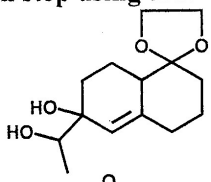
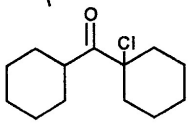
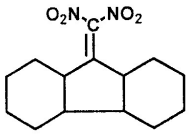
2) **Suggest the suitable mechanism and products for *Only Three* of the following reactions. Write the name of the suggested mechanism indicating each step using arrows.** (3 x 5 =15 Marks)

I- 

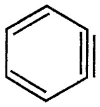
$\xrightarrow[Py]{TsCl}$?????

II- 

$\xrightarrow[Base]{MeOH}$?????

III- 

$\xrightarrow[MeOH]{MeO^-}$?????

IV- 3 
$\xrightarrow{h\nu}$?????

Prof. Dr. Aboel-Magd A. Abdel- Wahab & Prof. Dr. Mona A. Abdel -Rahman

Good Luck

	Assiut University- Faculty of Science Frist Semester- Final Exam 2025-2026 Chemistry Department	Program: Material Science Level : (3) Date: 16/1/2026 Time: 2 h	
Course Title: Dyes Chemistry		Code: 307 Industrial Chemistry	
Instructors: Prof. Dr. Adel Mohamed Kamal El-Dean			
Important:	No. of pages 1 / No. Of questions 3	Total Mark:50 degree	

I. Answer the following questions: .....(24 marks)

a. What is the difference between Chromophore and oxochrome group? (2 marks)

b. In the view of above question (a) show the difference between nitrobenzene and nitro aniline? Explain your answer by drawing the resonating structures of nitrobenzene and nitroaniline (4 marks)

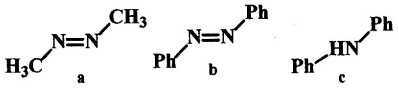
c. What is the difference between Dyes versus Pigments (2 marks)

d. Write a brief note about:_____(16 marks)

i. Chromogen ii. Direct dye iii. Acid dyes iv. Mordant dyes v. Vat dyes vi. Absorption vii. Exhaustion viii. Levelness

II. Chose the correct answer for the following question.....(5 marks)

1. Which is longer wave length of light in each pair of the following?
   a. blue or indigo b. indigo or orange c. green or yellow
2. The wave length in UV increased when go from: a. Red to blue b. When go from Blue to Red c. no one of the above
3. . When the white light falls on a triangular glass prism, it analysis into seven spectrum colors the lowest deviation (It is the closest to the prism for:
   a. The red colour b. Violet c. Orange.
4. Which colored compound in the following:



5. Halochromism : a. the group which when attached to chromophore the colour appear b. changing the color as the pH changes c. not a or b

III. Show by equation at least one method for synthesis of the following:.... ....(21 marks).

a. anthraquinone b. indigo dyes
c. Synthesis of bromamic acid d. Synthesis of indanthrone
e. Mechanism of formation Diazonium salt
f. Synthesis of Methyl Orange dye

End of Exam

Best Wishes Prof. Dr. Adel Mohamed Kamal El-Dean

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	Assiut University- Faculty of Science Final Exam 2025-2026 Chemistry Department	Program: Material Science and Nano technology Level : (3) Date: 16/1/2026 Time: 2 h	
Course Title: Nano catalysis		Code: 305 Chem.	
Instructors: Prof. Dr. Abd El-Aziz A. Said			
Important:	No. of pages 1 / No. Of questions 3	Total Mark:50 degree	

I. Answer the following questions (10 Marks)

I- True (T) or False (F) for the following sentences:

1- Nanoparticles of different shapes are undesirable as catalysts ( )

2- The good for developing of well defined nanoparticles is to get efficient and selective nanocatalysts for relevant catalytic reaction ( )

3- Positive size sensitivity reaction, when increase of turnover frequency with decreasing particle size( )

4- Nano catalysts should be able to display the benefits of both homogeneous and heterogeneous catalysis. ( )

5- Size reduction to nanometer scale leads to particular scale which leads to intrinsic properties ( )

6- The number of charge carrier of metal oxide be uninfluenced by the nanostructure of the solid ( )

7- The nanoscale of metal oxides can exhibit unique physical and chemical properties ( )

8- Nanocatalysts can simultaneously reduce CO, He and NOx emissions ( )

9- Nanocatalysts are not effective at high temperature ( )

10- Nanocatalysts are only used in homogeneous catalysis ( )

II- Write short notes on the following: (20 Marks)

1- Objectives of nanocatalysis research.

