-41. ***(2 Marks)***
C. How many atoms are present in 1 mCi of Ar-41 activity? ***(2 Marks)***
D. Insert spin and parity of the parent and of the daughter nuclei. ***(2 Marks)***
E. What is the specific activity of carrier free Ar-41? ***(2 Marks)***

***Question No.3:*** ***(5 Marks)***

Calculate the duration of time necessary to produce 600 mci (22.2 GBq) of $^{99}$Mo by irradiating 4g of $^{235}$U in the nuclear reactor whose thermal neutron flux is $2x10^{14}$ n/cm$^2$.sec. (Assume the formation cross section of $^{99}$Mo is 20 *mbarns* and the half-life of $^{99}$Mo is 67 hr).

***Question No.4:*** ***(5 Marks)***

The half lifes of $^{99}$Mo and $^{99m}$Tc are 67 hr and 6 hr respectively and both are in transient equilibrium. If the $^{99}$Mo activity is 75 mCi (2.8GBq), what is the activity of $^{99m}$Tc? Assume 87% $^{99}$Mo decay to $^{99m}$Tc.

***Question No.5:*** ***(5 Marks)***

A sample of $^{210}_{83}Bi$ ($B^-$ decay) ($T_{1/2}$=5.01 d) is freshly purified at t=0

a) Write the complete decay equation of this nuclide.
b) If the $T_{1/2}$ of the daughter nuclide is 138.35 d, what kind of equilibrium is exist between parent and its daughter?
c) If $1x10^{-10}$ g of $^{210}Bi$ is left without further purification when will the amount of the daughter is it be a maximum.

1Ci = $3.7x10^{10}$ Bq , 1b = $1x10^{-24}$ $cm^2$, $N_A$ = $6.003X10^{23}$ $mole^{-1}$ , $m_p$ = 1.00727u , $m_n$ = 1.00866 u, , mass of $^3He$ = 3.0160293, mass of $^4He$ = 4.0026032.

End of Exam

Best Wishes Prof. Dr. Refaat Mahfouz

Δ Remember ■Understand ●Apply ◊Analysis *Evaluate ◯Create

| | | | |
|---|---|---|---|
| | Assiut University-Faculty of Science<br>Second Semester-Final Exam<br>2025-26<br>Chemistry Department | Program: Applied Industrial Chemistry<br>Level: (3)<br>Date: 14-5-2026<br>Time: 2 h | |
| Course Title: Corrosion Prevention Tech. | | Course Code : Chem 302 | |
| Instructor: Prof. Abou-Elhagag Abdel-Aziz Hermas | | | |
| Important | No of pages : 2 | No. of questions : 6 | Total Mark: 50 |

## Answer only Five of the following questions:

**Q1 Give (√) for the correct statement and (x) for the wrong one:** (10 marks)

1. Most cases of the corrosion are electrochemical in nature. ( )
2. Tin and silver metals are used as cathodic coatings to the base steel. ( )
3. SI system unit of corrosion rate is grams square meter per day. ( )
4. Phosphate coating is given to the metal surface before finishing. ( )
5. The thermodynamic does not provide kinetic information for a metal corrosion. ( )
6. The pipe elbows (كوع الانابيب) is usually exposed to general corrosion. ( )
7. Organic inhibitors typically effect on anodic area only of corrosion cells. ( )
8. Organic inhibitors are used mainly in boilers and cooling towers. ( )
9. Tapped joints, gasket interfaces and bolts in a metallic structure may form intergranular corrosion. ( )
10. Organic inhibitor molecules attach to metal surfaces by chemisorption and physical adsorption. ( )

**Q2 Choose the correct answer:** (10 marks)

1. Due to corrosion, a direct cost is .....
   A. Cost of protection B. occurrence of disaster
   C. Stop of production C. decrease the cost of materials
2. Which of the following represents cathodic reaction of zinc corrosion in neutral aqueous solution?
   A. $Zn^{2+} + 2\,e^- \rightarrow Zn$ B. $O_2 + 4\,H^+ + 4\,e^- \rightarrow 2\,H_2O$
   C. $O_2 + 2\,H_2O + 4\,e^- \rightarrow 4\,OH^-$ D. $2H^+ + 2e^- \rightarrow 2\,H_2O$
3. Caustic embrittlement of boilers is due to hydrolysis of .....
   A. $CaSO_4$ B. $Mg(NO_3)_2$ C. $Ca(OH)_2$ D. $Na_2CO_3$
4. For protection of a steel tank which metal is used as a sacrificial anode:
   A. aluminum B. lead C. copper D. magnesium
5. Crevice corrosion is usually attributed to .....
   A. Mechanical stress B. high temperature C. bad design D. low conductivity
6. Removing the dissolved ..... from the aqueous solution in some cases prevents the corrosion.
   A. $H_2$ B. organic materials C. $O_2$ D. $N_2$
7. The preferred material selection for nitric acid storage tank is .....
   A. tin B. polymer C. stainless steel D. Cu alloy
8. The corrosion type which caused by relative motion between the metal surface and the corrosive fluid.
   A. stress B. pitting C. crevice D. erosion-corrosion
9. ..... is/or are types of stainless steels.
   A. Martensitic B. Ferritic C. Austenitic D. All of these
10. ..... are used as oxygen scavengers to remove dissolved oxygen.
    A. $Na_2SO_3$ and hydrazine B. $ZnSO_4$ and $Ca(HCO_3)_2$
    C. $Na_2CrO_4$ and $NaNO_3$ D. $Na_2CO_3$ and $Na_3PO_4$

