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كيمياء حيوى

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	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY		
	EXAMINATION FOR SECOND YEAR STUDENTS. (DOUBLE MAJOR PROGRAMS)		
COURSE TITLE:	INSTRUMENTAL ANALYSIS (1)	COURSE CODE: CH2244	
DATE: JUNE 3, 2017	TERM: SECOND	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

Question (1): Chose the correct answer for the following: [20 marks]

- The radiative $T_1 \rightarrow S_0$ process is....., while radiationless $S_1 \rightarrow T_1$ process is.....**
i) an internal conversion ii) an intersystem crossing iii) an absorption
iv) a phosphorescence v) a fluorescence.
- In atomic absorption spectroscopy, which of the following statements is FALSE?**
i) Flame is used to excite the element to a higher energy state.
ii) A hollow-cathode lamp with a cathode made of the element to be analyzed is used to produce a wavelength of light specific for the material.
iii) This light is absorbed by the ground state atoms in the flame.
iv) There is a net decrease in the intensity of the beam.
- The term (I/I_0) is called.....**
i) absorbance ii) opacity iii) extinction coefficient iv) transmittance
- What is the main light source used in fluorescence spectrometer?**
i) deuterium lamp ii) xenon lamp iii) hollow cathode tube iv) tungsten lamp
- The atomization processes in flame atomic absorption spectrometer occurs in.....**
i) photomultiplier tube ii) atomizer iii) nebulizer iv) flame
- In UV-VIS absorption spectroscopy, the UV absorption causes.....**
i) change of nuclear spin ii) change of electron distribution in valance shell
iii) change of configuration iv) change of electron distribution in inner shells
- In the atomic absorption spectroscopy, the combustion gas in the air-acetylene flame is.....**
i) air ii) nitrous oxide iii) acetylene iv) oxygen
- Which of the following is not active in IR absorption spectroscopy?**
i) Cl_2 ii) $CHCl_3$ iii) CH_4 iv) C_6H_6
- Hydrogen lamp gives a continuum spectrum in the**
i) IR region ii) UV region iii) Visible region iv) UV and visible regions
- What does the notation $n \rightarrow \sigma^*$ mean?**
i) Absorption; transition from a quantum level n to σ^* MO.
ii) Absorption; transition from a non-bonding MO to σ^* MO.
iii) Emission; transition from a quantum level n to σ^* MO.
iv) Emission; transition from a non-bonding MO to σ^* MO.

Question (2):

A. Answer the following:

[20 marks]

1. Illustrate with drawing the "Jablonsky diagram" and define the different processes of dissipating energy.
2. Draw a block diagram and steps of atomization in the flame of atomic absorption spectrometer.
3. Describe two light sources used for UV-VIS spectrophotometry.

B. Mark (✓) or (X) and give the reasons for each:

[10 marks]

1. The cells used for measuring VIS absorption spectra are made of quartz or glass.
2. Potassium bromide technique is used for measuring IR spectrum of solid sample.
3. Internal conversion is a radiative process from excited singlet to ground states.
4. Spectra of oxygen molecule can be recorded by Infrared spectrometer.
5. Unknown concentration of saturated hydrocarbons can be determined by UV spectrometers.

Question (3): Write short notes on each of the followings:

[20 marks]

1. Two applications of UV-VIS spectrophotometry.
2. Write the mathematical expression for fluorescence intensity and concentration at very low concentration, define each term, why the fluorescence intensity decreases at high concentrations?
3. IR principles and modes of vibration.
4. Deviation from Beer law due to chemical deviation.

Question (4):

A. Describe what it does and how it works:

[10 marks]

1. Photomultiplier tube.
2. Hollow cathode lamp.

B. Compare between each of the following:


[20 marks]

1. Electronic transition in organic and inorganic compounds.
2. Standard addition method and calibration method in photometric application of electronic absorption spectroscopy.
3. Nernst glower and Glycer lamp.
4. Potassium bromide and Nujol technique techniques in IR measurement.

