

II) Put (T) true or (F) false for the following statement (1 mark x 25):

1	<i>Streptococcus pneumoniae</i> vaccine prepared from bacterial capsule is a subunit vaccine	
2	Passive immunity obtained after clinical or subclinical infection	
3	Activated T helper 17 secretes TNF that recruits neutrophils and induce inflammation	
4	Toxoid while loses its toxicity, remains is immunogenicity	
5	The membrane attack complex in the complement pathway consists of C5b, 6, 7, 8, 9	
6	Memory cells are performed after active immunity and passive immunity	
7	T cells can see and respond to antigens associated with MHC molecules on antigen presenting cells	
8	Movement of cells toward objects in response to chemical agents called chemotaxis	
9	Macrophages play a similar role of cytotoxic T cells but unlike Tc cells its action is not restricted by MHC	
10	"Magic bullet" therapy is done by using monoclonal antibodies to tumour specific antigens alone or after coupling to cytotoxic agents	
11	In type III hypersensitivity, Neutrophils are attracted by C5b and bind immune complexes by their Fc receptors and release lysosomal enzyme causing tissue damage	
12	Graft rejection is performed only by type III hypersensitivity	
13	Penicillin, anesthetics and insect venom are common antigens associated with Type V hypersensitivity	
14	T cell receptor is composed of a dimer of alpha (α) and beta (β) chains which is non-covalently associated with CD3 complex.	
15	Adjuvants boost the immune response when an Ag has high immunogenicity	
16	Transfer of antibodies From the mother to the fetus through the placenta is a type of artificial passive immunity	
17	Bacteria are cleared from the blood stream mainly by spleen.	
18	TNF α is An example of a cytokine produced by activated macrophages with a major role in the innate immune response.	
19	The sequelae associated with exposure to superantigen is due to release of large amount of Cytokines.	
20	Once T cells leave the bone marrow they are completely immature.	
21	Substances that enhance the immunogenicity of molecules without altering their composition are termed adjuvants.	
22	B cells mature in the Thymus while T cells mature in the bone marrow and gut associated lymphoid tissue (GALT).	
23	B cell receptors consist of IgM and IgD.	
24	The specificity of an antibody is due to the Light chains.	
25	First immunoglobulin class produced in primary response to an antigen is IgE.	

GOOD LUCK

	Assiut University- Faculty of Science Second Semester- Final Exam 2025-2026 Chemistry Department	Program: Chemistry Level: four Date: May 24, 2026 Time: 3 hours	
Course Title: Selected Topics in Organic Chemistry		Code: 414 C.	
Instructors: Prof. Dr. Hussein El-Kashef and Prof. Dr. Ahmed Abdou O. Abeed			
Important:		Total Mark: 50	

Answer the following Two sections: (50 Marks)

Section (A): Chemotherapy (17 Marks)

Q1. Answer the following questions:

- 1- Synthesis of chloramphenicol (one method only). (3 points)
- 2- Structure elucidation of compound A (C_6H_9ONS) of vitamin B1. (5 points)
- 3- The synthesis of Penicillin. (3 points)
- 4- What is histamine? Show how histamine is released in the body, and what does histamine do? (3 points)
- 5- The synthesis of Omeprazole (3 Points)

Section (B): Nucleic acids and Protein Synthesis (33 Marks)

Q2. Identify each type of mutation: (3 points)

- A. Cytidine (C) enters the DNA sequence.
- B. One adenosine is removed from the DNA sequence.
- C. A base sequence of TGA in DNA changes to TAA.

Q3. A. Write the complementary base sequence and the amino acids for the matching strand in the

following DNA section: —C C U—A G C—G G A—C U U— (4 points)

B. Draw the structures of the following drugs: (4 points)

1. Indomethacin
2. Ibuprofen
3. Acetylsalicylic acid
4. Chloramphenicol

Q4. Answer the following questions: (13 points)

1. What are nucleic acids (DNA & RNA) made of?

2. What is the difference between ribonucleic acids (RNA) and deoxyribonucleic acids (DNA)?
3. What is the function of Messenger RNA (mRNA), Transfer RNA (tRNA), and Ribosomal RNA (rRNA)?

Q5 Place the following statements in order of their occurrence in protein synthesis: (5 points)

- A. mRNA attaches to a ribosome.
- B. The ribosome moves along a mRNA to add amino acids to the growing peptide chain.
- C. A completed polypeptide is released.
- D. A tRNA brings an amino acid to its codon on mRNA.
- E. DNA produces mRNA.

Q6 What are the different stages of the protein synthesis?

(4 points)

Good luck

Department of Chemistry

Faculty of Science



Date: 10/6/2026

Time: 3 hours

**Final Examination of Selected Topics in Analytical Chemistry (C-444)
for 4th level Students**

(50 Marks)

Answer Only Five Questions:

- I. a) Write a brief account on solvent extraction.
b) For the extraction of benzoic acid from water into ether, write the relation between D & K_D , define each term used, explain the effect of pH on the extraction process.
c) Derive a mathematical equation that expresses successive extraction.
d) The distribution ratio between 3M HCl and tri-n-butylphosphate for $PdCl_2$ is 2.34. How many extractions must be performed with separate 10 mL portions of tri-n-butyl phosphate to remove 90% of $PdCl_2$ from a 30 mL of 7.0×10^{-4} M $PdCl_2$ solution?
- II. a) The extraction process of a metal chelate consists of four steps each with its equilibrium constant. Explain.
b) Drive an expression for the percent extracted of a solute.
c) Arsenic (III) is 70% extracted from 7M HCl into equal volume of toluene. What percentage will remain unextracted after three individual extractions with toluene?
d) Metal A was determined to be 95% extracted into methylene chloride with dithizone at pH 6.0 when equal volumes of aqueous and non-aqueous solvents were used. Metal B was 5% extracted under the same conditions. What is the separation efficiency for these two metals at pH 6.0?
- III. a) Define and characterize the following:
1. Absorptivity and molar absorptivity
2. Chromophore and auxochrome
b) Write on photometric titration of mixture of Bi^{3+} and Cu^{2+} with standard EDTA solution and Sketch the graph.
c) The absorption spectra of benzene in cyclohexane contains bands at 183, 204 and 265 nm.
1. Which band corresponds to the lowest energy transition?
2. Which band corresponds to the lowest wave number?
3. From $\lambda = 256$ nm, $\log \epsilon = 2.30$, determine the concentration of a solution which gives an absorbance 0.25 ($b = 1$ cm).
d) Describe the principles of fluorescence. Why is fluorescence generally more sensitive than absorption measurement?
- IV. a) Define and characterize the following:
1. Stock shift
2. Vibrational relaxation
b) Sometimes, the method of standard addition is used for the analysis of an analyte. Describe the method and its merits.

See next page...

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

d) A 7.5×10^{-5} M of KMnO_4 has a transmittance of 36.4 % when measured in a 1.0 cm cell at a wavelength of 525 nm, calculate:

1. The absorbance of this solution

2. The molar absorptivity of KMnO_4 .

V. a) What are the main components of a potentiometric cell?

b) Which equation is used to calculate the cell potential in potentiometric analysis? Define each term in it.

c) What is the source of the junction potential and how does it affect the measured potential?

d) List the different kinds of metallic indicator electrodes and explain only one of them.

VI. a) What is the function of the reference electrodes? List three different reference electrodes.

b) A standard solution of pH = 4 gives a potential $E_1 = 0.236$ V using the glass electrode and an unknown solution gives a potential $E_2 = 0.177$ V with the same electrode. What is the pH of the unknown solution?

c) Explain the different types of errors that affect pH measurements using glass electrode.

d) What are the ion-selective electrodes (ISE)? Describe only one of them.

Good Luck,,,

Examiners: Prof.Dr. Hassan Sedaira

Prof.Dr. Elham Y. Hashem

Dr. Mohamed Kotb



Assiut University- Faculty of Science
Second Semester- Final Exam 2025-2026
Chemistry Department

Program:
Nanotechnology
Level : (4)
Date: 3/6/2026
Time: 2h



Course Title: Cosmetic Technology

Code: (402 Chem.)

Instructors: Prof. Dr. Kamal Ibrahim Aly

Important: NA

No. of pages: 1

No. of questions: 7

Total Mark: 50 degree

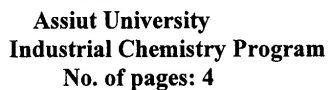
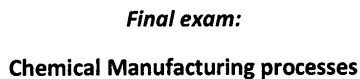
Answer Six Only from the following questions:

- 1) Explain in details, the classes of cosmetics according to skin, nails, hair and eyes?
- 2) Discuss briefly the classification of Cosmeceutical Products based on presently on the Market?
- 3) Explain the types of surfactants, showing each its type and its uses?
- 4) Discuss the meaning of Rheology Modifiers, its classification and applications?
- 5) What you mean by Cosmeceutical, Oral Cavity, and its common diseases?
- 6) Discuss the Gum problems, cause, its stage of diseases and its treatment?
- 7) Define the Humectants, its classification and mention the scope effects of general cosmetic products?