أنظر بالخلف

**Q3 Complete the following sentences** **(10 marks)**

1. The limiting anodic dissolution current of the anodic polarization behavior is .....
2. Some metals form oxide layer protects the metal against the corrosion like, .....
3. A metal with ..... hydrogen overvoltage is more susceptible to corrosion.
4. For dilute sulfuric acid solution storage the proper used material is .....
5. The corrosion rate unit "mpy" means .....
6. For the general engineering work, a high corrosion rate material is more than .....mpy.
7. One property of a good paint coating is .....
8. Tapped joints, gasket interfaces and bolts in a metallic structure may form ..... corrosion.
9. Use steel materials with less than 0.05% carbon which have sufficient resistance against .....corrosion after welding.
10. Chromate and nitrite are employed as ..... for iron.

**Q4 Answer the following**

**1- There are primary and secondary factors influence the corrosion rate, write on three factors of both. (5 mark)**

**2- Define the bio-corrosion, give an example and explain by chemical equations its mechanisms. (5 mark)**

**Q5 Answer the following**

**1- Calculate the cell potential and determine the corrosion behavior of Fe in this cell at 25°C; $Fe/Fe^{2+}// SO_4^{2-} // H^+, H_2/Pt$ , where $[Fe^{2+}]=0.5M$, $pH=1$, $P_{H2}=1atm$, $E°\ (Fe^{2+}/Fe) = -0.44V$ , and $E°\ (H^+/H) = 0.0V$ . ($F=96485\ Cmol^{-1}$, $R=8.314Jmol^{-1}K^{-1}$) (5 mark)**

**2- What is the Pourbaix diagram, its application and limitations in corrosion field. (5 mark)**

**Q6 Answer the following**

**1-According to Faraday's Law drive an equation to determine the mass loss of a metal by measuring the corrosion current in a definite time. (4 mark)**

**2-A Daniel cell is discharged at 0.05 A, the Zn anode is 1.2 cm diameter and is immersed to a depth of 12 cm in the electrolyte. What is the corrosion rate of Zn in cm/s? ( $d_{(zinc)} = 7\ g/cm^3$ , $M_e$ (zinc) = 0.3387 mg/C) (6 mark)**

مع أطيب التمنيات

الاستاذ الدكتور/ أبوالحجاج عبدالعزيز هرماس

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|---|---|---|
| كلية العلوم جامعة أسيوط | Final-term exam, 2nd semester, 2025/2026<br>Histochemistry (Z 316)<br>Time limit: 2 hours, Date: Friday, May. 15th, 2026<br>Total score: 50 marks, the test consists of 7 pages | جامعة أسيوط |

**Q1: Choose the correct answer from "A, B, C, or D", then put your answer inside the empty box, under the black arrow:** *(25 marks, one mark for each)*

| | | |
|---|---|---|
| 1 | **Which histochemical technique is used for the detection of free amino groups in proteins?**<br>A) Ninhydrin-Schiff method B) Sagaguchi method<br>C) Mercury orange method D) Millon's reaction | |
| 2 | **The histochemical method used to detect cholesterol and its ester is:**<br>A) Copper rubeanic acid method B) Schultz method<br>C) Calcium lipase method D) Acid hematin method | |
| 3 | **Acid hematin is a histochemical method used for the demonstration of:**<br>A) Cholesterol esters B) Phospholipids C) Triglycerides D) Plasmalogens | |
| 4 | **Which microscopy technique is used after staining with osmium tetroxide?**<br>A) Confocal microscopy B) Light microscopy<br>C) Fluorescence microscopy D) Electron microscopy | |
| 5 | **Which of the following methods is used to demonstrate antigens, antibodies, and antigen-antibody complexes in tissues and cells?**<br>A) Autoradiography B) Histological methods<br>C) Immunohistochemical methods D) Enzyme labeling | |
| 6 | **The structural unit of nucleic acids is:**<br>A) Monosaccharides B) Nucleotides C) Fatty acids D) Amino acids | |
| 7 | **The general chemical formula for carbohydrates is:**<br>A) $C_n(H_2O)_n$ B) $C_n(H_2O)_{2n}$ C) $C_n(H_2O)_{n+1}$ D) $C_n(H_2O)_{2n+1}$ | |

