Answer the following questions:

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   A-Mixture of primary and tertiary alcohols.   B- Secondary or tertiary alcohols.

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Examiner: Mahmoud El-Badawi

TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF CHEMISTRY
Final Examination of for second year students (Double major)

COURSE TITLE	Organic Chemistry 2 Model 3	COURSE CODE: CH2111

DATE:	24 / 2 / 2021	TERM: FIRST	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

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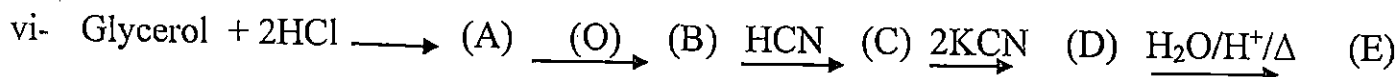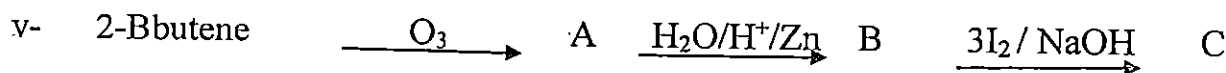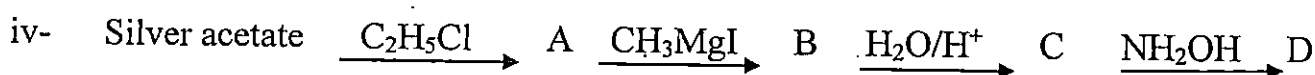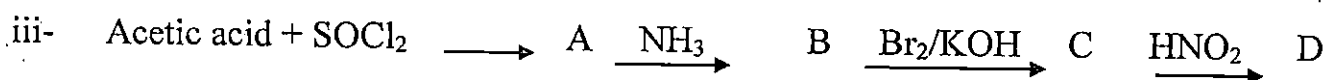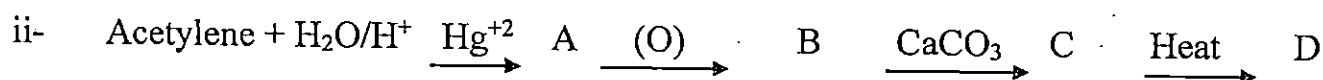
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		TANTA UNIVERSITY
		FACULTY OF SCIENCE
		DEPARTMENT OF CHEMISTRY
		Final Examination of for second year students (Double major)
COURSE TITLE	Organic Chemistry 2 Model 2		COURSE CODE: CH2111
DATE: 24 / 2 / 2021	TERM: FIRST	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

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Turn over to page 2

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TANTA UNIVERSITY
FACULTY OF SCIENCE
DEPARTMENT OF CHEMISTRY
Final Examination of for second year students (Double major)

| COURSE TITLE | Organic Chemistry 2   Model 5 | COURSE CODE: CH2111 |
| DATE: | 24 / 2 / 2021 | TERM: FIRST | TOTAL ASSESSMENT MARKS: 100 | TIME ALLOWED: 2 HOURS |

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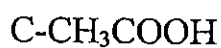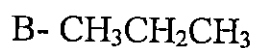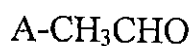
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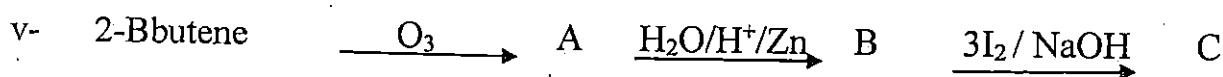C-Mixture of secondary and tertiary alcohols.　　D- Primary alcohols

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Examiner: Mahmoud El-Badawi

	Tanta University
	Faculty of Science
	Chemistry Department
	Final Examination for Second Year Students (Chemistry Section)
	Course Title: Organic Chemistry 1 — Course Code: CH2109
Date:10/3/2021	Term: First	Total Assessment Marks: 150	Time Allowed: 2 Hours

1] Choose the correct answer: (36 Marks)

1. Nitration of benzene is carried out by which of the following reactive species?
(a) NO_2^+
(b) NO_2^-
(c) HNO_3
(d) NO_3

2. The product formed predominantly in the reaction of toluene with chlorine in the presence of $FeCl_3$ is
(a) m-Chlorotoluene
(b) o- And p-chlorotoluene
(c) Benzoyl chloride
(d) Benzyl chloride

3. Which of the following will not undergo Friedel-Craft's reaction readily?
(a) Toluene
(b) Aniline
(c) Phenol
(d) Nitrobenzene

4. The product formed, when benzene reacts with CH_3COCl in the presence of $AlCl_3$ is
(a) $C_6H_5CH_3$
(b) C_6H_5Cl
(c) $C_6H_5COCH_3$
(d) C_6H_5COCl

5. When considering electrophilic aromatic substitution reactions the halides are described as...
(a) *Ortho/para* directing and activating
(b) *Ortho/para* directing and deactivating
(c) *Meta* directing and activating
(d) *Meta* directing and deactivating

6. Reaction of fluorobenzene with phenyllithium then hydrolysis in presence of CO_2 gave....
(a) Biphenyl
(b) Biphenic acid
(c) Biphenyl-2-carboxcylic acid
(d) Biphenyl-2-lithium

7. Bucherer Reaction is the conversion of a β-naphthol into the corresponding ....
(a) β-Naphthalene sulphonic acid
(b) β-Naphthylamine
(c) β-Naphthalene carboxcylic acid
(d) β-Methyl naphthalene

8. Reaction of benzyl chloride with benzene in presence of $AlCl_3$ gave......
(a) Triphenylmethane
(b) Diphenylmethane
(c) Triphenylcarbinol
(d) Tetraphenylmethane

9. Wurtz-Fittig reaction of anthracene then treated with hot methyl chloride gave.......
(a) 9,10 Dimethyl anthracene
(b) 9-Methyl anthracene
(c) 9,10 Dichloro anthracene
(d) 9-Chloro anthracene

10. Alizarin was prepared by the reaction of....
(a) Phethalic anhydride with catechol
(b) Phethalic anhydride with hydroquinone
(c) Phethalic anhydride with resorcinol
(d) Phethalic anhydride with phenol

11. Chlorination of naphthalene with one mole of chlorine at room temperature gave....
(a) 1,2,3,4 Tetrachloronapthalene
(b) 1-Chloronapthalene
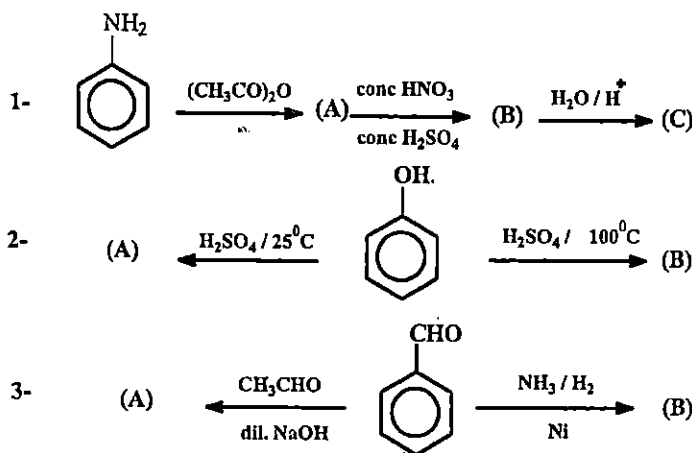(c) 1,4 Dichloronapthalene
(d) 1,4 Dichloro1,4-dihydronapthalene

12. Reaction of cyclohexanone with C_6H_5-MgX *via* Grignard reaction gave.....
(a) Naphthalene
(b) Anthracene
(c) Biphenyl
(d) Benzidine

2] Put right (a) or wrong (b) (36 Marks)

1. Reaction of butylbenzene with acidic ($KMnO_4$) yields benzoic acid.
2. NH_2 is *meta*-directing and activating group in benzene and has (+I,-M) effect.
3. Reaction of benzene with n-propylchloride / $AlCl_3$ yields n-propylbenzene.
4. Reaction of toluene with ($KMnO_4$) and, HNO_3/ H_2SO_4 yields mixture of ortho and para nitrobenzoic acid.
5. Reaction of bromobenzene with chlorine/$AlCl_3$ yields *meta* bromochlorobnzene.
6. Sulphonation of anthraquinone with olueum at $60°C$ without any catalysis gave anthraquinone-1-sulphonic acid
7. Nitration of naphthalene-α-sulphonic acid gave 2-nitro-1-naphthalene-sulphonic acid
8. Oxidation of β-methylnaphthalene gave 5- methyl-1,4-naphthaquinone
9. Oxidation of phenanthraquinone gave biphenic acid
10. Malachite green was prepared by the reaction of acetaldehyde with N,N-dimethyl analine
11. Nitration of phenanthraquinone gave 2 and 4- isomers
12. Sulphonation of phenanthrene at $120°C$ gave 9- phenanthrene sulphonic acid

3] Complete the following equations, write the name of products:- (14 Marks)

1-
NH$_2$ ⬡ $\xrightarrow[\text{...}]{(CH_3CO)_2O}$ (A) $\xrightarrow[\text{conc } H_2SO_4]{\text{conc } HNO_3}$ (B) $\xrightarrow{H_2O / \overset{+}{H}}$ (C)

2-
(A) $\xleftarrow{H_2SO_4 / 25°C}$ ⬡ OH $\xrightarrow{H_2SO_4 / 100°C}$ (B)

3-
(A) $\xleftarrow[\text{dil. NaOH}]{CH_3CHO}$ ⬡ CHO $\xrightarrow[\text{Ni}]{NH_3 / H_2}$ (B)

4] Carry out of the following conversions: (15 Marks)

a) Aniline to Methyl orange
b) Benzene to saccharine.
C) Phenol to Toluene.