Best Wishes and Good luck

Examiners	Prof. Dr. Ahmed Rehab Dr. Nagy Labieb Kamal
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 الدكتور
 محمد
 عبد
 السلام
 السيد
 مدير
 القسم

 1969	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY		
	FINAL EXAM FOR LEVEL2 STUDENTS (DOUBLE MAJOR)		
COURSE TITLE:	KINETIC THEORY OF GASES		COURSE CODE: CH2242
DATE	5 JUNE, 2017	TERM: SECOND	TOTAL ASSESSMENT MARKS: 50 TIME ALLOWED: 2H

Answer All Questions (50 marks)

1- Complete the following sentence: (28 marks)

1. Global warming is defined as.....
2. The unit of 1.5 atmosphere used to describe the pressure of a gas is equal to mmHg.
3. and are considered some of the man-made causes for global warming.
4. Poiseuille's equation for gases is represented by the following equation
5. For non-linear triatomic molecule the molar heat capacity at constant pressure is.....
6. Plasma "fourth state of matter" is defined as
7. As the pressure, the amount of oxygen available to breathe decreases.
8. A hot gas passing through a big spark will turn the gas stream into
9. and are considered some of the applications of gas liquefaction.
10. is specially designed to measure the atmospheric pressure, whereas can also be used to measure the pressures, which are lower than atmospheric pressure.
11. As the temperature increases the viscosity of gases increases. This is because

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2- Put true or false sign and correct the false answer? (18 marks)

- 1) For monoatomic gas like He or Ar, the total rotational kinetic energy represents the internal energy of the gas.
- 2) Smells of a perfume or meal in a room are examples of effusion in gases.
- 3) Viscosity of gas is the number of variables required to describe the motion of a particle completely.
- 4) The average kinetic energy is dependent of the mass of the molecule.
- 5) Pollution whether it is vehicular, electrical or industrial is the main contributor to the global warming.
- 6) The mean free path increases as the temperature increases.
- 7) Planting trees can help much in reducing global warming.
- 8) Landfills are the major contributor of methane and other greenhouse gases.
- 9) Van der Waal's equation corrects the non-ideality of real gases.

3- Answer the following (4 marks)

1. If the density of hydrogen is 0.090 g/L and its rate of diffusion is 5.93 times that of nitrogen, what is the density of nitrogen?
2. Calculate the root mean square speed in m/s of helium (He) at 30°C.


Best Wishes

Prof. Ahmed Borhan El-deen

Dr. Eman Fahmy Aboelfetoh

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	TANTA UNIVERSITY FACULTY OF SCIENCE CHEMISTRY DEPARTMENT		
	FINAL EXAM FOR 2 nd LEVEL STUDENTS		
	COURSE TITLE: CODE:	CHEMICAL KINETICS CH 2240	TIME ALLOWED: 2H
DATE: JUNE 7, 2017	TERM: SECOND	TOTAL ASSESSMENT MARKS: 100	

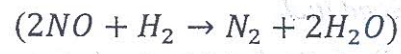
Answer the following questions (25 marks for each)

Question No., 1

I) Choose the correct answer : (15 marks 3 for each)

- 1) The unit of second order rate constant is
a) s⁻¹ b) L. mole⁻¹.s⁻¹. c) L². mole⁻².s⁻² d) Unitless
- 2) The half life time of all orders is proportional to
a) a¹⁻ⁿ b) aⁿ⁻¹
c) (a - x)ⁿ⁻¹ d) aⁿ
- 3) The integrated rate equation for the reaction A + B $\xrightarrow{\text{slow}}$ product is.....
a) $\frac{1}{a-b} \ln \frac{a(b-x)}{b(a-x)} = kt$ b) $\frac{1}{b-a} \ln \frac{a(b-x)}{b(a-x)} = kt$
c) $\frac{1}{b-a} \ln \frac{b(a-x)}{a(b-x)} = kt$ d) $\frac{1}{a-b} \ln \frac{a(b-x)}{b(a-2x)} = kt$
- 4) In the pseudo-order reaction,
a) Concentration of one reactant is very large compared to the other.
b) Concentration of one reactant is very small and can be neglected.
c) Concentrations of all reactants are equal.
d) a and b are correct
- 5) The rate constant of a reaction is independent on the initial concentration for:
a) Zero order b) First order
c) Second order d) Third order