| | | |
|---|---|---|
| 8 | **Which method involves the simultaneous production and capture of primary reaction product (PRP) and final reaction product (FRP) in one incubating medium?**<br>A) Self-colored substrate B) Post-incubation coupling<br>C) Metal precipitation technique D) Simultaneous coupling | |
| 9 | **Which type of enzymes catalyze the rearrangement of chemical bonds within a molecule?**<br>A) Ligases B) Transferases C) Isomerases D) Hydrolases | |
| 10 | **What enzyme is commonly used to illustrate lysosomes?**<br>A) Alkaline phosphatase B) Acid phosphatase<br>C) Dehydrogenase D) Esterase | |
| 11 | **Which of the following staining reactions for proteins depends on their physical configuration rather than their chemical composition?**<br>A) Sagaguchi method B) Ninhydrin-Schiff method<br>C) Mercury orange method D) Masson's Trichrome stains | |
| 12 | **What are the monosaccharide units that compose sucrose?**<br>A) Glucose and fructose B) Glucose and galactose<br>C) Glucose and mannose D) Glucose and ribose | |
| 13 | **Which histochemical method is used to demonstrate free fatty acids?**<br>A) Copper rubeanic acid method B) Acid hematin method<br>C) Schultz method D) Calcium lipase method | |
| 14 | **Which microscopy technique is used to identify crystalline cholesterol and cholesterol esters?**<br>A) Polarizing microscopy B) Fluorescent microscopy<br>C) Transmission electron microscopy D) Scanning electron microscopy | |
| 15 | **What type of bond links monosaccharide subunits in a polysaccharide?**<br>A) Peptide bond B) Hydrogen bond<br>C) Ionic bond D) Glycosidic bond | |
| 16 | **What is the substrate used to visualize peroxidase activity in immunoenzyme staining?**<br>A) Hematoxylin B) Alcian Blue C) Eosin D) Diaminobenzidine (DAB) | |

| | | |
|---|---|---|
| 17 | **What cellular structures can be visualized using dehydrogenase and ATPase enzymes?**<br>A) Nuclei B) Golgi apparatus C) Mitochondria D) Lysosomes | |
| 18 | **Which staining method is specific for glycogen?**<br>A) Alcian Blue stain B) PAS stain<br>C) DPAS stain D) None of the above | |
| 19 | **Which method involves the precipitation of colored PRP at the site of enzyme activity?**<br>A) Self-colored substrate B) Post-incubation coupling<br>C) Metal precipitation technique D) Simultaneous coupling | |
| 20 | **Which of the following is a pyrimidine base?**<br>A) Adenine B) Cytosine C) Guanine D) Inosine | |
| 21 | **Which method is used to demonstrate triglycerides in histochemical methods for lipids?**<br>A) Copper rubeanic acid method B) Acid hematin method<br>C) Schultz method D) Calcium lipase method | |
| 22 | **What color does the PAS stain produce in areas where carbohydrates are present?**<br>A) Blue B) Magenta C) Yellow D) Green | |
| 23 | **Which of the following is NOT an example of a simple protein?**<br>A) Albumin B) Fibrin C) Glycoproteins D) Reticulin | |
| 24 | **When osmium tetroxide is reduced by unsaturated fatty acids and their esters, it turns into a:**<br>A) White oxide B) Yellow oxide C) Black oxide D) Red oxide | |
| 25 | **Which histochemical method is specifically used to demonstrate DNA?**<br>A) Feulgen method B) Basophilia<br>C) Acridine red method D) Methyl Green Pyronin method | |

**Q2: Write the letter (T) if the statement is true, and write the letter (F) if the statement is false, then put your answer inside the empty box, under the black arrow:**

*(15 marks, one mark for each)*

| | | |
|---|---|---|
| 26 | Verbascose is an example of an oligosaccharide that contains 3 monosaccharide units. | |
| 27 | The staining reactions for proteins or protein-containing substances depend on their amino acid composition. | |
| 28 | Formaldehyde is the best routine fixative for lipid histochemical methods. | |
| 29 | The Sagaguchi method is a histochemical technique used for the detection of tyrosine in proteins. | |
| 30 | Glycogen is a homopolysaccharide composed of only one type of monosaccharide subunit. | |
| 31 | In Immunohistochemical methods, most of disadvantages of fluorochrome have been overcome by using of enzyme-labeling of the antibodies especially with the horseradish peroxidase. | |
| 32 | Histochemical demonstration of proteins is possible only in fresh tissue due to their high sensitivity. | |
| 33 | Cerebrosides are a type of glycolipids that consist of a fatty acid linked to sphingosine and a single carbohydrate residue. | |
| 34 | Proteins are involved in the synthesis of hormones, such as testosterone and estrogen. | |
| 35 | Alcian Blue stain is a histochemical method used to detect acidic polysaccharides in tissue samples. | |
| 36 | Sudan Black B is an appropriate histochemical method for the demonstration of phospholipids. | |
| 37 | In the Malachite green and Acridine red histochemical method, DNA is stained red, and RNA is stained green. | |
| 38 | A nucleotide is an organic molecule formed of a nitrogenous base, a six carbon-sugar, and a phosphate group. | |

| | | |
|---|---|---|
| 39 | Metachromasia is the phenomenon where certain dyes or stains exhibit a color change or shift when they bind to specific tissue components. | |
| 40 | Peptide bonds are the type of bond that links monosaccharide subunits in a disaccharide. | |