2- What are the expected benefits of nanocatalysis.

3- The characteristic properties of a catalyst support.

4- Advantages and disadvantages of homogeneous and heterogeneous catalysis.

III- Answer four only from the following: (20 Marks)

1- Mention the techniques can be used for characterization of nanocatalysts.

2- Mention the factors affecting synthesis of nanocatalysts.

3- Explain the impact intrinsic properties of nanomataerials on catalysis.

4- Explain the basic reactions by catalytic converter to reduce gas emissions.

5- The influence of texture and structure promoters on the catalyst properties.

End of Exam

Best Wishes **Prof. Dr. Abd El-Aziz A. Said**

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	Assiut University- Faculty of Science Frist Semester- Final Exam 2025-2026 Chemistry Department	Program: Industrial Chemistry Level : (3) Date: 22/1/2026 Time: 2 h	
Course Title: Colloids and Surface Chemistry		Code: 303 IC (Industrial Chem.)	
Instructors: Prof. Dr. Abd El-Aziz A. Said and Prof. Dr. Maher M. Girgis			
Important:	No. of pages 2	No. of questions 2	Total Mark:50 degree

Section (I)

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

1- Freundlich adsorption isotherm is given the expression $x/m = kP^{1/n}$, which of the following conclusions can be drawn from this expression.
   a) When n = 0, the adsorption is independent of pressure.
   b) When n = 0, the adsorption directly proportional to pressure.
   c) When n = 0, x/m vs P graph is a line parallel to x-axis.
   d) When n = 0, plot of x/m vs pressure is a curve.

2- Which is Favorable for physical adsorption?
   a) High T and high P c) Low T and high P
   b) High T and low P d) T and P don't affect

3- The term "sorption" stands for .....
   a) Absorption b) adsorption c) desorption d) both adsorption and desorption

4- Extent of adsorption of adsorbate from solution phase increases with .....
   a) Increase in amount of adsorbate in solution
   b) Decrease in surface area of adsorbent
   c) Increase of temperature of solution
   d) Decrease in amount of adsorbate in solution

5- In Langmuir's model of adsorption of a gas on solid surface
   a) The rate of dissociation of adsorbed molecules from the surface does not depend on the surface covered.
   b) The adsorption at a single site on the surface may involve multiple molecules at the same time
   c) The mass of gas striking a given area of surface is proportional to the pressure of gas
   d) The mass of gas striking a given area of surface is independent of the pressure of the gas

II. Short answer questions (10 Marks)
   a) Why is the process of physisorption reversible whereas chemisorption is not
   b) What is Freundlich adsorption isotherm.
   c) Why is it important to have clean surface in surface studies
   d) Why do physisorption and chemisorption behave differently with rise in temperature
   e) Why is desorption important for a substance to act as good

III. Answer two only from the following questions (10 marks)
   a) Apply t-method for calculating of S_t and Porosity of a solid catalyst from adsorption isotherm.

b) Apply the BET method for calculation S_{BET} of a solid catalyst from adsorption isotherm.
c) What are the differences between physisorption and chemisorption

Section (II)

1- Explain what is meant by the following terms (Give an example for each one): (6 Marks)
a) Emulsifying agents. b) Non-elastic gel.
c) Protective colloids. d) Salting out of lyophilic colloids.

2- Describe a method for the preparation of the following: (6 Marks)

a) Gold sol by the reduction method. b) Water in oleic acid emulsion.
c) Solid alcohol d) Silicic acid gel.

3- A) Give the structure of the colloidal ion of SiO_2 sol in water. (1 Mark)

B) Give reasons for the following:- (4 Marks)

a) The amount of electrolyte required to precipitate a given sol depends on the nature of the electrolyte added. Give an example.
b) The breaking of oil in water emulsion stabilized by sodium soap through addition of sulphuric acid.

4) Complete the following:- (4Marks)

a) ..... is a common thixotropic gel , and the dispersed phase in emulsions are generally ..... charged.
b) ..... is an example of multimolecular colloids, whereas .....soaps generally favor the formation of water in oil emulsions.
c) The "salting out" power of sufficiently high concentration of various ions is given by the ..... series, in which the ions are arranged in order of .....
d) ..... is an example of man-made emulsions, whereas detergents are man-made ..... .