Good Luck

Examinér:

Prof. Dr. Kamal Ibrahim Aly



Faculty of Science
First semester 2025-2026
Time: 2 hrs.

Answer the following questions supporting your answers with sketches

Question No. 1

(30 Marks)

Choose the best correct answer A, B, C or D

1. A chemical reactor is designed to control temperature, pressure, and concentration during reactions.
A. True B. False
2. Settling zone must be calm in the clarifiers.
A. True B. False
3. A clarifier separates solids from liquids using gravity.
A. True B. False
4. Clarifiers increase turbulence to speed up settling.
A. True B. False
5. In crystallization process, fast cooling produces small crystals.
A. True B. False
6. Crystallization is widely used in pharmaceutical industries.
A. True B. False
7. Increasing mixing speed helps produce uniform crystals.
A. True B. False
8. Cyclone separators use centrifugal force.
A. True B. False
9. Air classifiers separate fine particles.
A. True B. False
10. Cyclone separators use gravity and centrifugal force.
A. True B. False
11. Pressure filtration can achieve higher flow rates compared to gravity filtration.
A. True B. False.
12. Ultrasonic humidifiers consume more energy than gas-fired humidifiers due to high-frequency waves.
A. true B. False
13. Spray chambers are unsuitable for large-scale industrial humidification.
A. true B. False
14. Increasing air-water contact area always guarantees maximum humidification efficiency regardless of operating conditions.

- A. True
15. Dehumidifiers help prevent mold growth.
A. True
16. Which reactor provides the highest mixing?
A. PBR (Packed bed reactor)
B. CSTR (Continuous Stirred-Tank Reactors)
17. One advantage of absorber-based systems is:
A. Low cost
B. High efficiency in cold climates
18. Pressure drop is a disadvantage of:
A. CSTR (Continuous Stirred-Tank Reactors)
B. Batch
19. The main purpose of a clarifier is:
A. Heating water
B. Solid-liquid separation
20. Distillation is widely used in:
A. Food industry
B. Water treatment
21. Which type of crystallization depends on evaporating part of the solvent?
A. Cooling crystallization
B. Evaporative crystallization
22. Adding many seed crystals results in:
A. Large crystals
B. Many small crystals
23. In the clarifiers the sludge thickening occurs in:
A. Overflow
B. Settling zone
24. Which dryer is used for powders like milk?
A. Tray dryer
B. Spray dryer
25. Spray dryers produce:
A. Liquids
B. Powders
26. Cyclone separators remove particles from:
A. Water
B. Air
27. Increasing pressure in a pressure filter will:
A. Decrease filtration rate.
B. Increase filtration rate.
28. The Ultrasonic Humidifier is characterized by:
A. High energy consumption.
B. Low efficiency.
- B. False
B. False
C. Batch
D. Fluidized bed
C. No energy use
D. No maintenance
C. PBR (Packed bed reactor)
D. Bioreactor
C. Chemical reaction
D. Filtration
C. Petroleum industry
D. Cement industry
C. Melt crystallization
D. Precipitation
C. No crystallization
D. Very slow growth
C. Sludge hopper
D. Weir
C. Freeze dryer
D. Rotary dryer
C. Gases
D. Sludge
C. Oil
D. Solids
C. Not affect filtration rate.
D. Stop filtration completely.

- C. Producing fine cool mist.
 D. Used only in cement plants.
29. The main purpose of evaporation is to:
 A. add water
 B. remove solvent
 C. reduce viscosity
 D. produce crystals
30. In evaporation process, the pressure..... from effect to effect:
 A. increases
 B. remains constant
 C. decreases
 D. depends on condenser

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30

Question No 3

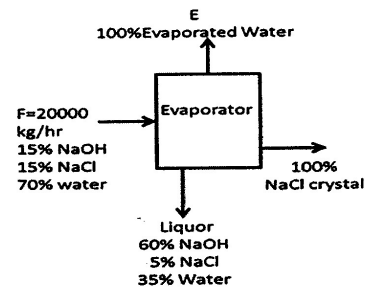
20 Marks

1. State the main control factors in the crystallization process?
2. Explain briefly, how a distillation column works, support your answer with net sketches?

3. Draw a net sketch for a rotary drum dryer?

4. An evaporator is feed continuously with 20000 kg/hr of a solution containing 15% NaOH, 15% NaCl and 70% water by weight. During the evaporation water is boiled off and NaCl is precipitates as a crystal and removed from the remaining liquor. The concentrated liquor leaving the evaporator contains 60% NaOH, 5% NaCl and 35% water. Assume the process is steady state. Calculate the following, kg/h?

- I. The amount of produced concentrated liquor.
- II. The amount of precipitated crystal salt.
- III. The amount of evaporated water.



Best wishes

Prof. Dr. Gemma Abdalla

Faculty of Science
Chemistry Department

Date: January 2026

Time: 2 Hours

Final Exam of Chemistry of Biomolecules (413 C) for double major Students
(Chemistry of carbohydrates, Amino acids & Proteins, Lipids and nucleic acids)

Note: Support your answer with Chemical equations whenever possible.

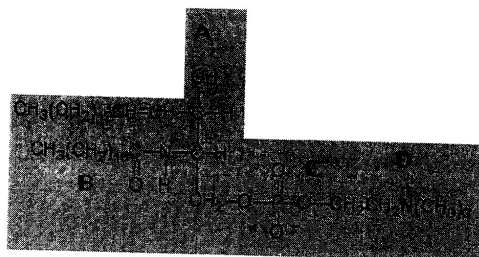
Answer on the Following Questions:

(50 Marks)

I]- Answer on Only Six of the following :

(6 X 5 = 30 Marks)

Q1- According to this figure answer the following question:
The diagram shows part of a phospholipid molecule



(i) This structure of this phospholipid is calcified as

(ii) Name the parts of the diagram labelled A, B, C and D.

Part A

Part B

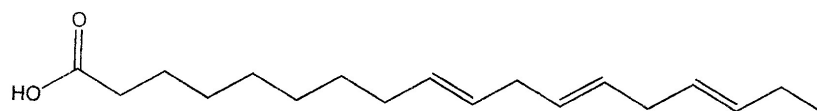
Part C

Part D

Q2- Show by equation Conversion of glucose to fructose?

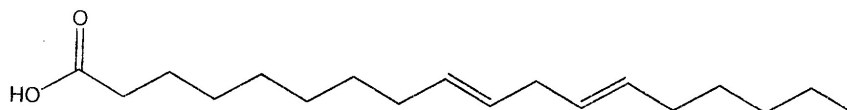
ملحوظة هامة : الأسئلة 5 صفحات

Q3- Write two different abbreviated chemical formula for each of the following acids:



Linolenic acid

.....
.....



Linoleic acid

.....
.....

Q4- Explain this statement (using chemical equations):

The Zwitter ion of an amino acid is amphoteric and may loss or gain a proton depending on the pH of the solution.

Q5- Show by equations how can you prove that Maltose is reducing sugar.

Q6- Explain this statement (using chemical structures):
Anomers and Epimers are two different types of diastereoisomers.

Q7- Preparation of alanine (amino acid) from phethalic acid. ?

II]- Choose the correct answer:

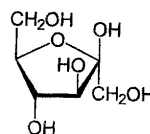
(1.5 X 14 = 20 Marks)

1- Oleic acid (omega- 9) is fatty acid.

- | | | | |
|--------------|---------------------|---------------------|-----------|
| a) saturated | b) mono-unsaturated | c) poly-unsaturated | d) strong |
|--------------|---------------------|---------------------|-----------|

2- Volatile short-chain fatty acids are water-soluble and volatile at room temperature, they are liquid in nature and contain carbon atoms.

- | | | | |
|--------|---------|----------|----------|
| a) 1-6 | b) 7-10 | c) 11-20 | d) 21-50 |
|--------|---------|----------|----------|



3- The name of this structure is

- | | |
|----------------------------------|--------------------------------|
| a) α - D- Fructofurranose | b) α - D- Glucopyranose |
| c) β - D- Fructofurranose | d) β - D- Glucopyranose |

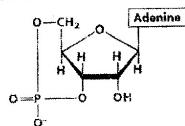
4- Oleic acid (omega- 9) is fatty acid.

- | | | | |
|--------------|---------------------|---------------------|-----------|
| a) saturated | b) mono-unsaturated | c) poly-unsaturated | d) strong |
|--------------|---------------------|---------------------|-----------|

5- Arabinose through Kiliani synthesis convert to

- | | | | |
|------------|-------------|------------|-------------|
| a) Glucose | b) Fructose | c) Mannose | d) Sorbitol |
|------------|-------------|------------|-------------|

6- Choose the correct name of the following compound:



- | | |
|--|--|
| a) adenosine-3',5'- cyclic monophosphate | b) adenine-3',5'- cyclic monophosphate |
| c) adenosine-3',5'- cyclic diphosphate | d) adenine-3',5'- cyclic diphosphate |

7- The action of conc. HCl on glucose convert it to

- | | |
|-----------------------------------|------------------------------------|
| a) methyl- β -glucopyranose | b) 5- hydroxymethyl furfuraldehyde |
| c) gluconic acid | d) sorbitol |

8- Green soap (or soft soap) is soap.

