المستوى الثاني - جيولوجيا - رياضيات بحتة ٢٠١٢

الفرقة: الثانيـــــــة		دور مايو ٢٠١٢
الشعب: كيمياء-		الزمن: ساعتـــــــان
المادة: رياضيات بحتة	كلية العلوم – قسم الرياضيات	التاريخ: ٢٠١٢/٦/٢٤

أجب على الأسئلة الآتية: (٢٠ درجة لكل سؤال)

[1] حل المعادلات التفاضلية الآتيـــــــة :

(i) $(x^2+2y^2)dx - xydy = 0$ [10 marks]

(ii) $(e^y + y\cos x)dx + (\sin x - \sin y + xe^y) = 0 \quad , y(0) = 0.$ [10 marks]

[2] أ. حل المعادلة التفاضلية الآتيـــــــة :

$$y' + \frac{y}{x} = \frac{1}{x^3y^4}$$ [10 marks]

ب. إذا كانت الدالة z معطاة بالعلاقة : $z = \ln(x^6 + x^3y^3 + y^6)$ ، فاثبت أن :

$$x\frac{\partial z}{\partial x} + y\frac{\partial z}{\partial y} = 6$$ [10 marks]

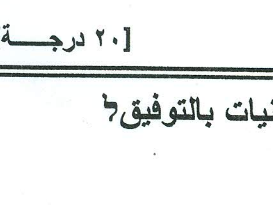
[3] أ. اوجد مساحة المنطقة R في الربع الأول المحصورة بين الدائرتين $x^2+y^2=4$, $x^2+y^2=9$ ، و الخطوط المستقيمة $y = x$ ، $y = 0$. [١٠ درجات]

ب. اثبت أن قيمة التكامل : $\int_{(0,0)}^{(1,3)} (4x^3y^2 - 9x^2y)dx + (2x^4y - 3x^3)dy$ لا تعتمد على المسار

الواصل

الواصل بين النقطتين (0,0) ، (1,3) ، ثم احسب قيمته [١٠ درجات]

[4] اذكر نظرية "جرين" .



حقق نظرية "جرين" بحساب كلا الطرفين لمعادلة "جرين" بالنسبة للتكامل :

$$\oint_c (2xy - x^2)dx + (x + y^2)dy$$

حيث c هو المنحنى المغلق للمنطقة المحصورة بالمنحنيات $y = x^2$ ، $x = y^2$

مأخوذاً في الاتجاه عكس عقارب الساعة. [٢٠ درجـــــة]

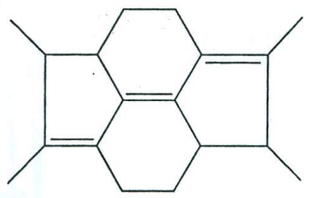
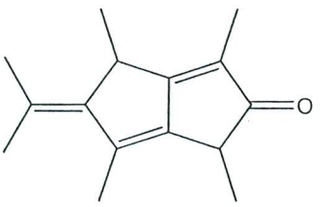
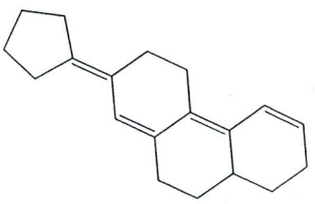
مع التمنيات بالتوفيق

Mansoura University Faculty of Science Chemistry Department Subject: Chemistry Course(s): Chem. 234 ***Organic Spectroscopy***		Second Term 2rd Level : Chemistry Students Date: 27 June. 2012 Time Allowed: 2 Hours Full Mark: **80** Marks

Answer All Questions;

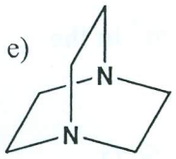
Question 1: (20 Marks)

I) Use the Woodward-Fieser rules to predict the expected λ_{max} for the following compounds:

(1)	(2)	(3)
		