5] Write short notes of the following, with equations:- (16 Marks)

a) Action of nitrous acid in 1ry, 2 ry and 3 ry aromatic amines.

b) Sulpha-drug compounds and its applications.

c) Sandmeyer reactions.

d) Reimer-Tiemann reaction

6] Give short note about the following: (33 Points)

a) Haworth synthesis for preparation of 9-methylanthracene.
b) Synthesis of β-nitronaphthalene
c) Proof the structure of phenantherene
d) Intra rearrangement of hydrazobenzene by HCl.
e) Reduction of naphalene and anthracene.
f) Complete the following equations and name the products A and B:
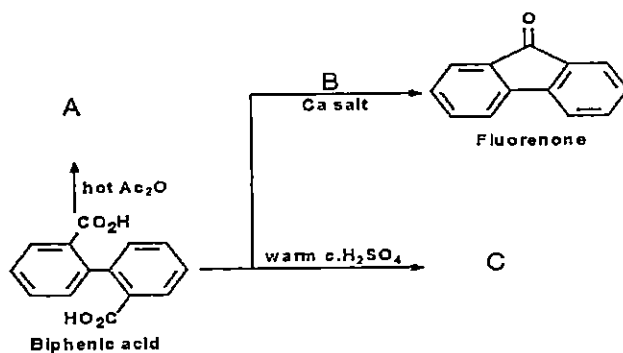
Good Luck

EXAMINERS	PROF. DR. HALA FAWZY& DR. SAMAH SHENDY

Answer the following questions: (100 Marks)

1] Choose the correct answer from the alternatives a,b,c and d.   (10 Marks)

1] 1-Chloro-4-methoxy-benzene + HNO$_3$/H$_2$SO$_4$ ⟶

a) 4-Chloro-1-methoxy-5-nitro-benzene   b)1 -Chloro-4-methoxy-6-nitro-benzene

c) 4-Chloro-1-methoxy-3-nitro-benzene.   d) 4-Chloro-1-methoxy-2-nitro-benzene

2] The pKa of phenol is 10. Which of the following compounds would you expect to be less acidic than phenol?

a) 3-nitro-phenol

c) 4-amino-phenol

b) 4-cyano-phenol

d) 3,4 -dinitro-phenol

3] Which of the following compounds is predicted to undergo slower nitration?

d) Compounds a, b, and c would undergo nitration atapproximately the same rate

a)   b)   c)

4] Reaction of 4-methyl-phenol with CH$_3$CH$_2$COCl/ AlCl$_3$ followed by reduction with Zn/HCl yield --------------- as a major product.

a) 4-Methyl-3-propyl-phenol

c) 4-Methyl-2-propyl-phenol

b) 3-Isopropyl-4-methyl-phenol

d) 2-Isopropyl-4-methyl-phenol

5] Which of the following statements about the structure of benzene is not true?

a) The electrons in the pi bonds are delocalized around the ring

b) Benzene has three short double bonds alternating with three longer single bonds

c) Benzene has six pi electrons   d) Benzene is planar

2] Put (√) or (x) and correct the wrong answer (Explain by answers):   (24 Marks)

a) Sulphonation of phenol at 100 °C gives o-phenol sulphonic acid.

b) Reaction of chlorobenzene with aqueous KCN yields cyanobenzene.

c) Methoxy group is *meta*-directing group in benzene, and cause deactivation of benzene ring for electrophilic substitution reaction.

d) Reaction of isopropyl-benzene with 3-chloro-2, 2-dimethylbutane using AlCl₃ gave 1-tert-Butyl-4-isopropyl-benzene as a major product.

e) Reaction of phenol with benzoyl chloride form phenyl benzoate.

f) Cyclopropenyl anion is an aromatic compound.

3] Carry out of the following conversions: (24 Marks)

a) Benzene sulphonic acid to anthranilic acid.

b) Benzene to methyl benzene sulphonate

c) Aniline to Methyl orange

d) Phenol to 4-chloro-2-nitroaniline

e) Chloro-benzene to 2-chloro-phenol

4] Complete the following equations. (22 Marks)

a) Aniline $\xrightarrow{\text{CH}_3\text{I}}$ A $\xrightarrow[\text{HCl}]{\text{NaNO}_2}$ B

b) Benzene + HCHO + HCl $\xrightarrow{\text{ZnCl}_2}$ A $\xrightarrow{\text{KCN}}$ B $\xrightarrow{\text{H}_3\text{O}^+}$ C

4] Write the mechanism of the following reaction: (20 marks)

a) Halogenation of benzene

b) Bromobenzene + KNH₂/NH₃ → Aniline

Good Luck
Examiner: Dr. Mohamed Hamed & Ass. Prof.Dr. Sahar El-khalafy

	Tanta University, Faculty of Science, Chemistry Department Final Exam. of Chemical Thermodynamic (CH2101) Level Two-Special Chemistry Students	
	First Semester -January 2021	Date: March , 2021
	Total Assessment Marks: 150	Time allowed: 2 hours

Question (1); choose the correct answer for the following?

1-The standard change of Gibbs energy for the reaction, $H_2O \rightleftarrows H^+ + OH^-$ at 25°C is:

(i) -90 kJ   (ii) 90 kJ   (iii) -100 kJ

2-The entropy change in the fusion of one mole of a solid melting at 27°C (the latent heat of fusion is 2930 J mol^{-1} is

(i) 9.77 $JK^{-1}mol^{-1}$ (ii) 10.73 $JK^{-1}mol^{-1}$ (iii) 2930 $JK^{-1}mol^{-1}$

3-The maximum work done in expanding 16 g oxygen at 300 K and occupying a volume of 5 dm^3 isothermally until the volume becomes 25 dm^3 is:

(i) 2.01 x 10^3 J   (ii) +2.81 x 10^3 J   (iii) 2.01 x 10^{-3} J   (iv) +2.01 x 10^{-6} J

4- 1 mole of an ideal gas at 25°C is subjected to expand reversibly ten times of its initial volume. The change in entropy of expansion is:

(i) 19.15 $JK^{-1}mol^{-1}$ (ii) 16.15 $JK^{-1}mol^{-1}$ (iii) 22.15 $JK^{-1}mol^{-1}$

5- For the process; $H_2O_{(l)} \rightarrow H_2O_{(g)}$ at T = 100°C and 1 atmosphere pressure, the correct choice is:

(i) $\Delta S_{system} > 0$ and $\Delta S_{surrounding} > 0$ (ii) $\Delta S_{system} > 0$ and $\Delta S_{surrounding} < 0$

(iii) $\Delta S_{system} < 0$ and $\Delta S_{surrounding} > 0$ (iv) $\Delta S_{system} < 0$ and $\Delta S_{surrounding} < 0$

6-The cooling in refrigerator is due to;

(i)- The reaction of refrigerator gas   (ii)-The work of compressor   (iii) The expansion of refrigerator gas

7- Spontaneous adsorption of a gas on a solid surface is exothermic process because

(i) Enthalpy of the system increases   (ii) entropy increases   (iii) entropy decreases

8- When a gas undergoes adiabatic expansion, it gets cooled due to;

i) loose of kinetic energy   ii) fall in temperature   (iii) Energy used in doing work

9- For which of the following processes will energy be absorbed

(i) Separating an electron from nucleus   (ii) separating proton from nucleus

(iii) Separating a neutron from neutron   (iv) Separating an electron from neutral atom

10- During an adiabatic process:

(i) Pressure is maintained constant   (ii) gas is isothermally expanded

(iii) There is perfect heat insulation   (iv) the system changes heat with surroundings

11-If 50 calorie is added to a system and system does work of 30 calorie on surroundings, the change in internal energy of system is:
(i) 20 cal   (ii) 50 cal   (iii) 40 cal   (iv) 30 cal

12-Identify the correct statement regarding a spontaneous process
(i) Exothermic processes are always spontaneous
(ii) Lowering of energy in the reaction process is the only criterion for spontaneous
(iii) For a spontaneous process in an isolated system, the change in entropy is positive
(iv) Endothermic processes are never spontaneous

13- For a particular reversible reaction at temperature T, ΔH, ΔS were found to be both +ve. If T_e is the equilibrium temperature at equilibrium. The reaction would be spontaneous when;
(i)$T_e > T$ ii) $T > T_e$ iii) T_e is 5 times T   iv) $T = T_e$

14- The internal energy change when a system goes from state A to B is 40 kJ/mol. If the system goes from A to B by a reversible path and returns to state A by an irreversible path. What would be the change in internal energy?
(i) 40 kJ   (ii) >40 kJ   (iii) <40 kJ   (iv) Zero
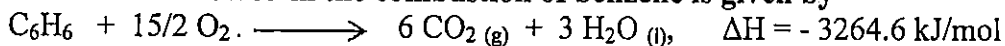
15- A gas is allowed to expand at constant pressure from a volume of 1.0 Liter to 10.0 Liter against an external pressure of 0.5 atm. If gas absorbs 250 J of heat from the surrounding, what are the values of q, w, and ΔE? (Note; 1 atm L =101 J)

	q	w	ΔE
i	250 J	-455 J	-205 J
ii	-250 J	-455 J	-710 J
iii	250 J	455 J	710 J
iv	-250 J	455 J	205 J