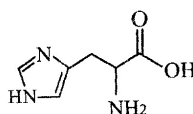
- | | | | |
|-----------|--------------|------------|--------------|
| a) sodium | b) potassium | c) calcium | d) magnesium |
|-----------|--------------|------------|--------------|

9- Esters of fatty acids with higher molecular weight monohydric alcohols.

- | | | | |
|----------|-----------------|-------------------|-------------------------|
| a) Waxes | b) Neutral fats | c) Derived lipids | d) β - Sitosterol |
|----------|-----------------|-------------------|-------------------------|

10- Fats and oils are hydrolyzed into their constituents (fatty acids and glycerol) by the action of

- | | | | |
|-----------------------|-------------------|-----------|------------------|
| a) super heated steam | b) acid or alkali | c) enzyme | d) All the above |
|-----------------------|-------------------|-----------|------------------|



11- Histidine classified as

- | | |
|----------------------------------|-----------------------------------|
| a) monoamino monocarboxylic acid | b) diamino monocarboxylic acid |
| c) triamino monocarboxylic acid | d) tetraamino monocarboxylic acid |

12- It is used for detection of hydrolytic rancidity because it measures the amount of free fatty acids present.....

- | | |
|--------------------------|--------------------------|
| a) Acid value | b) Iodine number |
| c) Saponification number | d) Richert-Meissl number |

13- Galactose and Glucose are

- | | | | |
|---------------|---------------|---------------|---------------|
| a) C5 epimers | b) C4 epimers | c) C3 epimers | d) C2 epimers |
|---------------|---------------|---------------|---------------|

14- Peptide linkage is the special name given to the amide bond between the

- | | |
|---|--|
| a) α -carboxyl group of one amino acid and the α -amino group of another. | b) β -carboxyl group of one amino acid and the α -amino group of another. |
| c) α -carboxyl group of one amino acid and the β -amino group of another. | d) β -carboxyl group of one amino acid and the β -amino group of another. |

1	2	3	4	5	6	7	8	9	10	11	12	13	14



**Final Examination of Biochemistry (413 C)
For 4th Year Students**

Answer the following questions:

(50 Marks)

Q1: Show the difference between the following items.

(4x5=20 marks)

- A- Classification of Carbohydrates.
- B- Types of Vitamins.
- C- Fats – Oils.
- D- Biological role of Proteins.

Q2: Write True (T) or False (F) for the following statements. (15x1=15 marks)

- 1- All carbohydrates are polyhydroxy aldehydes or ketones or compounds that hydrolyze to produce them. ()
- 2- Glucose provides energy for the brain and ½ of energy for muscles and tissues. ()
- 3- Monosaccharides contain chiral carbon atoms. ()
- 4- A reducing sugar is a sugar with an aldehyde group that reduces a metallic oxidizing agent. ()
- 5- A strong oxidizing agent such as HNO₃ can oxidize the aldehyde and the alcohol groups. ()
- 6- Cellulose is a polymer of glucose that forms plant cell walls. ()
- 7- Maltose is a disaccharide with an α(1, 4) glycosidic link between (C1 , C4) OH of 2 glucoses. ()
- 8- Lipids are compounds of biological origin that dissolve in non-polar solvents, such as chloroform or diethyl ether. ()
- 9- Lipids include fats, oils, terpenoids, phosphatides, waxes and related compounds. ()
- 10-Lipoproteins are important cellular constituents that are present both in the cellular and subcellular membranes. ()
- 11-Cholesterol enters in membrane structure and is used for synthesis of adrenal cortical hormones, sex hormones vitamin D₃ and bile acids. ()
- 12-Diastereomers are stereoisomers that are not enantiomers. ()
- 13-Epimers, two sugars that are different only in the configuration around one carbon atom. ()
- 14-Chiral centers are carbon atoms which have 5 different atoms bonded to it. ()
- 15-Amino acids bind with each other by glycosidic bond to produce proteins. ()

Q3: Choose the correct answer.

(15x1=15 marks)

- 1- Lactose is a disaccharide, formed from.....
a) 2 Glucose b) 2 Fructose c) Glucose, Galactose d) All of above
- 2- are reducing sugars because they contain an aldehyde group in their open-chain form.
a) Acetic acid b) Aldoses c) Ketoses d) Carboxylic acid
- 3- Reaction of glucose with Fehling's solutions produces.....
a) Glyconic acid b) Acetic acid c) formic acid d) Not react
- 4- Fructose is an optically active compound which contains.....chiral carbon atoms.
a) 4 b) 5 c) 6 d) 3
- 5- is a polysaccharide formed from poly glucose monomers.
a) Ammonia b) Lactose c) Starch d) Fructose
- 6- Maltose is a Sugar.
a) Reducing b) Oxidizing c) Basic d) All of above.
- 7- Glucose has isomers.
a) 17 b) 16 c) 12 d) 10
- 8- Monosaccharide can be oxidized by
a) Fehling's solutions b) Tollen's reagent c) HNO_3 d) All of above
- 9- Sucrose is a disaccharide produced from binding glucose and fructose monomers by bond.
a) Ionic b) Covalent c) Glycosidic d) Chelating
- 10- Monosaccharides have as a general formula.
a) $\text{C}_n\text{H}_{2n-2}$ b) $\text{C}_n\text{H}_{2n}\text{O}_n$ c) C_nH_{2n} d) $\text{C}_n\text{H}_{2n}\text{N}_2$
- 11- Alanine is a amino acid.
a) Neutral b) Acidic c) Strong acidic d) Basic
- 12- Amino acids have as function groups.
a) Carboxylic, Amino b) Only Amino
b) Carboxylic, Amide d) Only Carboxylic
- 13- Glycine is a simple one of acids.
a) Halogen b) Carboxyl c) Amino d) Hydroxyl
- 14- Simple lipids are esters of fatty acids with.....
a) Fatty alcohol b) Acetic acid c) Methanol d) H_2O
- 15- Are complex biological molecules composed of long chains of amino acids.
a) Fats b) Oils, Waxes c) Terpenoids, Phosphatides d) Proteins

انتهت الاسئلة بالتوفيق الممتحن / د. أماني عبدالرحمن عثمان

	Assiut University- Faculty of Science Frist Semester- Final Exam 2025-2026 Chemistry Department	Program: Chemistry Major Level : (4) Date: 3/6/2026 Time: 3 h	
Course Title: Surface and Electro chemistry		Code: 432Chem.	
Instructors: Prof. Dr. Abd El-Aziz A. Said and Prof. Dr. AbuEhagage A. Hermas			
Important:	No. of pages 3	No. Of questions 5	Total Mark: 50 degree

Answer the Following Questions:

Section (I) Surface Chemistry (33 Marks)

I. Chose the following correct answer of the following (5 Marks)

- Doping of silicon with boron leads to
 (i) n- type semiconductor (ii) p-type semiconductor (iii) Metal (iv) Insulator
- The existence of a substance in more than one solid modifications is known as
 (i) Polymorphism (ii) Isomorphism (iii) Anisotropy (iv) Enantiomorphism
- The materials which are weakly repelled by the magnetic field are known as
 (i) Diamagnetic materials (ii) Paramagnetic materials (iii) Ferromagnetic materials
 (iv) Ferrimagnetic materials
- Schottky defect is shown by
 (i) Strongly ionic compounds (ii) Compounds having high coordination number
 (ii) Compounds containing cations and anions of almost similar size (iv) All of these
- A solid having regular shape is
 (i) Amorphous (ii) Crystalline (iii) Anisotropic (iv) Isomorphous
- Which of the following facts about catalysts is incorrect
 (i) Catalysts reduces a reactions activation energy
 (ii) Catalysts increase the number of reactions that can happen spontaneously.
 (iii) Catalysts enhance the number of molecules with enough energy to break beyond the activation energy.
 (iv) Catalysts offer a different technique to get from reactant to product.
- The factor that influences heterogeneous catalysts activity is
 (i) Total surface area only
 (ii) The number of active sites per unit amount of catalyst only
 (iii) Method of preparation prior treatment only
 (iv) Total surface area, number of active sites and method of preparation.

8. Which of the statements below is incorrect

- (i) The surface area of a solid catalyst determines its efficiency.
- (ii) Catalyst work by giving an alternative path for the reaction that has a lower activation energy
- (iii) Catalyst reduces the energy required to activate the forward reaction while has no effect on the energy required to activate the backward reaction.
- (iv) The overall enthalpy change of the reaction is unaffected by the catalyst.