II) The following results were obtained in the reduction of nitric oxide with H₂



p₀ = 340.5 mm Hg at t_{1/2} = 102 s

p₀ = 288 mm Hg at t'_{1/2} = 140 s

Determine the order of the reaction. (10 marks)

Question No., 2

- I) What is the difference between a simple reaction and a complex reaction? (5 marks)
- II) It was found that the concentration of N₂O₅ in liquid bromine varied with time as follows: (20 marks)

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t(s)	0	200	400	600	1000
N_2O_5 (mole/L)	0.11	0.073	0.048	0.032	0.014

- a) Confirm graphically that the reaction is first order.
 b) Determine the rate constant and $t_{3/4}$.

Question No., 3

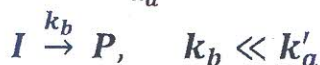
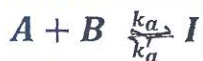
- I) Define the steps of the chain reaction. **(5 marks)**
 II) a) Rearrange the following equations according to the steps of chain reaction for the reaction ($A_2 + B_2 \rightarrow 2AB$) **(10 marks)**



- b) Write the rate equations of the formation and disappearance of $[A \cdot]$, $[B \cdot]$ and $[AB]$. **(10 marks)**

Question No., 4

- I) The reaction mechanism



Involves an intermediate I. Prove that $\frac{d[P]}{dt} = \frac{k_a k_b}{k'_a} [A][B]$. **(10 marks)**

- II) The rate of the reaction $A + 3B \rightarrow C + 2D$ was reported as 1.0 mole/L.s. state the rate of formation and consumption of the participants. **(5 marks)**
 III) What is the Arrhenius equation, Activation energy and collision number? **(10marks)**

.....
Good luck

*Examiners: Prof. Dr. Youssry El-Sheikh
 Dr. Nagla Oraiby*



TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF PHYSICS

EXAMINATION FOR SOPHOMORES (2ND LEVEL) STUDENTS OF BIOCHEMISTRY & CHEMISTRY/ BIOCHEMISTRY

COURSE TITLE:

BIOPHYSICS

COURSE CODE:PH2292

DATE:

27-5-2017

TERM: SECOND

TOTAL ASSESSMENT MARKS: 50

TIME ALLOWED: 2 HOURS

ANSWER THE FOLLWING QUSTIONS:

1- Write on:

(12 mark)

- a) Radiations effects on living tissues, and
- b) GM counters applications.

2- Explain:

(12 mark)

- a) Transitions of molecules,
- b) Bioelectrical Potentials and an application.

3- Discuss:

(12 mark)

- a) An application of sound forces,
- c) The effect of magnetic fields on human cells,

4- Write on:-

- (a) The applications of radioactive materials in medicine.

(14 mark)

- b) The Hearing theory.

والله ولى التوفيق

EXAMINERS:

Prof.Dr. G. FARAG

&

Prof. Dr.