16- The work done by the system in a cyclic process involving one mole of an ideal monoatomic gas is – 50 kJ /cyclic. The heat absorbs by the system per cyclic is:
(i)Zero   (ii) 50 kJ   (iii) -50 kJ   (iv) 250 kJ

17-The heat evolved in the combustion of benzene is given by
$C_6H_6 + 15/2 O_2 \longrightarrow 6 CO_{2 (g)} + 3 H_2O_{(l)}$, $\Delta H = -3264.6$ kJ/mol
Which of the following quantities of heat energy will be evolved when 39 g of C_6H_6 are burnt?
i)816.15 kJ   ii) 1632.3 kJ   iii) 6528.2 kJ   iv) 2448.45 kJ

18- What is the value of ΔG° at 25 °C for the reaction having equilibrium constant 4?
$C_2H_5 OH + CH_3COOH \longrightarrow CH_3COOC_2H_5 + H_2O$
i)-82.11   ii) + 82.11   iii) 821.1   iv) -821.1

19- Indicate which of the following has the highest entropy at 298 K.
i)0.5 g of HCN   ii) 1 mol of HCN   iii) 2 kg of HCN   iv) 2 mol of HCN

20-Change in entropy is negative for:
(i) Bromine (l) → Bromine(g)   (ii) $C_{(s)} + H_2O_{(g)} → CO_{(g)} + H_{2(g)}$
(iii) $N_2(g,10\ atm) → N_2(g,1\ atm)$ (iv) Fe (1mol, 400 K) → Fe(1mol, 300 K)

21- What is the standard entropy change when 10 g of methane reacts with 10 g of oxygen? $CH_{4\ (g)} + 2\ O_{2\ (g)}$ $CO_{2\ (g)} + 2H_2O_{\ (g)}$

Substance	$CH_{4\ (g)}$	$O_{2\ (g)}$	$CO_{2\ (g)}$	$H_2O_{\ (g)}$
$S°$ (J/mol. K)	186.2	205.0	213.6	70.0

(i) -121 J/K   (ii) -37.9 J/K   (iii) -242.6 J/K   (iv) -154.4 J/K

22- Given the following data, determine the molar free energy of combustion for propane gas, C_3H_8.

Substance	$C_3H_{8\ (g)}$	$CO_{2\ (g)}$	$H_2O_{\ (g)}$
ΔG (kJ/mol)	-23.5	-394.4	-105.6

(i)-1629.1 (kJ/mol)   ii) -1582.1 (kJ/mol)   iii) -476.5 (kJ/mol)

23-All the naturally occurring processes, i.e., spontaneous proceed spontaneously in a direction which leads to:
(i) decrease of free energy   (ii) increase of free energy   (iii) decrease of entropy

24-The free energy change due to a reaction is zero when
(i) The reactants are initially mixed. (ii) A catalyst is added (iii) The system is at equilibrium

25- The mathematical form of the first law of thermodynamics when heat (q) is supplied and W is work done by the system is:
(i) $\Delta E = q + W$ (ii) $\Delta E = q - W$ (ii) $\Delta E = -q + W$ (iv) $\Delta E = -q - W$

Question (II); Answer the following?

1- Hydrogen reacts with nitrogen to form ammonia (NH_3) according to the reaction; $3H_{2\ (g)} + N_{2\ (g)} \longleftrightarrow 2\ NH_{3\ (g)}$
The value of $\Delta H°$ is – 92.38 kJ/ mol, and that of $\Delta S°$ is - 198.2 J/mol K. Determine $\Delta G°$ at 25 °C?

2- Dinitrogen tetroxide (N_2O_4) decomposes to nitrogen dioxide (NO_2). If $\Delta H° = 58.02$ kJ/mol and $\Delta S° = 176.1$ J/mol . K, at what temperature is reactants and products in their standard states at equilibrium?

3-The mean specific heat of water is 1:00 cal. g^1 K^1. Calculate the heat required to increase the temperature of 1.5 L of water from 25°C to the boiling point?

4-A 500-g piece of iron, initially at 25 °C, is plunged into 0.5 L of water at 75 °C in a Dewar flask. When thermal equilibrium has been reached, what will the temperature be? The specific heat of iron is 0:106 cal g^{-1} K^{-1}.

Question (III):

1- Prove that; PV$^{\gamma}$ = Constant

2-Define each of the following

(i) Enthalpy of neutralization:---

(ii) Gibbs free energy:--

(iii) Extensive properties:---

(iv)Molar heat capacity:---

(v) Calorie :---

Good Luck for All   *Prof. Ali Gemeay*

![logo 1969]	TANTA UNIVERSITY
	FACULTY OF SCIENCE
	DEPATTMMENT OF CHEMISTRY
	Final Examination For Second Level Students (Special Chemistry)
	COURSE TITLE: The Phase Rule	COURSE CODE: CH2208
	DATE: 29/12/2020	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

Answer the following questions (label each area line and point in your diagram):

Each question (25 marks)

1- a) Drive the phase rule and explain the terms involved? Calculate the maximum number of phases that exist at equilibrium for one component system?

b) Evaluate P, C, and F for the following systems at equilibrium:

i) CO_2, O_2, and N2   ii) Ice/water/vapor.

iii) Dissociated steam at $1800°C$.

iv) Liquefied gas in a cylinder.

v) $Na_2SO_{4(s)}$ / $Na_2SO_4.7H_2O_{(s)}$ /ice$_{(s)}$ /solution and vapor phase.

2- Compare the following:

a) Phase diagram of H_2O and phase diagram of CO_2

b) Phase diagram of enantiotropic and monotropic systems.

3- Answer the following:

a) Write on the distillation of zeotropic and azeotropic mixtures.

b) Draw sketches for binary condensed systems with simple eutectic, peritectic, and eutectoid temperature.

4- Discuss the flowing phase diagrams.
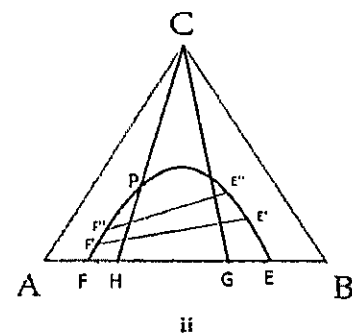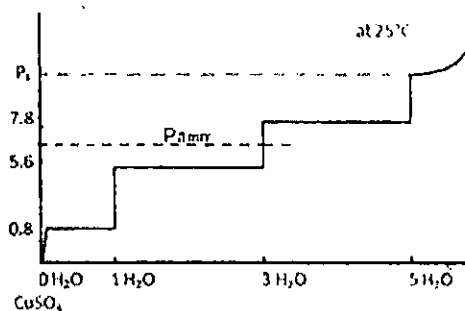
(Good luck)

Tanta University - Faculty of Science - Chemistry Department
Final Exam of nanotechnology
For 2ⁿᵈ year students (Biotechnology)
Course Code: BT229   **Date:20-2-2021**
Total assessment marks: 60   **Time Allowed: 2h**

<u>The Questions in two pages,</u> **Answer the following questions:**

1) **Write short notes on (8Marks)**
   1- Enhanced permeability and retention effect
   2- Stealth liposomes and uses of liposomes
   3- Disadvantages of Attrition method for production nanoparticles
   4- Mechanism of drug release from polymeric nanoparticles

2) **Compare between each pairs of the following (8 Marks)**
   1- Structure and Function of DNA and protein
   2- Emulsion solvent evaporation method and Dialysis method for preparation polymeric nanoparticles.

3) **Answer by √ or X (10 Marks)**
   1- NIR energy has unlimited penetration depth through human tissue
   2- In solvent evaporation methods the organic solvent should be miscible with water
   3- It is not recommended to use glutaraldehyde for preparation chitosan nanoparticles
   4- Excess of oxygen in pyrolysis result in larger diameter particles
   5- In solvent evaporation method, the organic solvent should be miscible with water
   6- Thiols are used as capping agents in preparation of metal nanoparticles
   7- Kaolinite is used in preparation of silver nanoparticles to prevent corrosion
   8- In solvent diffusion method loading water soluble drugs is recommended
   9- Silver nanoparticles can be prepared from silver nitrate without using reducing agent by pulsed laser technique
   10- Nanoshells manufactured from silica core and gold shell has the ability to capture infrared waves and can penetrate up to 10 cm in the body

4) **Complete: (13 Marks)**
   1- The surface of gold nanoparticles capped with citrate promote -------growth and adding surfactant to growth solution promotes ------growth.
   2- When phospholipids are added to water they form --------- and by agitation they form-------- and by sonication they form------- and by extrusion they form -------
   3- Liposomes can be delivered to appropriate sites by --------,-------,----------
   4- The particle size in chemical reduction method is controlled by -----,-----
   5- In pulsed laser method, the size of particles is controlled by ------and --------

5) **Write the scientific term (7 Marks)**
1- The spread of cancer to other location in the human body.
2- A class of proteins that specifically recognize foreign agents in the body and tag them for removal
3- An Environmental safe technique for production polymer nanoparticles with high purity without any organic solvents.
4- Process of covalent attachment of PEG to a drug or therapeutic protein that can mask the agent from host's immune system.
5- Particles that are characterized by brightness 20 times and 100 times photostable in comparison with organic dyes.
6- The method that the drug used to prevent DNA replication and stop cell division
7- A glycoprotein enzyme that is over expressed when prostate cancer is present

6) **Give reason (4 Marks)**
1- Encapsulated liposomes vitamin C is recommended in nutrition
2- Electric field is recommended in preparation TiO_2 nanoparticles by pyrolysis technique.
3- Silver nanoparticles are used in biomedical applications.
4- Aluminum nanoparticles are passivated by oxygen in RF plasma technique.