9. Favourable conditions for physical adsorption are....

- (i) Low temperature (ii) Low Pressure (iii) High temperature (iv) High Pressure

10. The correct answer about the adsorption of a gas on solid surface is

- (i) Adsorption is always exothermic
- (ii) Physisorption may transform into chemisorption at high temperature
- (ii) Physisorption decreases with increasing temperature but chemisorption decreases with increasing temperature
- (iii) Chemisorption is more exothermic than physisorption

2. Short answer on the four only of the following : (8 Marks)

- a) Steps involved in heterogeneous catalytic gas – solid reaction.
- b) Factors affecting the extent of adsorption
- c) Limitations of Langmuir adsorption equation
- d) Give a reason why heterogeneous catalysts can be poisoned by impurities in the reactants .
- e) What are the conditions required for a catalyst to act as an efficient heterogeneous catalyst.

3. Answer four only from the following: (20 Marks)

- a) Explain how are the holes within NiO semiconductor can be changed by doping with cations of lower and higher valences.
- b) How can you utilize t- method to calculate the S_t and porosity of a catalyst from adsorption isotherm
- c) What is meant by catalytic promoters and explain their promotion action
- d) Discuss the factors will be consider during synthesis of a solid catalyst by precipitation method.
- e) What is meant by f-center and how is the optical spectroscopy used for determination of imperfection in solids.

Section (II) Electrochemical (17 Marks)

Q1 : Complete the following : (5 marks)

- i) The exchange current (I_0) is define as
- ii) The internationally accepted primary reference electrode is
- iii) Pure water is a poor conductor because it
- iv) Concentration polarization of an electrode is due to
- v) Zeta potential is define as
- vi) The magnitude and sign of the zeta potential depends on both and
- vii) One characteristic of solid electrolyte is
- viii) One limitation of Debye-Huckel law is
- ix) If the electrode is polarized to a greater potential than at equilibrium ($\eta = +Ve$) thus take place.
- x) One of factors effect on IR drop is

Q2 Answer only three from the following (4 marks for each one):

- 1- Calculate Λ_m and $\gamma_{\pm}$ for 0.005 M $\text{Ca}(\text{NO}_3)_2$, ($\kappa = 1.5 \times 10^{-3} \text{ S/cm}$, $A = 0.509 \text{ (mol kg}^{-1})^{1/2}$)
- 2- Discuss the factors affecting conductivity of solution.
- 3- Define and explain the theories of electric double layer.
- 4- If you start form the Butler-Volmer equation for a one-electron electrode reaction:

$$I = I_0 \left[e^{\frac{-\eta F}{RT}} - e^{\frac{(1-\alpha)\eta F}{RT}} \right]$$

Drive the equation of " linear polarization resistance" and the Tafel's equation.

	Assiut University- Faculty of Science First Semester- Final Exam 2025-2026 Chemistry Department	Program: Chemistry Science Level: (4) Date: 28/12/2025 Time: 3 h	 جامعة اسيوط كلية العلوم
Course Title: Petroleum, Petrochemicals and Chromatography		Code: 411 C	
Instructors: Prof. Dr. Hassan Abdou Kotb			
Important:	No. of pages: 3	No. of questions: 3	Total Mark: 50 degree

1- Choose the correct answer for ALL of the following? (26 Marks)

(ترصد الإجابات النهائية فقط في الجداول الملحقة بهذا السؤال)

- 1-For diesel fuels, cetane number can be enhanced by ----- additives.
 - a) 2-ethyl-hexyl nitrate
 - b) 2,2,4-trimethylhexane
 - c) 3-methyl-hexyl acetate
 - d) 2-methyl-hexyl nitrite
- 2-Choose exact sequence of petroleum fractions in order of their boiling points?
 - a) lubricating oil > diesel > Petrol > LPG
 - b) lubricating oil > Petrol > diesel > LPG
 - c) petrol > Lubricating oil > diesel > LPG
 - d) lubricating oil > Petrol > LPG > diesel
- 3-The characterization factor for highly paraffinic crude oil, will be in range of -----.
 - a) 10.5 -11.5
 - b) 11.5-12.5
 - c) 12.5-13.0
 - d) 13.5-14.0
- 4-Aromatics have the highest ----- of all hydrocarbons with the same carbon atoms.
 - a) Smoke point
 - b) Octane number
 - c) Clouds point
 - d) Cetane number
- 5-Which of the following will have highest API gravity?
 - a) Ethane
 - b) Propane
 - c) Butane
 - d) Heptane
- 6-Visbreaking process is used mainly for making -----.
 - a) high cetane Diesel
 - b) high octane gasoline
 - c) fuel oil
 - d) kerosene
- 7-The H/C-ratio for the same number of carbon atoms is the highest in case of -----.
 - a) aromatics
 - b) naphthenes
 - c) polycycles
 - d) diolefins
- 8-A good lubricant should have high -----.
 - a) viscosity index
 - b) volatility
 - c) pour point
 - d) none of these
- 9-The Puck process used for the production of NH_2NH_2 by oxidation of ammonia in the presence of -----.
 - a) NaOCl catalyst
 - b) H_2O_2 catalyst
 - c) $\text{Ca}(\text{OH})_2$ catalyst
 - d) KMnO_4 catalyst
- 10-The following passive design is used as internals in ----- columns.
 - a) continuous-contact
 - b) simple distillation
 - c) staged-contact
 - d) none of these
- 11-The synthesis of ----- was carried out from the ring opening reaction of propiolactone with excess alcohol.
 - a) acrylic esters
 - b) mesityl oxide
 - c) allyl acetate
 - d) 2-ethylhexanol
- 12-Hydroformylations of ethylene oxide, followed by hydrogenation of the product will produce -----.
 - a) 1,3-propanediol
 - b) n-Butanol
 - c) vinyl acetate
 - d) 1,2-propanediol



1	2	3	4	5	6	7	8	9	10	11	12

13-Starting with allyl alcohol, Select the proper reaction sequences applied in the synthesis of glycerol?

- a) Epoxidation and hydrolysis reactions
- b) Hydrolysis and epoxidation reactions
- c) Oxidation and hydrolysis reactions
- d) Epoxidation and alkylation reactions

15-Select the correct reagents sequences, used in the three-step reactions for manufacture of glycerol from allyl chloride?

- a) (a) H_2O_2 , (b) NaOH, (c) $Ca(OH)_2$
- b) (a) NaOH, (b) $Ca(OH)_2$, (c) H_2O
- c) (a) Cl_2/H_2O , (b) $Ca(OH)_2$, (c) HCl
- d) (a) HOCl, (b) $Ca(OH)_2$, (c) H_2O

17-The reaction of n-butenes with O_2 at $400-440^\circ C/2-4$ atms catalyzed by Mo/V-P-oxides produces -----.

- a) maleic anhydride
- b) butylene oxide
- c) methyl methacrylate
- d) propylene chlorohydrin

19-The basis of gas chromatography, for separation of the components of the volatile material is the difference in -----.

- a) conductivity
- b) partition coefficients
- c) molecular weight
- d) molarities

21-In the reverse phase chromatography, the stationary phase is made form -----.

- a) non-polar
- b) polar
- c) either non-polar or polar
- d) none of these

23-The compound eluted last and retained more in normal and reversed phases, this will be ----- respectively.

- a) Non- polar and Polar
- b) Polar and Non-polar
- c) Both are in Non- polar
- d) Both are in Polar

25-The ----- used for acrolein synthesis in the presence of CuO-catalyst at $300-360^\circ C$ and 1-2 atms.

- a) Rashig process
- b) Sohio process
- c) Shell process
- d) DuPont process

14-Choose is the final product from the reaction of HCl with acetylene in the presence of $HgCl_2$?

- a) Perchloroethylene
- b) Trichloroethylene
- c) Vinyl chloride
- d) Ethylene dichloride

16-Bare silica is named as the normal stationary phase (NP) due to the -----.

- a) loss of silanol polarity
- b) neutral silanol groups
- c) polarity of silanol-groups
- d) Derivatizations of bare silica

18-The production steps of acetic anhydride is started by the formation of ----- followed by reaction with one mole of AcOH.

- a) ketene
- b) mesityl oxide
- c) 2-butanone
- d) acrylic acid

20- Retention factor, k' , describe -----.

- a) the distribution of an analyte between the stationary and the mobile phase
- b) the migration rate of an analyte through a column
- c) the velocity of the mobile phase
- d) both a and b

22-What useful information can be found from a Van Deemter plot?

- a) The selectivity factor
- b) Optimum mobile phase flow rate
- c) Optimum column temperature
- d) The capacity factor

24-The best method used for quantitative separation of DNA fragments is -----.

- a) Gas chromatography (GC)
- b) Column chromatography
- c) Electrophoresis
- d) TLC

26-Which of the following compounds could be detected by oxidation reactions in electrochemical detectors?