II) What is the number of the expected signals and types of splitting in ^{1}H NMR spectra of the following compounds:

a) $(CH_3)_3COH$ b) $CH_3COCH(CH_2Cl_2)_2$ c) $BrCH_2CH_2CH_2CH_2Br$

e) 

f) 

Question 2: (20 Marks)

a) Give a structure consistent with each of the following sets of spectral data:

i) $C_6H_{10}O$

IR (Cm^{-1}) ν = 3000 , 1700, 1606 Cm^{-1}

^{1}H-NMR δ = 1.83 (singlet, 3H) & 2.27 (singlet , 6H) and 6.15 (singlet, 1H)

ii) $C_{11}H_{14}O$

IR (Cm-1) ν = 3030 , 2950 , 1710 , 1610 Cm^{-1}

1H-NMR δ = 1.15 (doublet , 6H) & 3.90 (singlet , 2H) & 4.20 (heptet , 1H)
& 7.10 – 7. 40 (multiplet , 5 H)

III) C_4H_7NO

IR (Cm-1) ν = 2990 , 2220 Cm^{-1}

1H-NMR δ = 2.65 (triplet , 2H) & 3.51 (triplet , 2H) & 3.65 (singlet , 3H)

b) As you know, the molecular formula **C_4H_9Br** has four different isomers, Discuss how you can differentiate between each one of them using ^{1}H-NMR spectroscopy?

Question 3: (20 Marks)

III) Write shortly what you know about of the following:

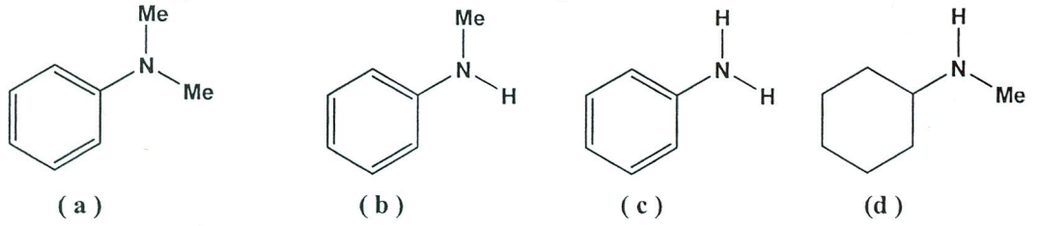
a; Hook's law and the role of inductive and mesomeric effects in the change of the value (ν').

b; Shielding effect and Chemical shift (δ).

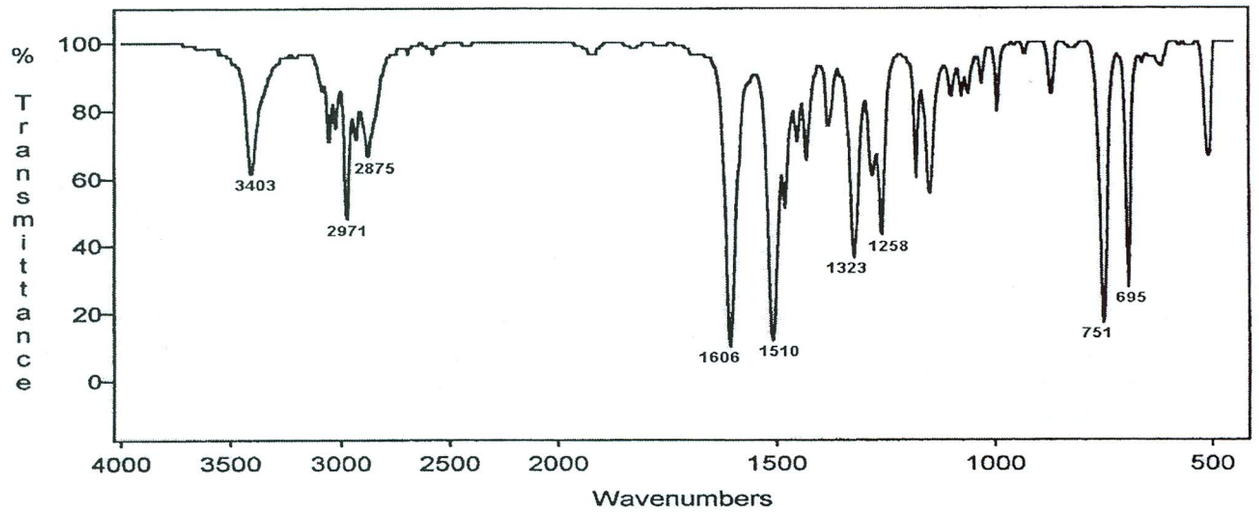
c, The role of conjugation phenomena in the value of (λ_{max}) value.