5) Mark (V) for the correct sentence and (x) for the wrong one [correct the wrong sentence]: (4 Marks)
a) Hydrous ferric oxide sol moves to the cathode.
b) The process of fast removing of ions (or molecules) from a sol by diffusion through a permeable membrane is called electroosmosis.
c) The dispersal of a precipitated material into colloidal solution by the action of an electrolyte in solution is called electrodialysis.
d) If the sol particles in a given colloid move towards the cathode, the dispersion medium carries negative charge.

---------- Good Luck ----------

Prof. Prof. Dr. Abd El-Aziz A. Said and Prof. Dr. Maher M. Girgis.

	Assiut University- Faculty of Science Frist Semester- Final Exam 2025-2026 Chemistry Department	Program: Chemistry Level: (3) Date: 5/1/2026 Time: 3 h	
Course Title: Environmental Chemistry Analysis		Code: 343 Chem	
Instructors: Prof. Dr. Elham Yasin Hashem and Dr. Haitham El-Bery			
Important:	No. of pages 2	No. Of questions 3	Total Mark:50 degree

Answer the following questions: (50 Marks)

1- Discuss only three of the following: (15 Marks)

a) The effect of oil pollution on aquatic life and the methods used to control its impact.
b) The impact of phosphate-based detergents on water bodies, and the best way to protect the environment from their pollution.
c) Mercury (Hg) is one of the most toxic heavy metals; however, its toxicity depends on its chemical state.
d) Physical and chemical processing units are used for treatment of industrial wastewater.

2- Differentiate between only two of the following: (10 Marks)

a) API and CPI separators in oil removal.
b) Aerobic and anaerobic treatment of wastewater.
c) Preliminary and primary treatment of domestic sewage wastewater.

3- Put (√) or (X) for the following sentences, and correct the wrong answer: (25 Marks)

1) Water sample saturated with O_2 is incubated for 5 hours to determine the amount of sample BOD.
2) Self-purification of water is directly proportional to the amount of DO.
3) Water has one of the highest surface tension values, by which it could moderate the biosphere temperature.
4) Lake at higher level will have a lower value of dissolved oxygen than one near the sea level.
5) The BOD value of industrial wastewater discharged from paper industry is usually higher than that of the food industry.
6) Plain sedimentation is more effective for the removal of total suspended matter than chemical precipitation.
7) Ultrafiltration could remove very fine particles even dissolved salts.
8) Carbon adsorption is selective toward the removal of certain organic contaminants such as volatile organic compounds (VOCs)

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9) Reverse osmosis membranes are effective in the removal of all particles (suspended or even dissolved salts)

10) Refractory organic compounds are known to be easily removed by conventional treatment methods.

11) Secondary treatment is merely a physical process designed to remove organic contaminants.

12) The objective of preliminary treatment processes is to remove heavy large inorganic solids in order to protect the operation.

13) Flotation and skimming units are among the preliminary treatment processes; however, coagulation and flocculation units are among the primary treatment.

14) Trickling biofilters use anerobic microorganisms to metabolize organic contaminants.

15) API separators are more effective than CPI ones in oil removal.

16) Amount of dissolved oxygen is crucial for effective removal of organic matter through the activated sludge process.

17) Phosphate based detergents are the main reason behind growth of algae (eutrophication).

18) Control of oil pollution in seas by skimming could be applied long after oil spills.

19) Organomercurials are non-toxic form of mercury unlike mercurous ions.

20) Anaerobic biological treatment produces methane as useful byproduct of the wastewater treatment process unlike aerobic treatment.

21) COD is a measure of oxygen that is needed by microorganisms to decompose the organic and inorganic pollutants in water.

22) Chemical oxidizing agent ($KMnO_4$) is used to degrade/oxidize organic matter during the COD test.

23) Turbidity test is a measure of the concentration of suspended solids in water samples.

24) Biomethylation process undergoes under anerobic conditions at pH range 8-9.

25) Both mercuric ions (Hg^{2+}) and mercury vapor (if inhaled) are toxic forms of mercury.

26) Carbonate and bicarbonate salts of Ca and Mg causes permanent hardness for water.