- a) Esters
- b) Aldehydes
- c) Mercaptans
- d) Ketones

13	14	15	16	17	18	19	20	21	22	23	24	25	26

Assiut University
Faculty of Pharmacy
Dept. of Pharmaceutics

Nanotechnology
Final Exam.
14/5/2026

Nanoparticles in Drug Delivery Course
(Time: 2hr.) Faculty of Science, 4th year Students (50 marks)

Instructor Prof. Dr. Tahani ELfaham

I-Tick (✓) for right and (X) for false statements , using the table below.
(1 mark for each, 10 marks)

- 1- Traditional dosage forms overcome many absorption and targeting barriers. ()
- 2- The time elapsed between a dose and the next dose is called duration of action. ()
- 3- Nanoparticles can enter the body via inhalation, but never reach the brain. ()
- 4- Gold nanoparticles (AuNPs), usually existing as solid nanoparticles. ()
- 5- The green synthesis process for preparation of nanoparticles utilizes only the plants roots. ()
- 6- Nanotubes has only single - walled structure. ()
- 7- NMR technique is not of choice to characterize polymerization reactions. ()
- 8- Temporary (RES) blockade, let injected therapeutic nanoparticles bypass the capture. ()
- 9- Nanoparticles are used only for treatment of Atherosclerosis , not for diagnosis. ()
- 10- VenuriGel (Nano-Hydrogel for injection) is injected directly into the damaged heart muscle to provide structural support. ()

1	2	3	4	5	6	7	8	9	10

II. Choose the most suitable statement in each of the following: using the table below. (one mark for each , 10 marks):

- 1- Which of the following is an advantage of nanoparticles ?
- A) Improved bioavailability
 - B) Targeted drug delivery
 - C) Both A and B
 - D) None of the above

- 2- Nanostructured lipid carriers are abbreviated as:
- A) NLC
 - B) NSLC
 - C) NLCs
 - D) NLCM.

III. Give the reason why: (Each 2 marks . 10 marks)

A- Nanocrystals are taking much attention currently.

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B- Polyethylene glycol (PEG) is often conjugated with hydrophobic polymers (like PCL-PEG or PLGA-PEG).

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C- Mesoporous silica NPs are considered one of the best drug carriers.

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D- Nanoparticles of TiO_2 and Zn in sunscreen products are coated with aluminum or silicon compounds.

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.....

E- Nanoparticles use in ocular drug delivery .

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.....

IV- write what you know about : (4marks each, 12 marks)

A- Disadvantages of using nanoparticles.

.....
.....
.....

V. Give the scientific term or an abbreviation that explains the sentence .

(each 1 mark , 8marks)

Sentence	Scientific term or abbreviation
Highly branched nano-sized, synthetic macromolecules with a well-defined, spherical, tree-like structure.	
Minimum Effective drug Concentration	
Nanostructured lipid carriers	
Are therapeutic agents where drug molecules are covalently linked to lipids to improve bioavailability, and enable targeted delivery.	
An eco-friendly, sustainable, and cost-effective method that uses natural resources like plant extracts to reduce metal ions into nanoparticles	
Cancer that has spread from its original site to other parts of the body, often referred to as stage IV.	
Membrane-bound organelles acting as the cell's "garbage disposal" and recycling center, containing over 60 acid hydrolase enzymes	
Deliver a specific dose of medication directly into the lungs, utilized by patients with asthma and chronic obstructive pulmonary disease (COPD).	

End of Exam

Best of luck.

Department of Chemistry		Date: 14/5/2026
Faculty of Science		Time: 2 hours

Final Examination of Analytical Chemistry (C-460) for 4th level Student

Answer the following questions: (50 Marks)

I. Put true (✓) or false (X) for the following statements: (10 Marks)

1. Precipitation titrations involve a reaction where a soluble reactant forms insoluble products.
2. Silver nitrate is commonly used in precipitation titrations involving determination of halid ions.
3. The reference electrode potential changes significantly during measurement.
4. Mohr's method must be performed in acidic medium.
5. Potentiometric titrations can be used to determine equivalent points using suitable indicator.
6. Volhard's method uses adsorption indicators to detect the end point.
7. In potentiometry, the measured potential depends on the concentration of analyte ions.
8. Fajan's method involves back titration using thiocyanate ions.
9. In Mohr's method silver chromate is more soluble than silver chloride.
10. Potentiometry is an electroanalytical method used to measure the potential of a solution without drawing significant current.

II. Choose the correct answer for the following: (30 Marks)

1. If we titrate 100 ml of 0.1 M NaCl solution by 0.1 M AgNO₃, then pCl after addition of 120 ml of AgNO₃ equals ($K_{sp} = 1.2 \times 10^{-10}$):

a) 7.08
b) 7.88
c) 4.96
d) 3.30
2. A very common interference for the glass pH electrode is

b) O₂
b) F⁻
c) Na⁺
d) EDTA
3. AgCl has to be filtered off before titration using method.

a) Volhard
b) Mohr
c) Fajan
d) a and b
4. What is the solubility product constant expression for Zn₃(PO₄)₂?

a) $K_{sp} = [Zn^{2+}][PO_4^{3-}]$
c) $K_{sp} = [Zn^{2+}]^3[PO_4^{3-}]^2$

b) $K_{sp} = [Zn^{2+}][2PO_4^{3-}]$
d) $K_{sp} = [3Zn^{2+}]^3[2PO_4^{3-}]^2$
5. In Daniel cell Zn/ZnSO₄ acts as

a) Cathode
b) Anode
c) Salt bridge
d) Reference electrode
6. A pH electrode is a good example of

a) A reference electrode
c) An ion selective electrode

b) A metal indicator electrode
d) An auxiliary electrode
7. If the K_{sp} of AgCl at 25 °C is 1.2×10^{-10} , the molar solubility of AgCl will be

a) 1.5×10^{-10} M
b) 1.09×10^{-5} M
c) 1.5×10^{-5} M
d) 2.4×10^{-10} M
8. is the suitable reference electrode for the electrochemical analysis at temperatures above 80 °C.

a) Calomel electrode
b) Ag / AgCl electrode
c) a and b
d) Mercury electrode

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9. The electrolyte solution within the glass electrode (ref.) of the pH meter is
 a) Saturated KCl b) Concentrated HCl c) Dilute KCl d) Dilute HCl
10. Using a glass electrode, a standard solution of pH = 4 gives a potential $E_1 = 0.236$ V and an unknown solution gives a potential $E_2 = 0.177$ V. What is the pH of the unknown solution?
 a) 2 b) 3 c) 5 d) 9
11. According to Brønsted–Lowry theory, an acid is a
 a) Proton acceptor b) Proton donor c) Neutral substance d) Electron donor
12. Conjugate base of H_2CO_3 is
 a) CO_3^{2-} b) HCO_3^- c) OH^- d) H_3O^+
13. The oxidizing agent
 a) Loses electrons b) Gains electrons c) Is oxidized d) Donates protons
14. Diphenylamine is used in titration of
 a) KMnO_4 vs. Fe^{2+} b) $\text{K}_2\text{Cr}_2\text{O}_7$ vs. Fe^{2+} c) NaOH vs. HCl d) AgNO_3 vs. Cl^-
15. Conjugate acid of NH_3 is
 a) NH_2^- b) NH_4^+ c) NO_3^- d) H_2O
16. Which is best for very dilute solutions?
 a) Molarity b) ppm c) Molality d) Normality
17. KMnO_4 acts as
 a) Indicator only b) Self-indicator c) Base d) Acid
18. One molal solution contains
 a) 1 mole solute in 1 L solution b) 1 mole solute in 1 kg solution
 c) 1 g solute in 1 kg solvent d) 1 mole solute in 100 mL solution
19. For weak acid HA, K_a expression depends on
 a) Temperature only b) Concentration c) Pressure d) catalyst
20. In buffer solution, pH depends on
 a) Total volume only b) Ratio of components c) Temperature only d) Pressure

III. Answer only two from the following:

(10 marks)

1. Calculate the pH of 0.05 M NH_3 ($K_b = 1.8 \times 10^{-5}$).
2. Find the pH of a solution resulting by mixing 25 ml of 0.1 M NaOH with 50 ml of 0.1 M HCl .
3. What is the pH of solution consists of 0.2 M CH_3COOH and 0.1 M CH_3COONa ? ($K_a = 1.8 \times 10^{-5}$)

With our best wishes for success

Examiners: Dr. Mohamed Kotb & Dr. Doaa Abdel-Rahman



Assiut University- Faculty of Science
Second Semester- Final Exam 2025-2026
Chemistry Department

Program: Chemistry
Level : (4)
Date: 6/6/2026
Time: 2h



Course Title: Applied Organic Chemistry

Code: (412 C)

Instructors: Prof. Dr. Kamal Ibrahim Aly

Important: NA

No. of pages: 1

No. of questions: 9

Total Mark: 50 degree

Answer Eight Only from the following:

- 1) Carbon Fibers..... the wonder polymer..... stronger than the steel". Show by equations the steps of production of this polymer.
- 2) Is it possible to make polyethylene from cyclohexane? If not, say why? then show examples of ring opening polymerization?
- 3) Explain the term "vulcanization of rubber". What are the differences between natural rubber and vulcanized rubber?
- 4) Discuss with examples the types of Initiators, and what you mean by HIPS ?
- 5) Mention the : Advantages, Disadvantages, Uses and Care for:
i) Cotton ii) Wool iii) Polyesters
- 6) Compare between the step- and chain- growth polymerization, and also compare, giving reason, between the time needed in polymerization of these monomers: (Vinyl Chloride, Styrene , MMA).
- 7) Explain by (equations or structures): Backbiting- Dianions, Self-initiator.
- 8) In the living polymerization, show by equations how can we put an ending for the living chain (Carbanion).
- 9) How does urea-methanal differ from nylon, Kevlar and Dacron, even though all of them are condensation polymers?