Question 4: (20 Marks)

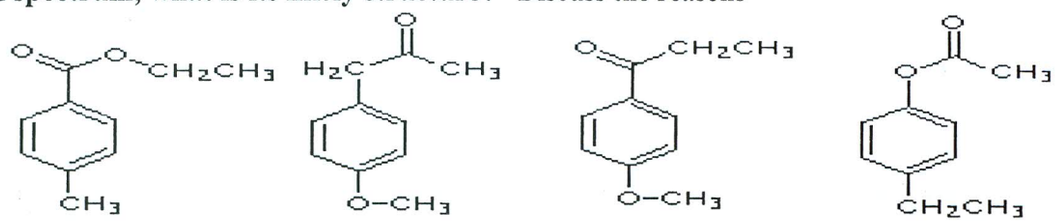
a) Which of the following structures best fits with IR spectrum shown below? Discuss the reasons.



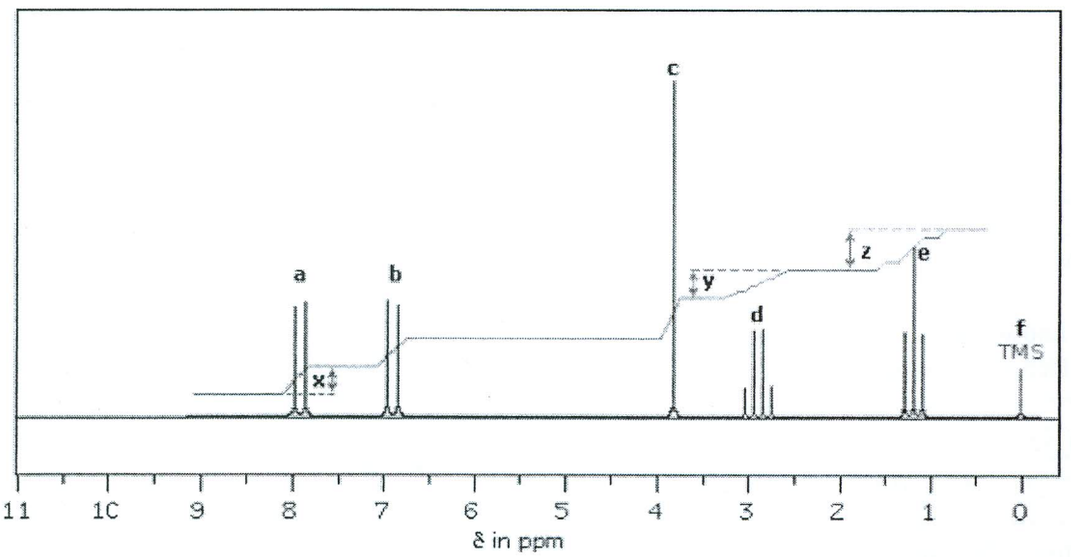
(a) (b) (c) (d)



b) **If this spectrum is from a $C_{10}H_{12}O_2$ compound, having a strong absorption at 1680 cm^{-1} in the infrared spectrum, what is its likely structure? "Discuss the reasons"**