7) **Choose the correct answer: (10 Marks)**
1- Gap intercellular junction
    a) prevent leakage of extracellular fluid
    b) Allow passage of salts and sugars between cells
    c) Prevent passage of salts and small molecules between cells

2- Flurene is
    a-two dimensional layered anisotropic material   b-one dimensional nanowire
    c-zero dimensional nanoparticle   d- Three dimensional nanoparticles

3- The size of one small unilamellar vesicle liposome
    a-$\geq$ 500 nm   b-$\geq$20-100 nm   c- $\geq$ 100 nm

4- To protect the drug molecules from in vivo degradation the drug molecules are
    a-adsorbed onto the surface   b-Encapsulated   c-chemically bound to the surface

5- The cells usually accepts
    a-Spherical >100 nm particles   b- Cylindrical > 100 nm particles
    c- Spherical <100 nm particles   d- non spherical < 100 nm particles

6- Many drink bottles are made from plastics containing nanoclays to
    a) decrease resistance to permeation by oxygen, carbon dioxide, and moisture.
    b) helps retain carbonation and pressure
    c) increases shelf life by several months.
    d) a, b are correct
    e) b, c are correct

7- Nanosensors can be used in biomedical applications to
    a) Decrease the impact
    b) Identify particular cells or substances in the body.
    c) Increase resistance to carbondioxide permeation

8- The melting point of nanoparticles are --------with reducing grain size
    a) Reduced
    b) Increased
    c) Not affected

9- Antibacterial potential of silver nanoparticles increased when the particle size ----- and surface area -------
    a- Decreased-decreased
    b- Increased-increased
    c- Decreased-increased
    d- Increased-decreased

10- The particle size in pyrolysis is affected by
    a-oxidant composition
    b-Flame length
    c-Nozzle quenching
    d-All are correct

================== With our Best Wishes ==================
Examiners: Prof. Nehal Salahuddin, Dr Naglaa Oreby

Answer The Following Questions :

1) Mark ($\sqrt{}$) or (X) and correct the false sentences: (6 Marks)

i- The streching vibration of $C = C$ bond for trans-isomer of stillbene is slightly higher than that of cis- isomer, while the binding vibration of $C-H$ bond for trans-isomer is very lower than that of cis-isomer in IR-Spectra. ( )

ii- Trans-isomer of cinnamic acid has very lower λ_{max} and slightly higher ε than that of cis– isomer with UV- spectra . ( )

ii- Mutarotation is the conversion of glucose to fructos . ( )

2) The chemical shift of ethylenic proton δ_H was found experimentally to be 7.69 ppm for [Ph.CH= C(Me) COOH] . What is the geometrical isomerism of the above acid ? (substituent constants for chemical shift are : $-Ph_{gem} = 1.35$, $-COOH_{cis} = 1.35$, $-COOH_{trans} = 0.74$, $-CH_{3\ cis} = -0.26$,$-CH_{3\ trans} = -0.24$ ppm). Write its name. (8 Marks)

3) Describe the separation of ($\pm$) -2-ethylpentanoic acid . (7 Marks)

4) Compare between each of the following: (8 Marks)
 i- Maleic & fumaric acids (only by stereoselective addition methods).
ii- Cationic and anionic racemization .
iii- Diastereomers and racemic mixture .

5) Startig with ethyl acetate describe the synthesis of ($\pm$)-3-methyl-2-hexanol. (8 Marks)

6)a-Draw and name the isomers of the following compounds: (9 Marks)
 i-2,3- Pentanediol.   ii- 3,4-Dibromohexane.   iii-Aldotetrose.
 b-Draw the following compounds : (4 Marks)
 i- (2Z,5R)-3,5-Dichloro-2-hexene.   ii- meso- Tartaric acid.
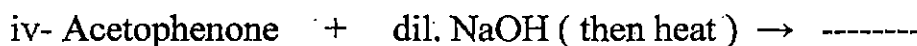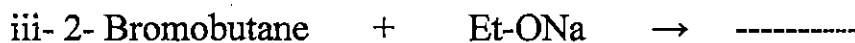

Examinars:

Prof.Dr. Adel I. Selim .   **Dr. Abdel-Baset Morsy .**

Answer the following questions :

1) Write the mechanism of the following reactions: (**20 Marks**)

i- 3- Hexanol   +   conc. H_2SO_4 (170°C) → ----------

ii- 2-Butanone   + NH_2NH_2 → ----------

iii- 2- Bromobutane   +   Et-ONa   → ----------

iv- Acetophenone   +   dil. NaOH (then heat) → --------
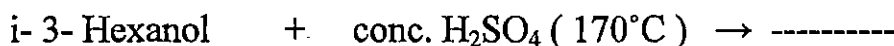
2) An organic liquid gave on analysis; **C: 64.86 %** , **H : 13.53 %** . (If its V.D. = 37) . Calculate its M.F. , and draw all possible isomers and name each of them according IUPAC system.   (**12 Marks**)

3)- An organic compound **A** discharge the colour of bromine , and on ozonolysis gave compound **B** (C_4H_8O) and compound **D** (C_4H_8O). Compound **B** react with **2,4- DNP** , can not reduce Fehling solutions but give iodoform test , while Compound **D** react with **2,4- DNP** , reduce Fehling solutions but give no iodoform test. What are compounds **A** , **B** & **D** ? Illustrate your answer by equations.   (**14 Marks**)
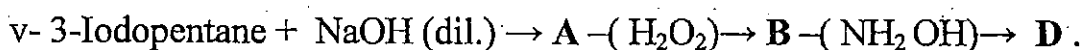
4) Carry out the following conversions: (**20 Marks**)

 i- Carbon grafite   →   Ethyl acetate .

 ii- Methyliodide   →   2- Butanol .

 iii- Ethanol   →   Acetone .

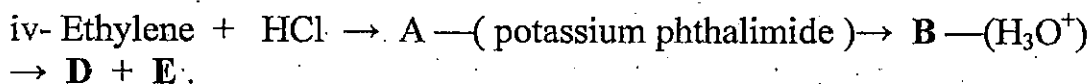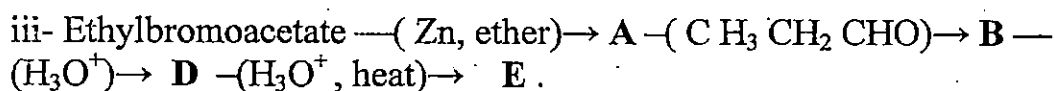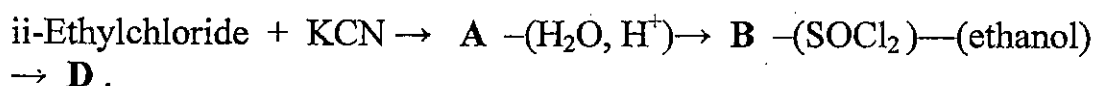 iv- Methanol   →   Diethyl ether .

 v- 1-Propene   →   Glycerol .

(أقلب الصفحة)
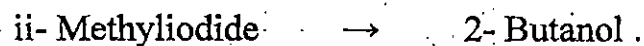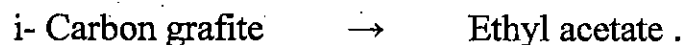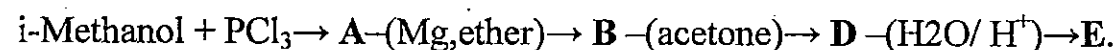
5) Give an account on each of the following: **(14 Marks)**
  i- Saponification value of an oil or fat .
 ii- The effect of heat on α- , **B**- & γ- hydroxybutyric acids .
iii- The effect of benzene sulphonyl chloride on iso-propylamine,
diethylamine & trimethylamine (Hinsberg test) .
iv- The effect of NaOH on 2-, 3- & 4- chlorohaxanoic acid .
v- Dumas method for estimation of nitrogen in an organic compound .

6) Complete the following equations and name the products: **(20 Marks)**

i-Methanol + $PCl_3 \rightarrow$ **A**–(Mg,ether)$\rightarrow$ **B** –(acetone)$\rightarrow$ **D** –(H2O/ H^+)$\rightarrow$**E.**

ii-Ethylchloride + KCN $\rightarrow$ **A** –(H_2O, H^+)$\rightarrow$ **B** –($SOCl_2$)—(ethanol) $\rightarrow$ **D** .

iii- Ethylbromoacetate —(Zn, ether)$\rightarrow$ **A** –(C H_3 CH_2 CHO)$\rightarrow$ **B** — (H_3O^+)$\rightarrow$ **D** –(H_3O^+, heat)$\rightarrow$ **E** .

iv- Ethylene + HCl $\rightarrow$ **A** —(potassium phthalimide)$\rightarrow$ **B** —(H_3O^+) $\rightarrow$ **D** + **E** .

v- 3-Iodopentane + NaOH (dil.) $\rightarrow$ **A** –(H_2O_2)$\rightarrow$ **B** –(NH_2 OH)$\rightarrow$ **D** .

Examinars :

Prof.Dr. Adel I. Selim   **Dr. Ahmed Noser**

Answer the following questions:

Q1. Mark (√) or (x) on the following phrases and correct the false one. *(20 marks)*

a) Eco-Sounder is used for measuring depth of large rivers, in excess of 10 m. ( )

b) Lead Line is a technique of using sound pulse to find the depth of water. ( )

c) Sounding Rods used to raise the level, which can be suspended at any height. ( )

d) Sounding Poles Suitable for shallow and quiet waters. ( )

e) Sounding Boat taking the velocity of sound in water to be approximately 1470m/s. ( )

Q2. Short Answer Type Questions. *(20 marks)*

a) Explain the Positioning Satellite (GPS).

b) Explain limitations of a single beam and multibeam echo sounder.