**Q3: Write short notes on <u>five only of the following eight topics</u>:** *(10 marks, 2 marks for each)*

**1- Metachromasia.**

**2-. Simultaneous coupling method**

**3-. Lyophilization**

**4- Feulgen method, indicating its principle.**

**5-. Oligosaccharides, with one example**

**6- Indirect fluorescent antibody method.**

**7- Oil-soluble dyes, indicating their basic concept, with one example.**

**8- Periodic Acid-Schiff (PAS) stain, indicating its principle.**

**<u>Write the numbers of the five selected topics in the box below</u>**

| **<u>Selected topics</u>** | | | | | |
|---|---|---|---|---|---|

| | | | |
|---|---|---|---|
| | Assiut University- Faculty of Science<br>Second Semester- Final Exam 2025-2026<br>Chemistry Department | Program: Special Chemistry<br>Level : (3)<br>Date: 17/5/2026<br>Time: 3 hours | |
| Course Title: Physical Chemistry III | | | Code: 332 Chem |
| Instructors: Prof. Dr. AbdelRahman A. Dahy and Prof. Dr. Mostafa Farrag | | | |
| Important: | No. of pages 2 | No. Of questions 3 | Total Mark: 50 degree |

**Answer the following questions:** **(50 Marks)**

***Question I-Quantum Chemistry Questions:*** *Answer the following questions* *(17 Marks)*

A) Drive Schrödinger equation from the simple harmonic motion of a microscopic particle revolving around center in a circle with a radius r.

B) Answer *only two* from the followings:

1-Drive the quantized energy relation for a rotating microscopic particle in a circle using De Broglie relation.

2- Calculate the ground state energy and its a companied wavelength for an electron moving in a linear molecule with length 0.77658 nm.

3- The spectra of hydrogen chloride molecule consists from equal distances spectral lines and separated from each other by $6.26 \times 10^{11}$ Hz. Calculate its bond distance in Ångstrom.

***Question II- Molecular Spectroscopy Section:*** *(17 Marks)*

**A) Answer the following questions:** **(10 Marks)**

1- A NMR spectrometer operating at a 60 MHz frequency gives proton spectra at a field of 1.4092T. At what field would the $^{11}B$ spectrum be observed at 60 MHz. (for $^{11}B$, I=3/2, g=1.792, $\mu_N = 5.0504 \times 10^{-27}$ $JT^{-1}$).

2- Write the rule of mutual exclusion, and show when $N_3^-$ ion will be infrared active and when Raman active.

3- The ESR frequency for a free electron is 9000 MHz. Calculate the magnetic field at which the ESR spectrometer is working. (Bohr magneton $\beta = 9.273 \times 10^{-24}$ $JT^{-1}$, g value = 2).

4- Explain how the electron charge cloud around an atom or molecule is distorted, when UV-Vis light is absorbed or emitted by the atom or molecule.

**B) State which of the following statements are true (T) and which are false (F):** **(3.5 Marks)**

1- Absorption increases the intensity of light. ( )
2- Dichroism is independent of polarization direction. ( )
3- Phosphorrescence involves delayed emission of light. ( )
4- Emission spectra and absorption spectra provide similar information about energy levels. ( )
5- In Rayleigh scattering, frequency of scattered light changes. ( )
6- In asymmetric top molecule, two moments of inertia are equal and the third is equal to both or zero. ( )
7- Symmetric stretching in $CO_2$ is Raman active. ( )

**C) Choose the correct answer for each point of the following questions:** **(3.5 Marks)**

1- Optical rotation is measured using a
a) Spectrometer b) Polarimeter c) Calorimeter d) Photometer

2- Reduction in intensity of light passing through a substance is called
a) Emission b) Reflection c) Absorption d) Refraction

3- Dependence of absorption on polarization direction is called
a) Fluorescence b) Dichroism c) Phosphorescence d) Refraction

4- Emission of light immediately after absorption is called
a) Phosphorescence b) Diffusion c) Reflection d) Fluorescence

5- The direction of the incident beam of the light can be changed by
a) Reflection b) Diffraction c) Polarization d) Scattering

6- The beam of light can be decomposed into other beams by
a) Reflection b) Diffraction c) Polarization d) Refraction

7- If light absorption leads to formation of reactive substances, the process is
a) Ionization b) Diffusion c) Polarization b) Photochemical reaction

## *Question III- Kinetic Theory of Gases Section:* *(16 Marks)*

**A) Answer the following questions:** *(10 Marks)*

1- For molecular carbon dioxide ($CO_2$) at 25 °C, calculate the collision frequency $z_{11}$ and the collision density $Z_{11}$ at a pressure of 1 μbar. The collision diameter of carbon dioxide is 0.464 nm.

2- Drive the probability density equation ($F(\varepsilon)d\varepsilon$) and plot $F(\varepsilon)$ for the molecular translational energy of an ideal gas molecular at 300 K versus the energy ($\varepsilon$).

3- What is the mean free path for oxygen at 25 °C and 0.1 Pa pressure? where the collision diameter of oxygen is 0.361 nm.

4 - The vapor pressure of solid beryllium was measured by using a Knudsen cell. The effusion hole was 0.318 cm in diameter, and they found a mass loss of 9.54 mg in 60.1 min at a temperature of 1457 K. What is the vapor pressure?