A **B** **C** **D**



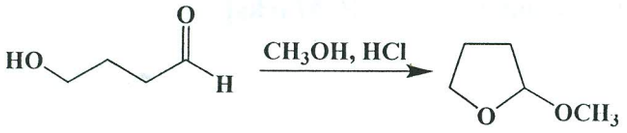
With Best Wishes *Prof. Dr. El-Sayed I. El-Desoky*

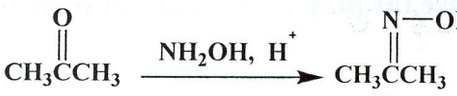
الفرقة الثانية - كيمياء - لائحة جديدة - الفصل الدراسي الثاني (٢٠١٢)

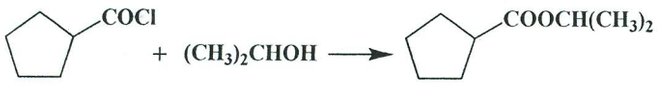
Mansoura University Faculty of Science Chemistry Department Subject: Chemistry Course(s): Chem.233 Physical Organic Chemistry II		Second Term 2nd Level Chem. Students Date: 3 / 6 / 2012 Time Allowed: **2** Hours Full Mark: **60** Marks

Answer All Questions

1- Propose mechanisms for the following reactions: **[20 Marks]**

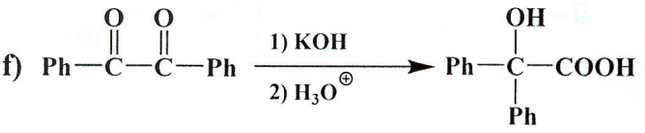
a) 

b) 

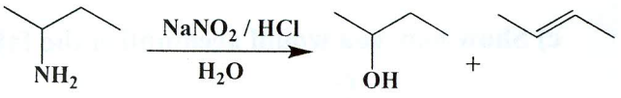
c) 

d) $(CH_3)_2CHBr \xrightarrow[2)\ PhCHO]{1)\ Ph_3P,\ BuLi} (CH_3)_2C{=}CHPh$

e) $C_6H_5CHO + CH_3CHO \xrightarrow{dil\ NaOH} C_6H_5CH{=}CHCHO$

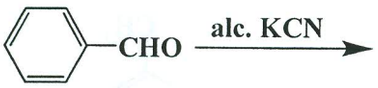
f) 

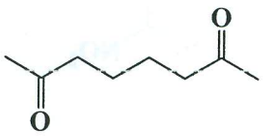
g) $CH_3CHO + BrCH_2CO_2Et \xrightarrow[2)\ H_3O^{\oplus}]{1)\ Zn} CH_3\underset{OH}{\underset{|}{C}}HCH_2CO_2Et$

h) 

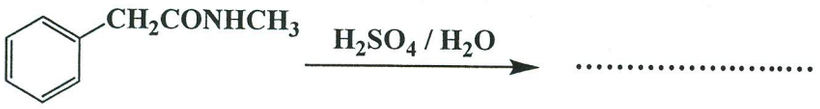
2- Complete the following equations and write the reaction mechanism to explain your answer:

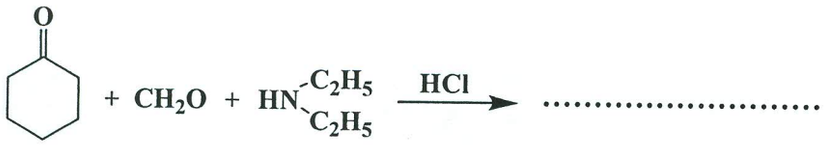
[20 Marks]

a)  .....

b)  .....

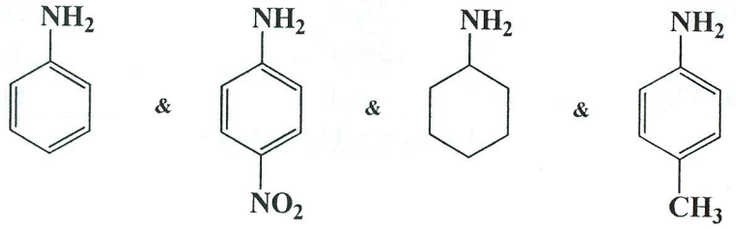
c)  .....

d)  .....