Good Luck

Examiner:

Prof. Dr. Kamal Ibrahim Aly

 كلية العلوم جامعة Assuit	Assuit University-Faculty of Science Second Semester- Final Exam 2025-2026 Chemistry Department	Program: Nanotechnology Level: 4 Date:5/6/2026 Time: 2 h	
Course Titel: Biomedical Nanotechnology		Code: 403 eng	
Instructors:Dr. Hanan Mosbah Khalaf			
Important:	No. of pages: 2	No. of question: 3	Total Mark: 50 degree

Answer the following questions:

I. Choose the correct answer for the following:

(20 Mark)

- Why is the cis geometry important for Cisplatin?
 - Binds two adjacent DNA bases
 - Increases blood stability
 - Prevents hydrolysis
 - Helps kidney excretion
- What is a key advantage of Pt(IV) over Cisplatin?
 - More toxic to healthy cells
 - Less stable in blood
 - Acts as a prodrug
 - Binds DNA faster
- Which system reduces Cisplatin's kidney toxicity?
 - Antibodies
 - Liposomes
 - Radiotherapy
 - Enzyme inhibitors
- Type II mechanism in PDT mainly produces:
 - Superoxide radicals
 - Hydroxyl radicals
 - Singlet oxygen
 - Hydrogen peroxide
- The main advantage of MRI over X-rays is:
 - Uses ionizing radiation
 - Unsafe for soft tissues
 - Non-invasive and safe
 - Does not provide high-resolution images
- Which photosensitizers is most commonly used in PDT?
 - Chlorins
 - Porphyrins
 - Bacteriochlorins
 - Phthalocyanines
- What is the main advantage of Cu(II)/Ru/PDA nanoplateforms that used in PTT?
 - Low cost only
 - Single function therapy
 - Combination of therapy and imaging
 - Oxygen production
- Which DNA base does Cisplatin mainly bind to?
 - Adenine
 - Thymine
 - Cytosine
 - Guanine

9. Which PTT agent is widely used due to strong NIR absorption and good biocompatibility?

- A) Copper-based nanomaterials B) Polydopamine nanoparticles (PDA)
C) Organic dyes D) Ruthenium complexes

10. Which element is commonly used in RF coils?

- A) Nickel B) Copper C) Gadolinium D) Gold

II. Answer Five Only of the following:

(25 marks)

1. What is the magnetocaloric effect?
2. The mechanism of the photodynamic effect is inherently complex, but they generally fall into one of two categories: type I and type II. Explain?
3. Photoacoustic imaging or optoacoustic imaging is a biomedical imaging technique which uses photosensitizer (PS). What is the mechanism of this technique? Show examples of metal complexes used as PS.
4. What makes a good photosensitizer for PDT?
5. What is meant with Photothermal therapy and photodynamic therapy and what is the main different between them?
6. Give short account for light sources used in PDT.

III. Give reason for two only of the following:

(5 marks)

- i. Platinum IV complexes are used rather than cis Platine.
- ii. Nanomaterials play a crucial role in improving photothermal therapy.
- iii. Gadolinium (III) used as a contrasting agent in MRI imaging.

End of Exam
With Best Regards
Dr. Hanan Mosbah Khalaf

	Assiut University- Faculty of Science Second Semester- Final Exam 2025-2026 Chemistry Department	Program: Chemistry (Double Major) Level: (4) Date: 22/5/2026 Time: 2 h	 كلية العلوم جامعة أسيوط
Course Title: Instrumental Analysis		Code: C445	
Instructors: Prof. Dr. Mohamed Sayed Ibrahim			
Important:	No. of pages 8	No. Of questions parts 3	Total Mark: 50 degrees

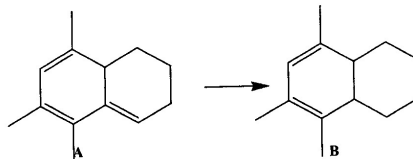
Answer the following questions: :

(20 points)

Part I: Choose the correct answer:

1. Given below two compounds A and B. What happens to the UV-Visible spectra when A is converted into B?

- (a) Hypsochromic shift.
(b) Bathochromic shift.
(c) Bathochromic shift and hypochromism.
(d) Hypsochromic shift and hyperchromism.



2. The principal use of the hollow cathode lamp in AAS is that:
(a) It generates atomic emission lines using laser source.
(b) It generates atomic emission lines using the element which is being analysed.
(c) It generates atomic emission lines using any element.
(d) All of these.
3. In visible Absorption Spectroscopy, which of the following is the generally used radiation source?
(a) Xenon mercury arc lamp. (b) Hydrogen discharge lamp.
(c) Deuterium lamp. (d) Tungsten Lamp.
4. Ionization of analyte atoms in flame AAS can be eliminated by:
(a) Increasing the temperature of flame. (b) Using oxygen or nitrous oxide as an oxidant.
(c) Addition of complexing agent (EDTA). (d) Addition of potassium salt.
5. Which of the following components is NOT part of an atomic absorption spectroscopy (AAS)?
(a) Lines source of radiation (b) Atomizer
(c) Nebulizer (d) Column
6. Which of the following is an example of spectral interference in AAS?
(a) The formation of stable compounds in the flame.
(b) An absorption line of another element overlapping with the analyte line.
(c) Ionization of the analyte atoms.
(d) Broadband absorption from matrix components.
7. The interference caused by phosphate (PO_4^{3-}) or sulfate (SO_4^{2-}) in the atomic absorption spectroscopy (AAS) determination of calcium (Ca^{2+}) can be eliminated by _____.
(a) Addition of excess concentration of NO_3^- . (b) The presence of releasing agent (Sr^{2+} or La^{3+}).
(c) Addition of excess concentration of Ba^{2+} . (d) All of these.

8. Ion exchange chromatography achieves separation based on _____.
 (a) Electrical mobility of ionic species. (b) Electrochemical process.
 (c) Partition chromatography. (d) Adsorption chromatography.
9. Which of the following is the atomization method used for highly toxic elements such as arsenic (As), antimony (Sb) and lead (Pb)?
 (a) Flame method. (b) Hydride generation method.
 (c) Electrothermal method. (d) Cold-Vapor method.
10. In liquid chromatography, the use of a single mobile phase during the entire elution process is called _____.
 (a) normal elution. (b) reverse elution.
 (c) isocratic elution. (d) frontal elution.
11. The retention factor (k') is an important parameter that is widely used to describe the migration rates of solutes on columns. For a solute A, when k'_A is > 30 .
 (a) The separation is poor. (b) The separation is slow.
 (c) The separation is optimum. (d) None of these.
12. Chromatographic column efficiency increases as:
 (a) The number of theoretical plates (N) decreases and the plate height (H) increases.
 (b) The number of theoretical plates (N) increases and the plate height (H) decreases.
 (c) The number of theoretical plates (N) equal to the number of plate height (H).
 (d) None of these.
13. In some quantitative chromatographic methods, the concentration of the analyte is found from the ratio of its peak area to the total area of all eluted peaks. What is the name of this method?
 (a) The internal standard method.
 (b) The calibration method.
 (c) The area-normalization method.
 (d) None of these.
14. An increase in the particle size of the stationary phase affects the efficiency of chromatographic separation by...
 (a) Increase efficiency. (b) No effect on efficiency.
 (c) Decrease efficiency. (d) Increase peak height.
15. In chromatography, what does retention time (t_r) represent?
 (a) Distance moved by solvent.
 (b) Time taken for sample injection for the analyte to reach the detector.
 (c) Detector response type.
 (d) None of these.