Q3. Define the following *(20 marks)*

a) Hydrographic chart.

b) Stream gaging.

c) Sounding line.

d) Tidal streams.

e) M.S.L (Mean Sea Level)

EXAMINER	Prof. Mohamed Z. Elsedemy

Wishing Success for the ALL

Answer the flowing questions

تصحيح السؤال الاول الكتروني

1- Chose the correct answer: (30 Marks)

1. The % of commodity chemicals is------------------------------------
   a) 70 %   b) 80 %   c) 90 %

2. White phosphorus in air react with ------- gives smoke
   a) Oxygen   b) Hydrogen   c) Nitrogen

3. The sulpher extract by frasch process is -----------------------------------
   a) Low melting point   b) high dentistry   c) high melting point

4. Raw material of NaCl from--
   a) Hydrosphere   b) lithosphere   c) atmosphere

5. Diamond is ---
   a) Electrical conductor   b) Electrical semiconductor   c) Electrical insulator

6. The raw material of white phosphorus is ---------------------------------------
   a) Graphite   b) apatite   c) methane

7. SO_3 react with conc. H_2SO_4 give -------- in manufacture of H_2SO_4
   a) Twice amount   b) same amount   c) fog of H_2SO_4

8. The % of water electrolysis to producte H_2 -----------------------------
   a) 75%   b) 50%   c) 25%

9. The catalyst in manufacture of ammonia deactivate by --------------
   a) Water   b) sulphur   c) Nickel

10. Remove of catalyst in H_2O_2 manufacture because it decompose-----
    a) H_2O_2 b) H_2 c) O_2

2- A) Write the Manufacture equations for: (15 Marks)
   i) H_2O_2 ii) NaOCl   iii) Mining of natural graphite

   B) Write two uses of : i)Hydrogen ii) NH_3 iii) Red phosphorus   (15 Marks)

3- A) Discuss the following points manufacture H_3PO_4 by thermal process
   i) Raw materials   ii) process   (10 Marks)

   B)) Discuss the following points: (21 Marks)
   i)   Different types of raw material in industrial chemistry
   ii) The gangue separation from diamond
   iii) Industrial chemistry

4-A) Draw the diagram for manufacture of extraction of sulpur by frasch process   (8Marks)

   B) Give the reason of the following: (21Marks)
   i) Diamond is very hard.
   ii) using catalyst in manufacture of H_2SO_4
   iii) Furnace design of SRM process is less compact than POX process

Examiners   Prof. Dr/ Mohamed Gaber   Prof. Dr/ Nadia El-Wakiel

B

	Tanta University, Faculty of Science, Department of Chemistry		
	Examination for 2nd year Chemistry (معادلة) (Model B)		
	Course Title	**Kinetic Theory of gases**	Code: CH2242
09/03/2021	1st Semester	Total Assessment Marks: **50**	Time: **2 hrs.**

Q1-Choose the correct answer: **(12 marks)**   **Each one; 1mark**

1-The volume of the gas in a container can be determined by the size of

a- the container   b-particles   c- both of them

2- The rate of diffusion of a gas is inversely proportional to the square root of its density, this statement of

a- Charles' law   b- Graham's law   c- Dalton's law

3- All atomic and molecular motion would stop when the temperature would be at

a- ($25\,^{\circ}C$)   b-($-273\,^{\circ}C$)   c-($0\,^{\circ}C$)

4- The passage of gases through a small hole or pores of a membrane under pressure this is the definition of

a-effusion   b- diffusion   c- both 1 and 2

5- The average kinetic energy of all gas molecules is proportional

a- inversely with its absolute temperature   b-directly with its Celsius temperature
c- directly with its absolute temperature

6- When the two molecules are headed in the same direction and collision angle = 0°, this is

a- grazing collision   b- head-on-collision   c-right angle collision

7-The motion of gas particles are in

a-order and straight-line   b- random and straight-line   c- random and zigzag

8-Collision between gas molecules can change the .... speeds, but this does not affect the .... speed of the system

a-average, individual   b-individual, average   c-average, most probable

9-Real gases obey the ideal gas equation at

a- higher temperature and very low pressures   b- lower temperature and very low pressures

c- higher temperature and very high pressures

B

10-The .... the temperature, the .... the kinetic energy

a-higher, greater   b- higher, litter   c- lower, greater

Q2- Calculate the degrees of freedom and the heat capacity at constant volume and pressure of H_2O? (R = 2 cal/mol deg)   **(10 marks)**

Q3-Give the reason for each of the following: (6 marks)

a) The pressure of gas.

b) The viscosity of an ideal gas is independent of its density.

c) The higher the elevation the lower the air pressure.

Q4-a) At room temperature, Xe atoms (F.W. = 131.3 g/mol) have an average speed of 240 m/s. At the same temperature, what is the speed of O_2 molecules (F.W. of O = 16 g/mol)   **(4 marks)**

b) What are the factors affecting on the rate of diffusion?   **(6 marks)**

Q5-a) Calculate C_{rms}, $\overline{C}^2$ for CO_2 gas at 25°C, at what temperature would H_2S gas has the same values of the velocities? (R = 8.314 x 10^7 erg $mol^{-1}K^{-1}$, F. W. of O = 16, C =12, H =1and S = 32) **(6 marks)**

b) **Define each of the following: (6 marks)**

    i)   Collision frequency
    ii)   Viscosity
    iii)   The Most Probable Velocity

End of the questions

Best wishes

Dr. Abeer S. Elsherbiny

A

	Tanta University, Faculty of Science, Department of Chemistry		
	Examination for 2nd year Chemistry (معادلة) (Model A)		
	Course Title	**Kinetic Theory of gases**	Code: **CH2242**
09/03/2021	1st Semester	Total Assessment Marks: **50**	Time: **2 hrs.**

Q1-Choose the correct answer: (12 marks)   Each one; 1mark

1- When the two molecules are headed in the same direction and collision angle = 0°, this is

a- grazing collision   b- head-on-collision   c-right angle collision

2- The passage of gases through a small hole or pores of a membrane under pressure this is the definition of

a-effusion   b- diffusion   c- both 1 and 2

3-The motion of gas particles are in

a-order and straight-line   b- random and straight-line   c- random and zigzag

4- The rate of diffusion of a gas is inversely proportional to the square root of its density, this statement of

a- Charles' law   b- Graham's law   c- Dalton's law

5-The volume of the gas in a container can be determined by the size of

a- container   b-particles   c- both of them

6-Real gases obey the ideal gas equation at

a- higher temperature and very low pressures   b- lower temperature and very low pressures

c- higher temperature and very high pressures

7- All atomic and molecular motion would stop when the temperature would be at

a- (25°C)   b-(-273°C)   c-(0°C)

8- The average kinetic energy of all gas molecules is proportional

a- inversely with its absolute temperature   b-directly with its Celsius temperature
c- directly with its absolute temperature

9-The ………….. of temperature, the ………….. kinetic energy

a-higher, greater   b- higher, litter   c- lower, greater

A

10- Collision between gas molecules can change the ....speeds, but this does not affect the .... speed of the system

a-average, individual   b-individual, average   c-average, most probable

Q2- a) At room temperature, Xe atoms (F.W. = 131.3 g/mol) have an average speed of 240 m/s. At the same temperature, what is the speed of O_2 molecules (F.W. of O = 16 g/mol)   **(4 marks)**

b) What are the Factors affecting on the rate of diffusion?   **(6 marks)**

Q3- Calculate the degrees of freedom and the heat capacity at constant volume and pressure of H_2O? (R = 2 cal/mol deg) **(10 marks)**

Q4-Give the reason for each of the following: (6 marks)

a) The viscosity of an ideal gas is independent of its density.

b) The higher the elevation the lower the air pressure.

c) The pressure of gas.

Q5-a) Calculate $C_{rms}, \overline{C}^2$ for CO_2 gas at 25°C, at what temperature would H_2S gas has the same values of the velocities? (R = 8.314 x 10^7 erg mol^{-1}K^{-1}, F. W. of O = 16, C =12, H =1and S = 32) **(6 marks)**

b) Define each of the following: (6 marks)

  i)   Collision frequency
  ii)   The Most Probable Velocity
  iii)   Viscosity

End of the questions

Best wishes

Dr. Abeer S. Elsherbiny

	TANTA UNIVERSITY **FACULTY OF SCIENCE** **DEPARTEMENT CHEMISTRY**		
	Examination for second year students of special Geology section		
	Course title:	Organic chemistry	Course code: CH 2145
	Date: 6 March 2021	Term: first Total Marks: 60	Time allowed: 2 hours

Answer the following questions:

1. **Write the mechanism for the synthesis of the following (20 mark) (5 for each)**

   a. Oxidation cleavage with potassium permanganate and with ozonolysis of 3-methyl-2-pentene.

   b. Preparation of pentane from ethyl chloride using Grignard reagent.

   c. Nitration of each of the following (benzene, bromobenzene and nitro benzene)

   d. Addition of HBr to 1-propene in the presence and absence of hydrogen peroxide.