***B)* State which of the following statements are true (T) and which are false (F):** *(3 Marks)*

1- Gas particle occupy a large portion of the container volume. ( )
2-Collisions between gas particles result in loss of total energy. ( )
3- Temperature is proportional to average kinetic energy. ( )
4- Different gases at the same temperature have different average kinetic energies. ( )
5- The collision frequency of a gas is inversely proportional with the mean speed. ( )
6- In general, the speed distribution curve is wider (broader) at higher temperature than that at lower temperature. ( )

**C) Choose the correct answer for each point of the following questions:** *(3 Marks)*

1- The volume of gas particles compared to the container volume is
A) Large B) Equal C) Negligible D) Variable

2- Between collisions, gas particles move in
A) Curved paths B) Circular paths C) Zigzag motion D) Straight lines

3- At the same temperature, different gases have
A) Same average kinetic energy B) Different average kinetic energies
C) Zero kinetic energy D) Infinite energy

4- Absolute zero corresponds to
A) Maximum pressure B) Zero volume C) Infinite motion D) Zero kinetic energy

5- If temperature increases and pressure is constant, the gases will
A) Contract B) Expand C) Condense D) Freeze

6- Gas molecules act independently when
A) They collide B) There are strong forces between them
C) Temperature is zero d) There are no interactions between them

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($R = 0.082$ L atm $K^{-1}$ $mol^{-1}$, 8.314 J $K^{-1}$ $mol^{-1}$, 1.987 cal $K^{-1}$ $mol^{-1}$, Avogadro's number = $6.022 \times 10^{23}$, $h = 6.626 \times 10^{-34}$ $JT^{-1} = 6.626 \times 10^{-34}$ JS, $m_e = 9.1 \times 10^{-31}$ kg, $K = 1.381 \times 10^{-23}$ $JK^{-1}$, speed of light $3.0 \times 10^{10}$ cm $s^{-1}$, the atomic mass of H = 1, Be= 9.012, C = 12, N = 14, and O = 16, Cl=35 g/mol, $\pi$=3.14).

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**End of Exam**

Best Wishes Prof. Dr. AbdelRahman A. Dahy Prof. Dr. Mostafa Farrag

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|---|---|---|---|
| | **Assiut University- Faculty of Science**<br>**Second Semester- Final Exam 2025-2026**<br>**Chemistry Department** | **Program: Organic Chemistry**<br>**Level : (3)**<br>**Date: 14 /5/2026**<br>**Time: 3 h** | |
| **Course Title: Natural Products Chemistry and Biochemistry** | | | **Code: 312 C** |
| **Instructors: Prof. Dr. Adel Mohamed Kamal El-Dean – Prof. Dr. Abdel Aal Mohamed Gaber** | | | |
| **Important:** | **No. of pages 2** | **No. Of questions 5** | **Total Mark: 50 degree** |

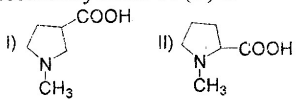
## Section A: Natural Products Chemistry (25 Marks)

**1. Write on the following:** (8 Marks)

**a)** Prove by equation, connection of N-methyl pyrrolidine is 2'- or 3'- with C3 of pyridine in nicotine via quaternary ammonium salts.
**b)** Starting with 6-methylheptanone, how you can synthesis of a-ionone
**c)** Starting with nerolidol, synthesis of phytol
**d)** Prove by equations that cholesterol has formula CnH2n-6 and contains Diel's hydrocarbon
**e)** Conversion of tropine into pimelic acid.

**2. Discuss the following:** (8 Marks)

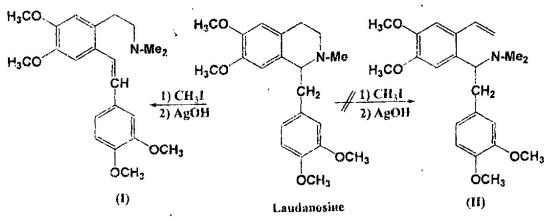
**a)** Conversion of phenol into papaverine.
**b)** Terpene (A) is an optically active liquid formula $C_{10}H_{18}O$. Its hydrogenation ($H_2$ +Pt) of (A) gives optically inactive a $C_{10}H_{20}O$ product (B). Heating of (B) with conc. $H_2SO_4$ gave (C), $C_{10}H_{14}$.Ozonolysis of (A) followed by dilute $KMnO_4$ treatment yields (D) acid ($C_7H_{10}O_4$) as the only identified product.
**c)** Prove that the decarboxylation of (II) more easily than in (I)




**d)** Starting with benzene, synthesis of tropic acid
**e)** Prove by equations that Oestrone has C=O and OH phenolic

**3. Explain the following points:** (9 Marks)

a) Synthesis of tropinone via action of 2,5-dimethoxy tetrahydrofuran
b) Reaction of epiphridine with HCL /heat gave two suggested epiphridine structure, how can you differentiate between them by Hoffman exhaustive methylation.
c) Conversion of allo cholanic acid into 1,2-dimethyl phenanthrene
d) Conversion of methyl vinyl ketone into Vit A2
e) Give a reason, Hoffmann exhaustive methylation of laudanisine give compound (I) not compound (II)