16. In AAS, which of the following atomization methods is used for mercury determination?
 (a) Flame method. (b) Hydride generation method.
 (c) Electrothermal method. (d) Cold-Vapor method.
17. In voltammetry, the purpose of adding a supporting electrolyte (like KCl) in a large excess is to:
 (a) Buffer the solution.
 (b) Increase the diffusion current.
 (c) Eliminate the migration current.
 (d) Act as a catalyst.
18. In voltammetry, the auxiliary (counter) electrode is...
 (a) Dropping mercury. (b) Mercury pool.
 (c) Graphite electrode. (d) Platinum wire electrode.
19. All voltammetric measurements should be conducted in _____.
 (a) oxygen free solution. (b) nitrogen free solution.
 (c) supporting electrolyte solution. (d) a and c are correct.
20. Which of the following is (are) disadvantages of graphite furnace technique?
 (a) Background absorption effects.
 (b) Analyte sample may be lost at the ashing stage and not completely atomized.
 (c) The precision was poor than the flame method and the analytical range is relatively narrow.
 (d) All the above.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

Part II: Enter in the appropriate box the expressions you would select to define each of the phenomena Labeled 1-15 inclusive. (15 points)

Expression	Phenomena
Molar absorptivity	[1] Is simply defined as "the fraction of light that reaches a detector in UV/visible spectrophotometer after passing through a sample.
Nebulizer	[2] It is the time for an unretained species to reach the detector in chromatography.
Beer's law	[3] A method is used for the determination of analytes in a complex matrix where interferences for the analyte will occur i.e. blood, sediment, human serum, etc.
Partition chromatography	[4] This method is based on the interaction between the solute (Analyte) molecules and active sites on the stationary phase. This attachment or interaction depends on the polarity of solutes.
Size-exclusion chromatography	[5] A characteristic value for each substance at a particular wavelength in UV-Visible spectroscopy.
Transmittance	[6] A device that measures the difference between the transmitted light through the sample (I) vs. the incident light (I_0) and sends this information to the recorder.
Bathochromic shift	[7] A transport mechanism occurs in voltammetry which involves the movement of oppositely charged ions towards electrode due to electrostatic attractions.
Wavenumber ($\bar{\nu}$)	[8] In this method the separation is based mainly on differences between the solubility of the sample components in the stationary phase or on differences between the solubility of the components in the mobile and stationary phases.
Zeeman effect	[9] Microelectrode used in voltammetry whose potential is varied with time. Examples: Carbon, Gold, Silver, Copper, Iron, Zinc, Mercury
Adsorption chromatography	[10] In this method, the column is filled with material having precisely controlled pore sizes, and the particles are separated according to its their molecular size.
Photoelectric transducer	[11] The number of waves per cm in units of cm^{-1} and equal to $1/\lambda$.
Working electrode	[12] A shift to higher wavelength (λ) or lower energy.

Migration process	[13] It is used for background correction in AAS by place flame polarized light through sample in magnetic field get absorbance (atom+molecule) or absorbance (molecule) depending on how light is polarized.
Standard addition method	[14] In that the absorbance (A) is directly proportional to the concentration of the absorbing species (c) and the path length (b) of the absorbing medium.
Dead time (t_M)	[15] A device used for converting solution into fine spray or droplets in AAS.

[1]		[2]	
[3]		[4]	
[5]		[6]	
[7]		[8]	
[9]		[10]	
[11]		[12]	
[13]		[14]	
[15]			

Part III: Problems and Questions (15 points)

1. In AAS, discuss the processes occurring during flame atomization. (2 points)

- a)
- b)
- c)
- d)
- e)
- f)

2. The concentration of Zn^{2+} in a sample is determined by reacting it with the ligand aldimine and measuring its absorbance at 286 nm in a 1.00- cm cell. When a 50.00-mL sample is treated with aldimine and diluted to 100.00 mL, the resulting solution has an absorbance of 0.228. A second 50.00-mL sample is mixed with 5.00 mL of a 20.00 mg/L standard of Zn^{2+} , treated with aldimine and diluted to 100.00 mL, giving an absorbance of 0.362. calculate the mg Zn^{2+} /L in the sample. (3 points)

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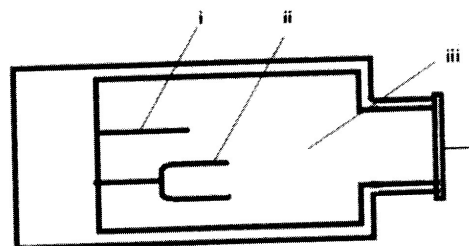
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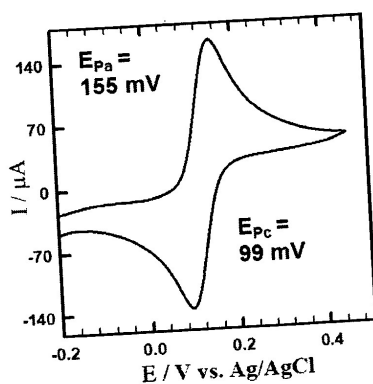
- Calculate the following:**

- | | t_R (min) | W, (min) |
|------------|-------------|----------|
| Unretained | 2.0 | — |
| A | 16.0 | 0.75 |
| B | 20.0 | 1.20 |

- i. _____
- ii. _____
- iii. _____
- iv. _____



5. The following cyclic voltammogram was recorded for a reversible couple: Calculate the number of electrons transferred (n) and the formal potential (E°) for the couple? **(3 points)**



6. Using Woodward-Fieser rule, calculate the wavelength of absorption maximum (λ_{max}) of the following compounds: **(2 points)**

Compound (I)	Compound (II)
<chem>CN(C)c1ccc2ccccc2c1</chem> $\lambda_{max} =$ 	<chem>CC1=CC=C(Cl)C=C1C2=CC=CC=C2</chem> $\lambda_{max} =$

End of Exam

Best Wishes



Assiut University- Faculty of Science
First Semester- Final Exam 2025-2026
Chemistry Department

Program: Material
Science and Technology
Level: (4)
Date: 7/6/2026
Time: 2 h



Course Title: Surface and Colloidal chemistry

Code: 205 Chem.

Instructors: Prof. Dr. Abd El-Aziz A. Said and Dr. Ahmed A. K. Mohammed

Important:

No. of pages 2

No. Of questions 5

Total Mark: 50

Section (I)

Answer the Following Questions:

1- Choose the correct answer: (5 Marks)

a) Which of the following statement is not true?

- (i) The value of adsorption enthalpy of physical adsorption is less than chemical adsorption.
- (ii) The physical adsorption occurs due to the van der Waals forces.
- (iii) Chemical adsorption decreases at high temperature
- (iv) Physical adsorption is reversible

b) How magnitude of adsorption gas is expressed?

- a) $\frac{m}{x}$
- b) $m \cdot \Delta x$
- c) $\frac{x}{m}$
- d) $x + m$

(c) If the value of $\frac{1}{n}$ becomes zero in Freundlich adsorption isotherm the adsorption is independent to

- (a) Pressure
- (b) Temperature
- (c) quantity
- (d) a and b

(d) What will be the intercept in a graph of Freundlich isotherm?

- (a) k
- (b) $\log k$
- (c) $\frac{1}{a}$
- (d) $\frac{1}{n}$

(e) Whose value is less than zero during adsorption

- (a) ΔG
- (b) ΔH
- (c) ΔS
- (d) All the given

2- Define the following terms : (5 Marks)

- (i) Adsorption
- (ii) chemisorption
- (iii) monolayer adsorption
- (iv) surface excess concentration
- (v) Specificity of adsorption

3- Answer three only from the following: (15 Marks)

- a) Give account of Langmuir adsorption isotherm.
- b) Apply the BET equation for determining of the S_{BET} of solid catalyst from the adsorption isotherm
- c) How is the porosity of a solid catalyst be assessed from the adsorption isotherm.
- d) Explain three factors that affect the adsorption of gases on solids.

Section II

Answer the Following Questions:

Question 1: Choose the correct answer: (15 marks)

- Colloidal solutions are
a) transparent b) translucent c) opaque
- The path of a beam of light is visible in
a) true solutions b) colloidal solutions c) a and b d) neither a or b
- In multimolecular colloids, molecules are held together by
a) Van der Waals forces b) ionic interactions c) covalent bonds d) all of the preceding
- An example of a multimolecular colloid is
a) gold sol b) starch c) protein d) soap
- An example of an associated colloid is
a) gold sol b) starch c) protein d) soap
- Tyndall scattering occurs when the dimension of the dispersed phase is the wavelength of the beam of light.
a) larger than b) smaller than c) equal to
- The diffusion of colloidal systems is true solutions
a) slower than b) faster than c) equal to
- A liquid in a solid is called
a) sol b) emulsion c) gel d) foam
- A gas in a liquid is called
a) sol b) emulsion c) gel d) foam
- sols are stable.
a) Lyophilic b) Lyophobic c) a and b d) neither a or b

Question 2: answer only three of the following: (10 marks)

- Explain the purification of sols by dialysis.
- Discuss the diffusion of sols.
- What are the applications of emulsions?
- Define electroosmosis and state its applications.