2. **Complete the following equations (name the products) (14 marks)**

1)

COONa

$\underset{\text{NaOH/CaO}}{\xrightarrow{\text{Sodalime}}}$ A $\xrightarrow{\text{Br}_2/\text{FBr}_3}$ B $\underset{\substack{\text{Wurtz-Witting} \\ \text{reaction}}}{\xrightarrow{\text{CH}_3\text{Br/2Na}}}$ C

1)Mg/Dry ether
2)H3O$^+$ ↓

D

2)   H—C≡C—H $\xrightarrow{\text{O}_3}$ A $\underset{[\text{O}]}{\xrightarrow{\text{KMnO}_4}}$ B

Hg^{+2}, 60 °C | H$_2$O/H$^+$ ↓

C

3)   C$_2$H$_5$OH $\xrightarrow{\text{HBr}}$ A $\underset{\text{Heat}}{\xrightarrow{\text{ethanolic NH}_3}}$ B $\xrightarrow{\text{CH}_3\text{Br}}$ C
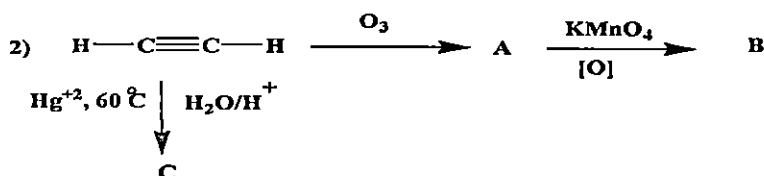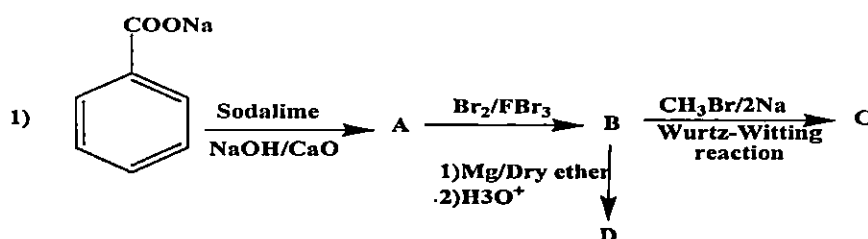
3. **Write short notes about the following (choose four only) (16 marks) (4 for each)**

   a. Friedel crafts acylation of benzene.

   b. Industrial sources of acetylene

   c. Halogenation of methane in sunlight.

   d. Transference of 1° alcohols to 2° and 3° alcohols.

   e. Formation of TNT from toluene

Best wishes   **Dr/ Hend Hekal**

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY			
	EXAMINATION FOR SECOND YEAR STUDENTS OF MATERIAL SCIENCE.			
	COURSE TITLE:	INSTRUMENTAL ANALYSIS	COURSE CODE: CH2171	
DATE:	MARS, 2021	TERM: FIRST	TOTAL ASSESSMENT MARKS: 150	TIME ALLOWED: 2 HOURS

Answer the following questions:

Frist question (50 marks)

1. a- Write the mathematical expression of Bears lambert law in molecular and atomic absorptions, what is the unit of concentration and what are the factors responsible for the deviation from the law? (20 marks)

2. Complete the missing words in the following table (16 marks)

Spectral Region	Detector	Principle of operation
UV-VIS- NIR	i-	ii-
	iii-	iv-
IR	v-	vi-
	vii-	viii-

3. What is the kind of material of prism that can be used in the following spectral regions?
   i- 4000 cm^{-1} to 400 cm^{-1}.
   ii- VIS- region.
      (14 marks)

Second question
   1. Put (√) at the correct sentence and (X) at the wrong one. (don't write the sentence) (20 marks)
      a- In Nd-YAG laser the active medium is yttrium aluminum garnet and the active substance is neodymium.
      b- The cells used for measuring UV absorption spectra are made of quartz.
      c- Carbon tetrachloride is non-polar solvent suitable for measuring IR absorption spectra.
      d- In the spectrometer, the spectrum is usually observed visually.
      e- As the cell length increase the absorbance decreases

Turn the paper on

f- The atomic absorption line is very narrow .

g- The cells used for measuring Visible absorption spectra are made of quartz.

h- A C° = 10^{-9} meter (m),

i- Two kinds of flame are used in flame atomic the first one is nitrous oxide acetylene and the second is air and acetylene.

j- The main light source used in infra-red spectrometer is glober

2. **Complete (don't write the sentence)**   (30 marks)

a- The electronic transitions in organic compounds are ...i...,...ii...,...iii...,...iv...and...v...

b-. ...vi... and , ...vii...,... are used for measuring IR spectra of solid sample.

c- Hydrogen lamp viii... and ...ix... are continuum light source, while ...x... is a line source.

d- ...xi...and ...xii... are in-plane bending vibration, while ...xiii...and ...xiv... are out-of plane bending.

- ...xv...and charge transfer transitions are electronic transitions in inorganic compound

The third question

1. Choose the correct answer: (write your choice only) (30 marks,)

a. In UV-VIS photodiode array spectrometer the spectra is measured (simultaneously – sequentially – point by point – all of those.) (2 marks)

b- Total number of normal vibrations of an N atomic molecule for a linear molecule = (N, 3N, 5-3N, N-5, 5N, 3N-5, 6-3N, 6N, 3N-6,) (2 marks)

c- Total number of normal vibrations of an N atomic molecule for a nonlinear molecule =   (N, 3N, 6N, 5-3N, N-5, 5N, 3N-5, 6-3N, 3N-6)   (2 marks)

d- The unit of Transmittance is ((1000 $liter^{-1}.cm^{-1}.mole$. - $liter^{-1}mole$. cm^{-1}.- $liter.mole^{-1}.cm^{-1}$. – $liter.molar^{-1}cm^{-1}$. a dimensionless quantity -)   (2 marks)

e- The unit of absorbance is: ($liter.mole^{-1}.cm^{-1}$, 1000 $cm^2.mole^{-1}$, $M^{-1}cm^{-1}$, $liter^{-1}.mole.cm^{-1}$, a dimensionless quantity). (2 marks)

f- The unit of obacityis: ($liter.mole^{-1}.cm^{-1}$, 1000 $cm^2.mole^{-1}$, $M^{-1}cm^{-1}$, $liter^{-1}.mole.cm^{-1}$, a

g- The main light source used in atomic absorption spectrometer is (continuum source – deuterium lamp – hallow cathode lamp – tungsten lamp.   (2 marks)

h- To reduce the interference of PO_4^{-2} in analysis of Ca^{+2} in fertilizers by flame atomic absorption we added EDTA. In this case EDTA is: (catalyst, interfering element, releasing agent, protecting agent). (2 marks)

Answer the following:

Question (1) (14 marks)

a. Drive the condition for consuming maximum power from electrical source?

b. For AC generator, prove that the amplitude of the generated AC voltage is depending on the angular frequency of the generator shaft.
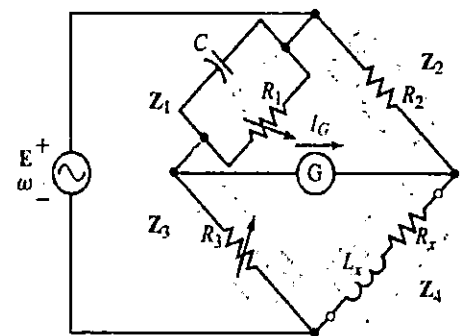
Question (2) (12 marks)

a. Drive the phase angle between the I and V for the individual components R, C and L then answer why the Ohmic resistors are the best component for heaters ore power losing devices?

b. For the case of a series resonance, circuit showing in the figure
- Study the total impedance and the phase angle between I&V.
- The relation between both (Z_L, Z_C, R) and frequency.
- The relation between frequency and I.
- Calculate the V_L at resonance If R=0.1 Ω, L=100 μH, C=0.1 nF, V=2 volt

$$|\leftarrow \Delta v_R \rightarrow|\leftarrow \Delta v_L \rightarrow|\leftarrow \Delta v_C \rightarrow|$$
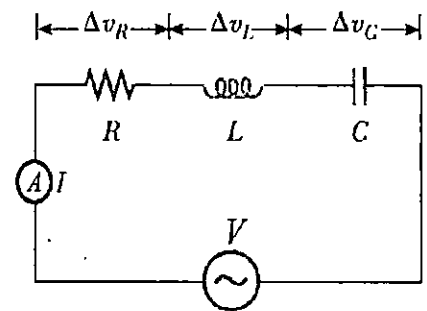
Question (3) (12 marks)

Name the given A.C. Bridge and draw it and Drive its balance conditions. Then *Calculate the values of* L_x, R_x and I_G at balance, if R1=1KΩ, R2=2KΩ, R3=3KΩ, C= 0.1μF and f=50Hz.

Question (4) (12 marks)

Briefly, describe an experiment to determine the linear absorption coefficient for transparent materials.

☺ ☺ Best Wishes ☺ ☺
Dr. Ahmed Atlam

Answer the following questions;

Question (I): Choose the correct answer from each of the following:-

(30 marks, three for each)

1. What is the $[OH^-]$ of a solution with a pH of 9.0?
   A) 1×10^{-5} M
   B) 1×10^{-9} M
   C) 1×10^{-4} M
   D) 1×10^{-7} M

2. Upon analysis of a mixture from Na_2CO_3 and NaOH using standard HCl and Ph.Ph as an indicator, the volume of NaOH equals to.....................
   A) $1/2\ Na_2CO_3 + NaOH$
   B) $1/3\ Na_2CO_3 + NaOH$
   C) $Na_2CO_3 + NaOH$
   D) $1/2\ Na_2CO_3$ only

3. The pH of solution of 50 mL 0.1M NH_4OH with 30 mL 0.2 M HCl is equals to.....................
   A) $pH = pK_w - pK_b - \log [salt]/[base]$
   B) $pH = -\log [H+]$
   C) $pH = 1/2pK_w - 1/2pK_b + 1/2pC_s$
   D) $pH = pKw - 1/2pK_b - 1/2pC_b$

4. Alkalimetry is the titration of ....
   A) sodium hydroxide with hydrochloric acid.
   B) sodium carbonate with hydrochloric acid.
   C) hydrochloric acid with sodium hydroxide.
   D) ammonium hydroxide with hydrochloric acid.