## Section B: Biochemistry (25 Marks)

**4. Answer the following questions: ..... .(15 Marks)**

a. What is the difference between DNA and RNA.
b. Draw the types of nucleic bases present in DNA and RNA
c. Show by equation with example the Gabriel method for preparation of amino acids.
d. Show by equation how you can elucidate the structure of lactose.
e. Define the Caramelization of sugars and show by equations what happens during Caramelization.
f. Show by equations the effect of the following reagents on amino acids:
i. $CHCl_3/KOH$ ii. NOCl iii. $Ba(OH)_2$
g. Show by equations the Strecker Synthesis of amino acids
h. Show by drawing structure the difference between ADT and ATP structures

**5. All the following statements are wrong, rewrite the correction for each one.... (10 Marks)**

1. Treatment of glucose with hot hydriodic acid (HI) this gave sorbitol.
2. Reduction of glucose using $NaBH_4$ gave the hexane as major product.
3. Oxidation of glucose gave the corresponding dicarboxylic acid (glucaric acid) using $Ag_2O$ or $Br_2/H_2O$.
4. Glucose and other saccharides are extensively cleaved by periodic acid, This oxidative cleavage, known as the Millard reaction.
5. Mannose and glucose giving the same ozazone, this means that both glucose and Mannose are present in D form.
6. D-sugars meaning the OH attached with carbon No. 2 pointing to left.
7. all disaccharides (lactose, cellobiose, maltose and sucrose) are reduced sugars
8. Cyclic Glucose containing four chiral centers
9. Tollens' reagent is the best reagent for distinguishing aldoses from ketoses.
10. The two anomers of lactose refer to Galactose part.

انتهت الأسئلة

*Best Wishes*
*Prof. Adel Kamal El-Dean*
*Prof. Abdel-Aal Gaber*

كلية العلوم
جامعة أسيوط

كلية العلوم - جامعة أسيوط

**Final Exam: Physiology 1I (310Z)** **Time: Two Hours**
**Chemistry/Zoology Students** **Second Semester 2025/2026**

## 1-Choose the correct answer: (8 marks)

**1-The function of the cerebrospinal fluid is to.....**
a. Protect the brain b. Provide nutrients to the surrounding tissues c. Remove waste products d. All of the above

**2-Neurons receive signals through their..... and send signals to other neurons through their.....**
a. dendrites..... receptor b. terminal arborization .....cell bodies and dendrities c. cell bodies and dendrities ... axon d. transmitters vesicles ... axon

**3- Oligodendrocytes are located in the.....**
a. PNS b. CNS c. ANS d. All are True

**4. Which of the following types of cells is common in the CNS?**
a. Astrocytes b. Oligodendrocytes c. Ependymal cells d. All are True

**5- Which of the following is not considered a catecholamine?**
a. Dopamine b. Norepinephrine c. Serotonin d. Epinephrine

**6- Excessive polarization due to GABA is created due to the opening of .....channels.**
a. Ca++ b. Cl- c. K+ d. Na+

**7-Which of the following neurotransmitters acts as a natural opiate?**
a. dopamine b. serotonin c. endorphins d. epinephrine

**8-Thalamus is.....**
a. main sensory input center b. Sorts and relays information from all senses to higher level brain centers. c. Receives signals from parts of the brain which regulate emotion. d. All are True

**9- The name of the cranial nerve which formed by the union of a cranial root and a spinal root is.....**
a. Optic nerve b. Vagus nerve c. Fascial nerve d. Accessory Nerves

## II- Put True (T) or False (F) for each one: (8 marks)

1-Neuroglia comprise all the non-neural cells of the CNS, which form almost half the total mass of the CNS. ( )

2.Liposomes loaded with nanoparticles gain access through the BBB. ( )

3-The activation of ACh receptors by the binding of ACh leads to an influx of Na+ into the cell and an efflux of K+, resulting in a depolarization of the postsynaptic neuron and the initiation of a new action potential. ( )

4-The greatest concentration of serotonin 5HT is found in the enterochromaffin cells of the gastrointestinal tract. ( )

5- Cerebral cortex m**akes up 80 % of total brain mass. It control the sophisticated behavior and have larges surface area to body mass ratio.** ( )

6- Lateral horns - located ONLY in thoracic and lumbar regions contain *visceral motor cell bodies* ( )

7- *Lumber plexus it* found on first four lumber vertebrae (L1-L4). It is innervate lower abdomen and anterior medial portions of the hind limb. ( )

8- Sensory receptors can adapt either partially or completely to any constant stimulus after a period of time. ( )

9- Mediators of pain includes bradykinin, serotonin, histamine, acids, and proteolytic enzymes. ( )

**III- Answer on Three OLY of the following questions: (9 Marks)**

**1- Compare between the chemical and electrical synapse.**

**2- Mention the homeostatic and involuntary functions of medulla oblongata.**

3- Write on the *Structural Differences between the* sympathetic and parasympathetic nervous system

Good luck

*Dr. Hossam El-Din M Omar, Prof. of Physiology*

## Part (2): Endocrinology

### Q1: Choose the correct answer (5 marks)

**1. What is the function of parathyroid hormone (PTH)?**

a) Stimulate milk production
b) Increase blood calcium levels
c) Decrease blood glucose levels
d) Regulate blood pressure

**2. What is the role of oxytocin during childbirth?**

a) Stimulate milk production
b) Stimulate uterine contractions
c) Promote calcium absorption
d) Regulate blood sugar