F. Elhussiny



Tanta University
Faculty of Science
Chemistry Department

Examination for Sophomores (Double Major Students)

Course Title	Organic 3	Course Code: CH 2214
Date: June 2017	Total Assessment Marks: 150	Time Allowed: 2 hrs

Answer the following questions:


- 1- Discuss the mechanism of the following reactions: [30 Marks]
 - A) Addition reaction of HBr to 1,3-butadiene.
 - B) Preparation of allyl alcohol by the reaction of glycerol and oxalic acid.
 - C) Reaction of trialkylborane and bromoacetone in the presence of a base.
- 2- Carry out the following conversions: [15 Marks]
 - A) Ethyl acetoacetate into 3-methyl-2-hexanone.
 - B) Diethyl malonate into 2-methylpentanoic acid.
- 3- Write an account on each of the following : [30 Marks]
 - A) Wittig reaction.
 - B) Perkin reaction for preparation of α , β - unsaturated carboxylic acids.
 - C) Reformatsky reaction for preparation of β -hydroxy esters.
- 4- Discuss the mechanism of Hofmann rearrangement reaction. [8 Marks]
- 5- Circle the more likely mechanism for the reaction: [8 Marks]
Chlorobenzene + $\text{KNH}_2 \rightarrow$ aniline.
 - A) Aromatic electrophilic substitution.
 - B) Aliphatic Nucleophilic substitution.
 - C) Benzyne intermediate mechanism.
 - D) Nucleophilic aromatic bimolecular displacement mechanism.
- 6-What products would you expect from the following reactions? (explain your answer) [8 Marks]
 - A) 3,3-Dimethyl-1-butene + HI \rightarrow
 - B) $\text{CH}_3\text{CH}_2\text{CHBrCH}_3 + ^-\text{OC}_2\text{H}_5 \rightarrow$
- 7- Mark (\checkmark) for the correct and (X) for the wrong statements. Please correct the wrong one. [6 Marks]
 - A) The rate of $\text{S}_{\text{N}}1$ reactions depend on the concentration of nucleophile ().
 - B) Inversion of configuration is associated with $\text{S}_{\text{N}}1$ reactions. ().
 - C) The addition of bromine to alkenes is stereoselective, i.e. 100% SYN-addition. ().

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- 8- Discuss the mechanism of nucleophilic addition reactions to carbonyl compounds. [8 Marks]
- 9- Which of the following statements correctly describe(s) E1 reactions of alkyl halide (RX)? [7 Marks]
- I) Rate = k [base] II) Rate = k [base][RX]
 III) Rate = k [RX] IV) The reactions occur in two steps.
 V) The reactions occur in one step.
- A) I and V B) III and IV C) II and V
- 10- Discuss the use of isotope for explaining the mechanism of aqueous hydrolysis of esters. [7 Marks]
- 11- Discuss the S_N1 mechanism (give examples). [7 Marks]
- 12- For each of the following two pairs of groups, circle the one that you expect to be the best leaving group. [8 Marks]
- i- A) RS^- B) RO^- ii- A) OH^- B) H_2O .
- 13 -Which of the following reactions exhibits primary kinetic isotope effect? (Explain your answer). [8 Marks]
- A) E1 reactions. B) E2 reactions.
 C) Nitration reaction of benzene
 D) Oxidation of Ph_2CHOH to $Ph_2C=O$.

Examiners: Dr. Mahmoud Taha
Dr. Mahmoud El-Badawi
Dr. Atif El-Gharably

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	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY			
	EXAMINATION FOR SECOND STAGE STUDENTS OF SPECIAL CHEMISTRY.			
1969	COURSE TITLE:	INSTRUMENTAL ANALYSIS (I)	COURSE CODE: CH2206	
DATE:	JUNE, 2017	SECOND SEMESTER	TOTAL ASSESSMENT MARKS: 150	TIME ALLOWED: 2 HOURS

Answer the following questions:

The first question: (50 marks)