5. Cu^{2+} ion is almost complexed in.............................
   A) acidic medium
   B) basic medium
   C) neutral medium
   D) none of them

6. Na_2CO_3 is a base according to ....
   A) Arrhenius
   B) Bronsted& Lowry
   C) Lewis
   D) Ostwald

7. Complexes are compounds characterized by involving....................
   A) metallic bond
   B) coordinate bond
   C) covalent bond
   D) hydrogen bond

8. Bronsted-Lowery acid in reaction $H_2O + NH_3 \leftrightarrow NH^+_4 + OH^-$ is....................
   A) NH_3
   B) OH^-
   C) NH^+_4
   D) H_2O

9. The pH of a 0.02 M solution of an unknown weak acid is 3.7. What is the pK_a of this acid?
   A) 4.9
   B) 5.7
   C) 3.2
   D) 2.8

10. Which statement about Arrhenius acids is **FALSE**?
    A) They increase the concentration of hydroxide ions in aqueous solution.
    B) Their water solutions are called aqueous acids.
    C) They are molecular compounds with ionizable hydrogen atoms.
    D) Their pure aqueous solutions are electrolytes.

Question (II): State true or false for each of the following:-

(22 marks, two for each)

1. Sr^{2+} and Ba^{2+} ions can be titrated in highly alkaline medium, in the presence of Erio-T as an indicator.
   A) True
   B) False

2. The equivalent weight of an acid can be calculated by molecular weight × acidity.
   A) True
   B) False

3. Titration of ferric ion; with EDTA is carried at acidic medium.
   A) True
   B) False

4. Argentimetry is depending on formation of slightly soluble silver salt.

Turn over the page

A) True   B) False

5. Titration of Cl^- ions with Hg_2^{+2} Is based on formation of insoluble mercurous salt.

A) True   B) False

6. Usually the basic media of pH 8-10 is suitable for EDTA titration of Fe^{3+} ions but pH of 1-3 is required for the titration of Zn^{2+}.

A) True   B) False

7. When 100 mL of 0.1 N NaOH is added to 5 mL of 0.1 N H_3PO_4, (pK_{a1} = 2.12, pK_{a2}= 7.21, pK_{a3}= 12.0), the pH of solution is 5.30.

A) True   B) False

8. Reaction of Hg^{2+} with Cl^- results in formation of insoluble mercuric chloride complex.

A) True   B) False

9. Chelation is a process in which some component of analyte is not protected from reaction with EDTA without being physically separated from medium.

A) True   B) False

10. Direct method is a type of EDTA titration used for metal formed complexes easily with EDTA, and also for metal that have no suitable indicator.

A) True   B) False

11. Alkaline medium is not strongly preferred in Volhard's method.

A) True   B) False

Question (III):Match each of the following with the correct statements from A-E

(8 marks, two for each)

1. Fajan' s method	(A) may precipitate before AgCl in back precipitation titration of chloride ions
2. Volhard's method rely on	(B) is more soluble than AgCl
3. In alkaline medium AgOH	(C) uses adsorption indicator in detection end point
4. AgNCS	(D) formation of soluble complex of reddish brown color.

Question (IV): Discuss in details each of the followings:- (40 marks, five for each)

a) Chromophore theory for the action of ph.ph as indicator.

b) The sequence of the reaction in determination of Cl^- by Volhard's method.

c) Medium used to selective determination of each of Fe^{3+} and Ca^{2+} in a mixture using EDTA titration.

d) The titration error in determination of Cl^- by Mohr's method using chromate ion. How this problem can be solved?

e) Determination of Cl^- ions by Volhard's method must be carried out in solution free from PO_4^{---} or CO_3^{--} ions. What the action must be taken to prevent such problem?

Good Luck

Examiners;   *Prof. Mohamed Yousry El-Shiekh*   *Prof. Hanaa S. El-Desoky*   *Ass Prof. Marwa N. El-Nahass*

	TANTA UNIVERSITY			
	FACULTY OF SCIENCE			
	CHEMISTRY DEPARTMENT			
	FINAL EXAM FOR SECOND YEAR STUDENTS (DOUBLE MAJORS AND BIOCHEMISTRY)			
	COURSE TITLE:	CHEMICAL THERMODYNAMICS (CH2141)		TIME ALLOWED:
DATE: , 2021	TERM: FIRST	TOTAL ASSESSMENT MARKS: 100		2 HOURS

Answer the following questions (20 marks for each question)

Question 1:

A) Write downs short notes on:

    i) Different thermodynamic systems

    ii) Spontaneous and nonspontaneous processes (give examples)

    iii) Exothermic and endothermic processes (give examples)

B) The vapor pressure of boron trichloride equals 562.9 mmHg at 10 °C and 807.5 mmHg at 20 °C. Calculate the latent heat of vaporization.

Question 2:

A) Derive the relation between pressure and temperature for adiabatic process.

B) What is the work in joules done by 0.225 moles of N_2 gas when it expands at constant temperature of 23 °C from an initial pressure of 2.15 atm to a final pressure of 746 mmHg? and what are the initial and final volumes?

Question 3:

A) Explain Carnot cycle and show how can you calculate the maximum work done through the cycle.

B) Calculate the minimum amount of work required to freeze 1 g of water at 0 °C by means of a refrigerating engine which operates in surrounding at 25 °C if the heat of fusion of ice equals 79.8 cal/g at 0 °C.

Question 4:

A) Mention only the thermodynamic formulation for the following (define each term):

    i) The first law of thermodynamic for different thermodynamic processes.

    ii) Relation between V and P for an adiabatic process.

    iii) Kirchhoff's equation.

    iv) The work done for adiabatic processes.

B) From the following chemical equations:

    i) $C_3H_{6(g)} + H_2 = C_3H_{8(g)}$ $\Delta H°_H = -29.6$ kcal

    ii) $C_3H_{8(g)} + 5O_2 = 3CO_{2(g)} + 4H_2O_{(l)}$ $\Delta H°_C = -530.6$ kcal

    iii) $C_{(s)} + O_{2(g)} = CO_{2(g)}$ $\Delta H°_f = -94$ kcal

    iv) $H_{2(g)} + \frac{1}{2} O_{2(g)} = H_2O_{(l)}$ $\Delta H°_f = -68.3$ kcal

Calculate the heat of combustion and the standard heat of formation of propylene ($C_3H_{6(g)}$).

Question 5:

A) Define each of the followings:

    i) Joule-Thomson effect.

    ii) Themochemical laws (Hess and Laplace).

    iii) The heat of phase transition.

B) The molar heat capacity (C_p) of helium (monoatomic gas) between -200 °C and 0 °C is 5.0 cal/deg.mol. Calculate the entropy change (ΔS) of the process at constant pressure.

Examiner:
Prof. Hosny Eldaly

Answer the following questions (20 marks for each question)

Question 1:

A) Write downs short notes on:

i) Different thermodynamic systems

ii) Spontaneous and nonspontaneous processes (give examples)

iii) Exothermic and endothermic processes (give examples)

B) The vapor pressure of boron trichloride equals 562.9 mmHg at 10 °C and 807.5 mmHg at 20 °C. Calculate the latent heat of vaporization.

Question 2:

A) Derive the relation between pressure and temperature for adiabatic process.

B) What is the work in joules done by 0.225 moles of N_2 gas when it expands at constant temperature of 23 °C from an initial pressure of 2.15 atm to a final pressure of 746 mmHg? and what are the initial and final volumes?

Question 3:

A) Explain Carnot cycle and show how can you calculate the maximum work done through the cycle.

B) Calculate the minimum amount of work required to freeze 1 g of water at 0 °C by means of a refrigerating engine which operates in surrounding at 25 °C if the heat of fusion of ice equals 79.8 cal/g at 0 °C.

Question 4:

A) Mention only the thermodynamic formulation for the following (define each term):

i) The first law of thermodynamic for different thermodynamic processes.

ii) Relation between V and P for an adiabatic process.

iii) Kirchhoff's equation.

iv) The work done for adiabatic processes.

B) From the following chemical equations:

i) $C_3H_6 {}_{(g)} + H_2 = C_3H_8 {}_{(g)}$ · $\Delta H°_H = -29.6$ kcal

ii) $C_3H_8 {}_{(g)} + 5O_2 = 3CO_2 {}_{(g)} + 4H_2O {}_{(l)}$ $\Delta H°_C = -530.6$ kcal

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Calculate the heat of combustion and the standard heat of formation of propylene ($C_3H_6 {}_{(g)}$).

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A) Define each of the followings:

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Examiner:
Prof. Hosny Eldaly

TANTA UNIVERSITY
FACULTY OF SCIENC
CHEMISTRY DEPARTMENT

FINAL EXAM FOR 2nd LEVEL STUDENTS (CH-BC, CH-ZO, CH-EN, BC AND EN)			
COURSE TITLE	CHEMISTRY OF THE MAIN GROUP ELEMENTS	TIME ALLOWED 2 H	
CODE	CH2107		
DATE: MARCH 17, 2021	TERM: FIRST	TOTAL ASSESSMENT MARKS	100

[I]. Give reasons for the following.   (20 Marks)
1- Water has abnormal low volatility and the stability of hydrides decreases down group VI
2- Silanes are strong reducing agents, but alkanes are chemically unreactive.
3- F_2 is the strongest oxidizing agents in group VII
4- PCl_5 is known but PH_5 is not known.