**3. What is the primary function of aldosterone?**

a) Stimulate stress response
b) Regulate blood sodium and potassium levels
c) Stimulate uterine contractions
d) Promote calcium absorption

**4. Which of the following hormones promotes the development of secondary sexual characteristics in females?**

a) Estrogen b) Progesterone c) Testosterone d) Prolactin

**5. Which of the following is the primary effect of glucagon?**

a) Decrease blood sugar levels
b) Stimulate fat storage
c) Increase blood sugar levels
d) Inhibit protein synthesis

**6. Hypothalamus is connected to the posterior pituitary by?**

a) Hypothalamo-hypophyseal portal veins b) Axon of Nerve cells c) Both d) None of these

**7. Due to excess secretion of vasopressin (ADH)?**

a) Urine become dilute b) Blood become thick c) Amount of urine decrease d) Blood pressure decrease

**8. Which of the following hormone increase the excretion of Ca2+ in the urine?**

a) Thyrocalcitonin hormone b) PTH c) T4 d) T3

**9. The target cells for the hormone ACTH are in the .....**

a) Posterior pituitary b) Anterior pituitary c) Adrenal cortex d) Hypothalamus

**10. The endocrine system is most accurately thought of as a ..... system.**

a) Neurotransmitter b) Hormonal c) Respiratory d) Cardiovascular

## Q2: Complete the following sentences (10 marks)

1. Glucagon is released by ..... when blood glucose levels are ..... and stimulates the liver to release .....

2. The adrenal medulla produces ..... and ....., which are involved in the body's response to stress and help increase ..... and .....

3. ..... hormone stimulates ovarian follicle maturation.

4. The active form of Vitamin D, ..... is converted from its precursor primarily in the .....

5. In down-regulation, a hormone..... the number or ..... of receptors for itself.

6. The rise of ..... hormone that occurs just before ovulation is a result of .....

feedback of estrogen on the anterior pituitary.

7. Factors inhibit growth hormone secretion..... , .....

8. Exocrine glands, such as ..... glands, secrete their products into special .....

9. The pancreas functions as an ..... gland via acinar tissue and an ..... gland via the Islets of Langerhans.

## Q3: Answer FIVE items only from the following (10 marks)

1. Compare and contrast endocrine and exocrine glands with examples.

2. Explain the mechanism of negative feedback in the regulation of hormone secretion.

3. Describe the physiological functions and regulation of Antidiuretic Hormone (ADH).

4. Discuss the metabolic actions of Growth Hormone (GH) on the body.

5. Outline the metabolic functions of thyroid hormones (T3 and T4).

6. Compare the functions of Parathormone (PTH) and Calcitonin in calcium regulation.

7. Explain the "Fight-or-Flight" response mediated by adrenal medullary hormones.

***Good luck***

Dr. Sohair Mohamed

Assiut university May, 2026

Faculty of Science Chemistry Department Time 3h

Final and oral exam of "Inorganic chemistry III" course code 324C for the third level students

( ملحوظة : الاسئلة في ثلاث صفحات)

Part I : Answer the following (18 Marks)

Complete the following (4 Marks)

i. .....is the most stable divalent ion among the divalent lanthanides .

ii. +7 oxidation state in actinide elements is known only for the elements.....and.....

iii. $Sc_2O_3$ is a .....base compared to lanthanide oxides.

iv. The first and second ionization energies of lanthanides are comparable to those of.....metals

B. Write in details on the following (6 Marks)

i. Points of similarities between the chemistry of lanthanides and that of actinides

ii. The problems arising to study the chemistry of actinides due to their extensive radioactivity .

iii. Different applications of actinides.

C. Give reasons for the following (6 Marks)

i. Actinides show higher oxidation states ranging from +4 to +7 while lanthanides exhibit a maximum oxidation stat of +4.

ii. $Sc(acac)_3$ (acac = acetylacetonate) sublimes upon heating.

iii. Uranium –oxide system is the most complex oxide system known.

D. Choose the correct answer A, B, C or D (2 Marks)

i. Among the quadrivalent lanthanides, it was found that one of the following quadrivalent lanthanide ions is sufficiently stable in solution as well as in solid state:

a) Ce(IV) b) Pr (IV) c) Tb(IV) d) Dy (IV)

انظر خلف!

$[Cr(H_2O)_6]^{2+}$, $[Cr(H_2O)_6]^{3+}$, $[Mn(H_2O)_6]^{2+}$ and $[Mn(H_2O)_6]^{3+}$

4-i- How many electronic transitions should be expected for $d^2$ and $d^4$ weak field octahedral complexes? Show their assignments.

i-Calculate the total pairing energy of $d^6$ complex ion in both HS and LS octahedral complexes, given mean pairing energy equals 22,400 $Cm^{-1}$.

5-i-State the different postulates of crystal field theory.

ii-The difference of calculated and experimental lattice energy of $Fe^{2+}$ high spin complex ion equals -226 $KJmol^{-1}$, estimate the crystal field splitting energy of this ion.

Atomic numbers: Cr=24, Mn=25, Fe=26, Ni=28, Cu=29, Pt=78.