1. Mention: (30 marks)
 - a. Two methods for atomization in inductively coupled plasma atomic emission spectrometers (ICPAES). Why is the chemical interference less important in (ICPAES).
 - b. Types of magnets in NMR spectrometers. What are the advantage and disadvantage of each? How the homogeneity of magnetic field around the sample position be improved?
 - c. The kinds of interference in atomic absorption measurements.
2. Draw the photometric titration graph for the following cases (10 marks)
 - a. A mixture of B^{+3} and Cu^{+2} with EDTA at 745 nm.
 - b. X and T are coloured and P is colorless.
The symbols: X, T and P are the unknown substance, the titrant, and the reaction product, respectively. The terms: coloured and colorless mean absorb and do not absorb at the measuring wavelength respectively.
 - c. Mention all kinds of the electro-magnetic light sources that used in the following spectrometers:
UV- VIS, IR, fluorescence, atomic absorption and NMR., (10 marks)

The second question: (50 marks)

The accuracy of a spectrophotometer can be evaluated by preparing a standard solution of 60.06-ppm $K_2Cr_2O_7$ in 0.005 M H_2SO_4 and measuring its absorbance at a wavelength of 350 nm using a cell of a path length of 1.00 cm. The expected absorbance should be 0.640.

Answer:

- a. How can the accuracy of the spectrophotometer be evaluated? (5 marks)
- b. Calculate the molar concentration, the percentage transmittance (T%) and the molar absorptivity at 350 nm for the standard solution. (10 marks)
- c. The standard is analyzed by spectrophotometer (A) and three results of absorbance have an average value of 0.60, is the spectrophotometer (A) accurate or moderately accurate or inaccurate? Why?. (10 marks)
- d. Comment on:
 - I. Deviation of Beer's law regarding: the two types of deviations, the reasons of deviations, how can you differentiate between the two types. (15 marks)
 - II. The behavior of fluorescence intensity at high concentrations. (10 marks)

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The third question: (50 marks)

1. Put (✓) at the correct sentence and (X) at the wrong one. (don't write the sentence) (10 marks)

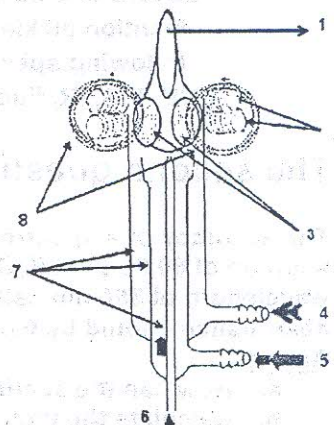
- $(\text{CH}_3)_4\text{Si}$ is used as an internal standard for measuring ^1H -NMR spectra.
- The ^1H -NMR signal of acetone signal appears as triplet.
- The cells used for measuring UV absorption spectra are made of quartz.
- CDCl_3 suitable for measuring ^1H -NMR spectra.
- The cells used for measuring IR absorption spectrum of aqueous sample are made of silver chloride.

2. Choose the correct answer: (write your choice only) (10 marks)

- In UV-VIS photodiode array spectrometer the spectra is measured (simultaneously – sequentially – point by point – all of those.) (2 marks)
- The principle of operation of photodiode array detector depends on (external photoelectric effect – thermal voltage (EMF) – pyroelectric effect – internal photoelectric effect.) (2 marks)
- The non radiative $T_1 \rightarrow S_0$ process is: (internal conversion – absorption – intersystem crossing – phosphorescence – fluorescence). (2 marks)
- The non radiative $S_1 \rightarrow T_1$ process is: (internal conversion – absorption – intersystem crossing – phosphorescence – fluorescence). (2 marks)
- The term (I_0/I_t) is called (absorbance – opacity – extinction coefficient – transmittance) (2 marks)

3. In the fig. (1): (20 marks)

- What does the figure represent? (2 marks)
- What do the numbers from 1 to 8 refer to? (16 marks)
- In what spectrometer this equipment is used? (2 marks)



4. Mention: (10 marks)

- The techniques for measuring the infra-red spectra of solid sample.
- Types of solvents and standards for measuring ^1H NMR spectra.

Hint:

H=1, K= 39.1, Cr= 52, O= 16

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Fig.(1)

EXAMINERS	Prof. Dr. samy salem.assar.	Prof. Dr. safa-Aldin Hasan
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