[II]. Draw and explain the structure of the following: (20 Marks)
1- Beryllium halides and hydrides   3- H_2O_2
2- SO_3 in gaseous and solid state   4- Diborane

[III]. Rank the following in DESCENDING ORDER and giving the reason: (20 Marks)
1-   HF, HCl, HBr, HI   (Acidic Strength)
2- BF_3, BCl_3, BBr_3 (Lewis acidic strength)
3- NH_3, PH_3, AsH_3 (Donor properties and stability)
4-   Li, Na, K , Cs   (The nature of interaction with water)

[IV]. Compare between the following: (20 Marks)
1-   Trimethylamine and trisilyamine in structure and donor properties.
2-   Hydrolysis of trialkylchlorosilane and dialkydichlorosilane

[V]. Choose the correct answer with REASON: (20 Marks)
1- **The fusion of sodium carbonate with silica produce:**
     a-Silanes   b- Organosilicon polymers   c- Silicates   d- Silicones
2- **Which of the following compound is ionic?**
     a- PbF_4 b- PCl_5 c- CCl_4 d- $PbBr_4$
3- **The balanced reaction of phosphorus trioxide with water is:**
     a- $2P_2O_6 + H_2O \rightarrow 2H_3PO_3$ b- $P_4O_4 + 6 H_2O \rightarrow 4H_3PO_3$
     c- $P_4O_6 + 6H_2O \rightarrow 4H_3PO_3$ d- $P_2O_6 + 6H_2O \rightarrow 4H_3PO_3$
4- **$BeCl_2$ dissolves in water to give $[Be(H_2O)_n]^{2+}$ where:**
     a- n = 2   b- n = 6   c- n = 3   d- n = 4
5- **The basic building block in silicates is ..... , with central Si atom of .... hybridization.**
     a- SiO_4 tetrahedron; sp^3 c- SiO_3 trigonal pyramid; sp^2
     b- SiO_4 trigonal pyramid; sp^3 d- SiO_4 tetrahedron; sp^2
6- **Which one of the following processes is exothermic?**
     a- $Na(g) + e^- \rightarrow Na^-(g)$ b- $Na(g) \rightarrow Na^+(g) + e^-$
     c- $Na(s) \rightarrow Na(g)$ d- $Na^+(aq) \rightarrow Na^+(g)$

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7- Which element in Group IV will form the most stable compounds in the +II oxidation state?

a- Silicon   b- Lead   c- Germanium   d- Tin

8- The reaction of formic acid with sulfuric acid produces:

a- CO_2 b- C_5O_2 c- C_3O_2 d- CO

9- Bromine reacts with:

a- Iodide   c- Chloride

b- Bromide   d- Fluoride

10- The formula of oxygen fluorides is

a- O_3F_2 b- OF_2 c- F_2O d- a and b

Best wishes

Examiners	Prof. Dina Abd El-Aziz Prof. Yusif S. El-Sayed

| "The Chemistry of the Main Group Elements" |
| Final Exam For 2nd Level Students (Chemistry Section) 2021 Course Code : CH2107 |
| Time Allowed : 2 Hours |

1) Give reason (Four Only) : (20 Marks)

a. Beryllium salts are ionic with acidic character when dissolved in water?

b. The difference in size between Al and Ga is less than expected?

c. Hydrogen reacts slowly and how can we activated ?

d. Li and group 2 metals form nitrides on heating in air ?

e. Hydrofluoric acid has low acidic strength ?

2) Compare between the following : (20 Marks)

a. Group 1 and Group 2 elements in softness and reaction with water.

b. The properties and structure of SO2 and SeO2.

c. Trimethylamine and trisliyl amine in structure and donor properties.

d. The properties and the structure of diamond and graphite.

3) Rank each of the following series from high to low according to the given criteria and give reasons : (20 Marks) FOUR ONLY

a. Li+, Na+, K+,Rb+ (Conductivity in aqueous solution).

b. BF_3 , BCl_3 , BBr_3 (Lewis acidic strength).

c. NH_3 , PH_3 , AsH_3 (Donor properties and stability).

d. HF   HCl   HBr   HI   (Acidity strength).

e. $SiCl_4$ $SnCl_4$ $PbCl_4$ (Stability).

4) Choose the correct answer : (40 Marks)

1- Ortho and para hydrogen differ in

   a- Nuclear charge   b- Nuclear spin   c- Electron spin   d- Nuclear reaction

2- KCl adopt Rock-salt structure with coordination number:

   a- n = 2   b- n = 4   c- n = 8   d- n = 6

3- The structure of boron nitride looks like:

   a- Benzene   b- Graghite   c- Tetrahedral   d- Planar triangle

4- The hybridization of B in solid orthoboric acid and aqueous solution are:

   a- sp^3 b- sp^2 and sp^3, respectively   c- sp^2 d- sp^3 and sp^2, respectively

5- In which reaction is H_2 liberated ?

   a- NaH + H_2O b- NaC l+ H_2O c- Na_2O + H_2O d- NaOH + H_2O

6- Na_2O_2 reacts with water to give:

   a- NaOH only   b- NaOH + H_2O_2 c- NaOH + O_2 d- NaOH + H_2

7- The most stable low valent halide:
    a- $GeCl_2$ b- $SnCl_2$ c- $PbCl_2$

8- A nonexistent halide:
    a- $SnCl_4$ b- $PbCl_4$ c- pbI_4

9- A Purely acidic oxide:
    a- PbO_2 b- SnO_2 c- $SiO2$

10- The substance that is coordinatively saturated:
    a- CCl_4 b- $SiCl_4$ c- $PbCl_4$

11- In which of the following compounds, nitrogen exhibits highest oxidation state?
    a- HNO_3 b- NH_2OH c- N_2H_4 d- NH_3

12- Chlorine gas will oxidizes :
    a- Bromine   b- Fluorine   c- Bromide   d- Fluoride

13- The structure of $AlCl_3$ is :
    a- Monomer   b- Dimmer   c- Trimmer   d- Polymer

14- Orthophosphoric acid is :
    a. Monobasic   b. tribasic   c. dibasic

15- The bond angle of phosphine molecule is :
    a. 107   b. 93   c. 91

16- The lowest oxidation state of nitrogen is :
    a. N2   b. N2H4   c. NH3   d. NH2OH

17- The formula of pyrophosphoric acid is :
    a. H4P2O7   b. H3PO4   c. H4P2O5

18- The lowest oxidation state of phosphorus is / are :
    a. P4O10   b. H3PO3   c. H4P2O7   d. P4O6

19- CO2 is nonpolar molecule due to the hybridization :
    SP3   b. SP   c. SP2

20- The hydrolysis of dialkyl dichlorosilane yields :
    a. Dimer silicones   b. chain silicones   c. cross linked silicones

Good Luck
Prof. Said Anwar

	Tanta University, Faculty of Science, Department of Chemistry		
	Final Exam for 2nd year Chemistry		
1969	**Course Title**	**Kinetic Theory of gases**	**Code: CH2103**
22/03/2021	1st Semester	Total Assessment Marks: 50	Time: 2 hrs.

Q1- Complete the following sentences: (10 marks)

1- ....is defined as the passage of gases through a small hole or pores of a membrane under pressure.

2- .... depends on transport of momentum across a momentum.

3- The energy of gas molecules which is due to the molecular motion along three coordinate axes is called ....

4- At constant temperature and constant amount of gas, the volume of a sample of a gas varies inversely with the pressure, this is the statement of .... Law.

5- When the two molecules are headed in the same direction and collision angle = 0°, this is .... collision.

6- ....is defined as the average distance a molecule travels between collisions.

7- ....is a transport of mass across a concentration gradient.

8- The volume of real gas is .... than expected from the ideal gas at higher pressures.

9- .... is defined as number of collisions per molecule.

10- The volume of the gas in a container can be determined by the size of ....

Q2-Write the mathematical equation of following and define each parameter in it: (6 marks)

a) Van der Waals equation
b) Graham's law of diffusion
c) The average of the square of the velocity

Q3- Calculate the degrees of freedom and the heat capacity at constant volume and pressure of H_2O? (R = 2 cal/mol deg) (10 marks)

Q4-a) Show by figures only with complete parameters each of the following (4 marks)

i-Effect of temperature on the distribution of molecular velocities of gas.

ii-The plot of the pressure volume (PV) # P for an ideal gas and real gas

b) What is the molar mass of a gas if it diffuses 0.907 times the speed of oxygen gas? (F.W. of O = 16 g/mol) **(4 marks)**

Q5- Give the reason for each of the following: **(6 marks)**

a) The hole's diameter in gas effusion must be smaller than the molecules' mean free path.
b) The higher the elevation the lower the air pressure.
c) The viscosity of liquids decreases as temperature increases.

Q6 -a) Suppose that a gas contains 5 molecules with velocity of 2 m/sec, 10 molecules with velocity 3 m/sec and 4 molecules with velocity 6 m/sec, determine the C_{rms}, $\overline{C}$, C_p. **(6 marks)**

b) Mention the Factors affecting on the mean free path? **(4 marks)**

End of the questions

Best wishes

Dr. Abeer S. Elsherbiny