End of Exam

Best Wishes Prof. Dr. Abd El-Aziz A. Said
Dr. Ahmed A. K. Mohammed

	Assiut University- Faculty of Science Second Semester- Final Exam 2025-2026 Chemistry Department	Program: Chemistry Level : (2) Date: 21/5/2026 Time: 2h	 كلية العلوم جامعة أسيوط
Course Title: Petroleum and Petrochemicals		Code: (451C)	
Instructors: Prof. Dr. Kamal Ibrahim Aly			
Important: NA	No. of pages: 1	No. of questions: 4	Total Mark: 50 degree

Answer the following questions:

(50 Mark)

Question 1.

- a) Explain the Doctor's sweetening process?
- b) Write short notes on :-Non- Hydrocarbons in crude Petroleum.

Question 2.

- a) What you mean by Octane number & Oxygenate additives.
- b) Explain the Propane deasphalting.

Question 3.

- a) Discuss the effect of sulfur compounds upon the Gasoline Product?
- b) Explain the Carbide Theory for origin of the Petroleum and its defects.

Question 4 .

- a) Discuss the following terms:
 - i) Aniline Point
 - ii) Additives
 - iii) Freezing Point of Aviation Fuels
- b) Starting from the following building blocks, discuss what are the petrochemicals can be produced from it :
 - a) Methane
 - b) Propene.
 - c) Butadiene

Good Luck

Examiner:

Prof. Dr. Kamal Ibrahim Aly

d) Th1 cells

17- C3b when bind on a microbe will make it more attractive for phagocytosis, this process is

- a) Agglutination
- b) Complement activation
- c) Neutralization
- d) Opsonization

18- Which is an effector cell involved in ADCC of viral infected cells?

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- c) Natural killer cells
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- a) Cytokines by T cell
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5

23-Monocolonal antibodies recognize a single

- a) Antigen
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- d) Paratope

6-
de

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- a) Cytotoxic T cells
- b) Macrophages
- c) Dendritic cells
- d) Th1 cells

7- s

25- Which type of antibodies is elevated in parasitic infection?

- a) IgM
- b) IgE
- c) IgG
- d) IgA

4. Formation of natural zeolites requires reaction with

- A) acidic rainwater
- B) distilled water
- C) alkaline groundwater
- D) seawater

5. Compared to synthetic zeolites, natural zeolites generally have

- A) lower cost
- B) better pore size control
- C) higher structural purity
- D) higher catalytic activity

6. Metal-exchanged zeolites are especially useful in

- A) pure adsorption only
- B) redox catalytic reactions
- C) framework stabilization
- D) increasing microporosity

7. Which factor generally decreases adsorption capacity in zeolites?

- A) Decreasing temperature
- B) Increasing pressure
- C) Decreasing molecular size
- D) Increasing temperature

8. Which property of zeolites allows them to act as molecular sieves?

- A) High chemical reactivity
- B) Uniform pore size
- C) Bulk density
- D) Color

9. In hydrocracking, what role do metal sites play?

- A) Hydrogenation/Dehydrogenation
- B) Cracking
- C) Isomerization
- D) Crystallization

10. Zeolites contribute to

- A) increased pollution
- B) sustainable industrial practices
- C) higher energy use
- D) None of the previous

3) Write the advantages and limitations of natural zeolites.

4) Explain the molten salt method for zeolite synthesis and its advantages.

- 5) Show the significance of both solid-state NMR and electron microscopy (SEM/TEM) techniques for characterization of zeolite structure.

6) Why do we modify zeolites? Explain only one type of zeolite modification.

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7) Describe some applications of zeolites in the environmental treatment.

With my best wishes

Prof. Dr. Ahmed Fawzy



Assiut University
Faculty of Medicine
Department of Medical Microbiology and Immunology

Date: 9/6/2026
Time: 2 hours
No Pages: 4

كلية معتمدة
بتاريخ ١٢/٧/١٢

Immunology Exam for third year Science Students

I) Choose correct answer (1mark x 25)

1-In hyposensitization, injection of very small dose of allergen for long period leads to formation of blocking antibodies type

- a) IgA
- b) IgE
- c) IgG
- d) IgD

2-Naturally acquired active immunity would be acquired through which processes?

- a) Vaccination
- b) Drinking colostrum
- c) Natural birth
- d) Infection with disease causing organism followed by recovery

2- Which of the following is not true regarding effective immunogen?

- a) Foreign to the host
- b) Fairly large (molecular weight > 6000)
- c) Chemically complex
- d) Requires a carrier conjugate to stimulate antibody production

3- During type I hypersensitivity reaction, the mast cell are

- a) destroyed
- b) activated
- c) degranulated
- d) lysed

4- Opsonization is mediated by

- a) C3b
- b) C3b and IgG
- c) C5b
- d) C5b and IgG

5- A complement component which is strongly chemotactic for neutrophils is:

- a) C3
- b) C3b
- c) C5a
- d) C5b

6- Antibody-dependent cellular cytotoxicity (ADCC) is the process by which natural killer cells destroy infected cells, identified by what immunoglobulin on the surface?

- a) IgA
- b) IgE
- c) IgG
- d) IgM

7- Serum sickness is a clinical type of which hypersensitivity reaction

- a) Type I
- b) Type II
- c) Type III



Assiut University
Faculty of Medicine
Department of Medical Microbiology and Immunology

Date: 9/6/2026
Time: 2 hours
No Pages: 4

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- a) Type I
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- d) Type IV
- 8- Which part of the antibody is responsible for most biologic activity & effector functions?
- disulphide bond
 - Fc
 - Fab
 - paratope
- 9- Which Isotype of antibodies could protect newly born baby?
- IgG
 - IgA and IgG
 - IgG and IgE
 - IgE
- 10- CD40 Ligand (CD154) is expressed by which of the following?
- B cells
 - Dendritic cells
 - Resting T cells
 - Activated T cells
- 11-A Delayed hypersensitivity reaction is characterized by:
- An infiltrate composed of helper T cells and macrophages
 - An infiltrate composed of neutrophils
 - Edema without a cellular infiltrate
 - An infiltrate composed of eosinophils
- 12-Passively acquired immunity:
- Involves active generation of antibodies by the individual
 - Does not depend on the type or amount of immunoglobulin
 - Of long duration
 - May be brought about by the administration of preformed antibodies
- 13-Tissue injury in cytotoxic hypersensitivity reaction is initiated by
- Ab interfering with the functioning of biologically active substance
 - Antigen reacting with cell bound Antibody
 - Ab reacting with cell bound Ag
 - Formation of Ag-Ab complex
- 14- Which of the following is true about macrophages?
- Express CD4
 - Only involved in adaptive immunity
 - Play important role in killing virus infected cells by secreting granzymes.
 - Settle mainly in the tissue.
- 15- Which is the major difference between CD8+ and NK cell cytotoxicity?
- Cytotoxic T cells recognize virus infected cells by recognizing viral antigens on the surface of the target cell
 - Only cytotoxic T cells kill host cells infected with intracellular bacteria
 - Only NK cells induce target cell death by apoptosis
 - Only NK cells use perforins and granzymes to induce cytotoxicity
- 16- Which cells utilize reactive oxygen species and lysosomal enzymes to kill pathogens?
- Cytotoxic T cells
 - Macrophages
 - Natural killer (NK) cells

d) Th1 cells

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7- 5

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- c) IgG
- d) IgA



Assiut University
Faculty of Science
Chemistry Department



Final Exam in Zeolites and their industrial applications (Chem 407) 2nd Term-2026

Answer FIVE ONLY from the following questions:

(50 Marks)

1) Put (✓) in front of the correct statement and (x) for the wrong one:

1. Zeolites are synthesized under hydrothermal conditions. ()
2. Molten salt method is a hydrous technique for zeolite synthesis. ()
3. Microwave-assisted synthesis for zeolites leads to a slow crystallization. ()
4. A gram of zeolite can have an internal surface area equivalent to $> 500 \text{ m}^2/\text{g}$. ()
5. The primary building unit of all zeolites is the TO_4 tetrahedron. ()
6. Zeolites are not particularly effective adsorbents. ()
7. The selective adsorption capability allows zeolites to act as molecular sieves. ()
8. Zeolites adsorb CO_2 via chemical adsorption. ()
9. Zeolite modification is used to generate acidic or metal-containing zeolites. ()
10. Transmission electron microscopy (TEM) for zeolites shows the crystal size, shape (morphology), and uniformity. ()

2) Choose the correct answer:

1. Substitution of Si^{4+} by Al^{3+} in the zeolite framework results in

- | | |
|------------------------------|----------------------|
| A) positive charge | B) no charge change |
| C) negative framework charge | D) neutral structure |

2. The Si/Al ratio mainly affects

- | | |
|-----------------|-----------------------------------|
| A) color only | B) chemical and physical behavior |
| C) density only | D) melting point only |

3. Typical pore size of natural zeolites ranges between

- | | | | |
|------------|--------------|---------------|------------|
| A) 1–10 nm | B) 10–100 nm | C) 0.3–1.0 nm | D) 5–20 nm |
|------------|--------------|---------------|------------|