End of Exam

Best Wishes
Prof. Dr. Elham Y. Hashem, Dr. Haitham M. El-Bery

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	Assiut University- Faculty of Science Frist Semester- Final Exam 2025-2026 Chemistry Department	Program: Industrial Chemistry Level : (3) Date: 9/1/2026 Time: 2 h	
Course Title: Introduction to Polymer Chemistry		Code: (211 C)	
Instructors: Prof. Dr. Kamal Ibrahim Aly			
Important: NA	No. of pages : 1	No. Of questions : 8	Total Mark: 50 degree

Answer Seven Only from the following questions:

1) Show by equations the mechanism of coordination polymerization using Zigler-Natta catalyst and Propylene gas.

2) Discuss by equations the steps of production of Carbon Fibers.

3) Explain by equations the Cationic Vinyl polymerization?

4) Compare with giving reason, between the time needed in polymerization of theses monomers: (Vinyl Chloride, Styrene , MMA).

5) In the living polymerization, show by equations how can we put an ending for the living chain (Carbanion).

6) Explain by (equations or structures): Types of copolymers- Backbiting- Dianion.

7) In the termination step of polyethylene, discuss by equations how the branching takes place.

8) Show by equations how can you prepare the following polymers:

i) Polyethyleneterephthalate. ii) Nylon 6,6

Good Luck

Examiner:

Prof. Dr. Kamal Ibrahim Aly

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	Assiut University- Faculty of Science Frist Semester- Final Exam 2025-2026 Chemistry Department	Program: Industrial Chemistry Level : (3) Date: 9/1/2026 Time: 2 h	
Course Title: Introduction to Polymer Chemistry		Code: (211 C)	
Instructors: Prof. Dr. Kamal Ibrahim Aly			
Important: NA	No. of pages : 1	No. Of questions : 8	Total Mark: 50 degree

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i) Polyethyleneterephthalate. ii) Nylon 6,6

Good Luck

Examiner:

Prof. Dr. Kamal Ibrahim Aly

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كلية العلوم
جامعة اسيوط

جامعة أسيوط

Faculty of Science
Chemistry Department

Jan 14, 2026
Time : 3 Hours

Photochemistry and Reactive intermediates (313 C)
Final Exam for The 3rd level Students

Note: Support your answer with Chemical equations whenever possible.

Answer on the Following Two Sections: (50 Marks)

Section (A): Photochemistry: (25 Marks)

Answer on the Following Questions:

I]- Answer on Only Four of the following : (4 X 2 = 8 Marks)

1- Describe the different types of Forbidden electron transition..

2- Explain the possible methods for the determination of the photo chemical reaction mechanism with special reference to the product quantum yield method.

3- Give examples for the photoreduction of ketones with special reference ti the reduction of 2-acetylnaphthalene.

4- Describe the Photo-Chemical transformations in the vision process .

5- Indicate the advantages of Microwave Radiations in organic synthesis .

II] – Mark right (√) or wrong (X) on Only Four of the following statements, and Explain your answer : (4 X 2 = 8 Marks)

1- Pyrex Glass transmitting radiations ≥ 500 nm can be used in U.V. light photolysis of organic compounds. ( )

2- Solar light is a result of fusion of Hydrogen Gas. ( )

3- Concerted Mechanism includes acyclic transition state. ( )

4- Photochromism is a Photo-reversible process. ( )

5- The microwave radiations have a higher energy than visible light. ( )

ملحوظة هامة : الأسئلة 3 صفحات

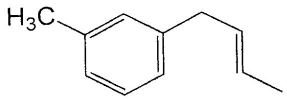
III] Complete the following equations and Discuss the reaction mechanism:

(5 X 2= 10 Marks)

a - 1,3-n-heptadiene $\xrightarrow{hv\ /\ O2}$?

b- 6 CO2 + 6 H2O $\xrightarrow{hv}$?

c- 2,5-Hexadione + CH3CH2NH2 $\xrightarrow{Microwave}$?

d- 

$\xrightarrow{hv}$?

e- 1,3-cyclopentadiene + Diazomethane $\xrightarrow{hv}$?

Section (B): Reactive Intermediates: (25 Marks)

Answer on the Following Questions:

1) Write on *two only* of the following (use equations & structures): (2 x 5 =10 Marks)

a. 2,6-Di-tert-butyl-4-methylphenol (Butylated hydroxyl toluene, BHT) is used as antioxidant.

b. The carbocation has two possible hybridized forms, mention these two possibilities, then explain which one is the preferred one? (draw the two figures)

c. The ethyl and cyclohexyl radicals are π radicals while the trifluromethyl and cyclopropyl radicals are σ radicals (explain this statement).