Good Luck

Examiners: Prof. Dr. Aref A. M. Aly
Prof. Dr. Mohamed Abd El-Hakeem
Prof. Dr. Asma I. El-Said

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**Assiut University** **Date: 7-6-2026**

**Faculty of Science** **Time: 2h**

**Chemistry Department**

**Final Fertilizer Industry Chemistry Examination (Chem300)Third Year Industrial Students.**

**Answer the following questions:(50 M)**

**Question No.1(10M)**

1)Write four methods for determination of reactivity of rock phosphate.(2.5M)
2) Explain the Heber –Bosh method for production of ammonia $NH_3$ .(7.5M)

**Question No.2(10M)**

1) Choose the correct answer:(2.5M)
a) The emission of sulfur dioxide gas according to the Egyptian Environmental Law 2015 equal (1500-800-450) $mg/m^3$ in production of $H_2SO_4$ acid by contact process.
b) The emission of fluorine gas according to the Egyptian Environmental Law 2015 equal (15-5-20) $mg/m^3$ in production of SSP .
2) Explain how sulfuric acid is produced by contact prosess and write the equation of the reaction.(7.5M)

**Question No.3(10M)**

1)Write the structure of pure fluorapatite .(2.5)
2)There are two methods for production of phosphoric acid explain one of these methods with equation. (7.5M)

**Question No.4(10M)**

1) Write the equation for production of these fertilizers:
Di-ammonium phosphate(DAP)-Mono ammonium phosphate(MAP)- Single superphosphate(SSP)-Potassium sulfate - Ammonium sulfate (AS)-Ammonium Nitrite (AN).(7.5M).
2)Write the conditions Process operating variables in urea production.(2.5M)

**Question No.5 (10M)**

1) What is the purpose of Primary and Secondary reforming for ammonia production. (2.5M)
2) What is the advantage of direct granulation of TSP. (2.5M)
3) Write the basic chemical reaction involved in production of triple superphosphate( TSP). (2.5M)
4) Write the reaction mechanism of $V_2O_5$ catalyst using in production of $H_2SO_4$ by contact process. (2.5M)

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**Good luck** **Dr. Atef .H. Ali**

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| | **Assiut University- Faculty of Science**<br>**Second Semester-**<br>**Final Exam 2025-2026**<br>**Chemistry Department** | **Program: Chemistry Science**<br>**Level: (2)**<br>**Date: 1/June/2026**<br>**Time: 2 h** | |
| **Course Title: Green Chemistry for the 2nd Level NanoTech. Students** | | **Code: 311C** | |
| **Instructors: Prof. Dr. Hassan Abdou Kotb Abd El-Aal** | | | |
| **Important: 2 St** | **No. of pages: 3** | **No. of questions: 2** | **Total Mark: 50 degree** |

**Answer all of the following questions? (50 Marks)**

**1- Choose the correct answer for *ALL* of the following? (20×2 = 40 Marks)**

**( ترصد الأجابة النهائية في الجداول بعد كل السؤال )**

**1-Which of the following sentences is *NOT TRUE* for DDE?**

a) Produced slowly during environmental degradation of DDT.
b) Used as a fungicide for cereal crops.
c) Interferes with the enzyme that regulates the distribution of birds, fish and humans calcium.
d) Soluble in fat and animal tissues

**2-Which of the following is *NOT* considered as chemical disposal methods of PCBs?**

a) Substitution of a chloride ion with H by using of NaH
b) Substitution of chlorine by polyethylene glycols for $2h/N_2$
c) Hydrogen cleavage of C-Cl bond and biphenyl nucleus using copper catalyst
d) Uses of $C_{10}H_8Na$ which results in the expulsion of a chloride ion

**3-Which of the following sentence is NOT TRUE for the Troposphere oxidation of Methane?**

a) Soluble in water
b) No multiple bonds
c) Do not absorb sunlight
d) Slow oxidation initiated by $HO^{\bullet}$

**4-Protection mechanism of inorganic active ingredients against UV rays is by ------.**

a) absorbing UV light
b) dissipating UV light
c) reflecting UV light
d) adsorbing UV light

**5-Benomyl can be synthesized by the reaction of ----- with ----- followed by addition of ----- and finally reaction of the later intermediate with -----.**

a) cyanamide & o-$C_6H_4(NH_2)_2$ & methyl chloroformate & $CH_3NCO$
b) cyanamide & methyl chloroformate & o-$C_6H_4(NH_2)_2$ & $C_4H_9NCO$
c) methyl chloroformate & o-$C_6H_4(NH_2)_2$ & cyanamide & PhNCO
d) o-$C_6H_4(NH_2)_2$ & cyanamide & methyl chloroformate & $C_5H_{11}NCO$

**6-What is going on if there is no nitrogen oxides present over antarctic zone?**

a) The $Cl_2$ molecule is broken down by solar radiation producing two chlorine $Cl^{\bullet}$
b) Nitric acid is incorporated into the polar stratospheric clouds (PSC)
c) HCl and $ClONO_2$ react with each other to produce $Cl_2$ and $HNO_3$.
d) Chlorine radicals start a catalytic reaction chains leading to ozone destruction.

| 1 | 2 | 3 | 4 | 5 | 6 |
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ملحوظة: الأختبار مكون من ثلاث صفحات