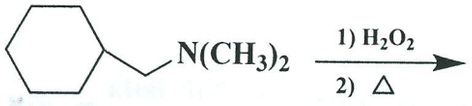
e)  .....

P. T. O.

3- a) Arrange the following in order of decreasing with respect to their basic strength. Explain **[4 Marks]**



b) Give the product(s) expected from the following reactions: **[6 Marks]**

i - 

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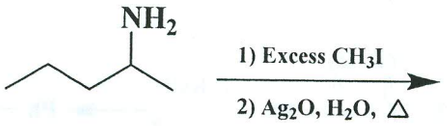
ii - 

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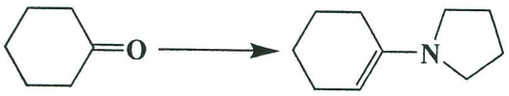
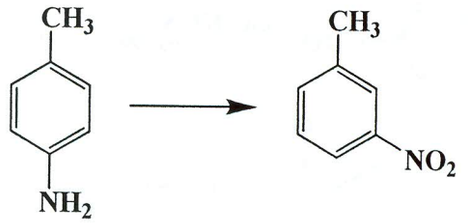
c) Show how you would accomplish the following transformation: **[10 Marks]**

i - 

ii - 

iii - 

Best Wishes and Good luck

A.Prof. Dr. Eman KeshK

المستوى الثاني - كيمياء - الكيمياء الفيزيائية الفصل الثاني الحالي (٢٠١٢)

Mansoura University **Faculty of Science** **Chemistry Department** **Subject : Chemistry** **Course(s):**Chem.245,Physical Chemistry of liquids and solutions	كلية العلوم جامعة المنصورة	**Second Term** **Second year Students** **Special Chemistry-level 2** **Date : June 2012** **Time Allowed : 2 hours** **Full Marks : 60 Marks**

Answer the following questions :

1.a) Explain the partial molal volumes, partial molal enthalpies and the methods of determination of the partial molal volumes. (10 marks)

b) The boiling point of benzene is raised from its normal value of 80.3 to 83.3 by the addition of 14.2 gm biphenyl $C_6H_5C_6H_5$ to 95 gm of benzene. What is the boiling point elevation constant? (10 marks)

2. a) Write on the Gibbs-Duhem equation and different colligative properties of solutions (10 marks)

b) A current of 0.1 ampere is passed through aqueous copper sulphate solution for 15 minutes using platinum electrode. Calculate (i) the amount of copper deposited at the cathode,(ii) number of copper atoms deposited and (iii) the volume of oxygen liberated at STP (standard temperature and pressure). (10 marks)

3. a) Write on the transference numbers and their methods of determination. (10 marks)

b) In a moving boundary experiment and by the use of 0.1 M KCl solution and by using LiCl as indicator solution. 0.00621 ampere current was passed for half an hour. The moving boundary moves 6.2 cm in capillary tube with area 0.122 cm^2. Calculate t_+ and t_-. (10 marks)

(F= 96500 Coulomb, molecular weight of Cu =63.5.H = 1 and C = 12)

With best wishes; Prof.Dr.Esam Gomaa

University of Mansoura Faculty of Science Chemistry Department Subject: Chemistry		Second Term Second Year : Chemistry Date : 10 June 2012 Time allowed : 2 hours
Course (s): Chem 244: Quantum Chemistry		Full Mark:: 80 Mark

Answer the following Questions: Each Question (20) Mark

[1-a] Discuss the idea of quantum theory and the importance of using that idea in studying chemical problems. [8] Mark

[1-b] The task of the theory was to fit the experimental investigation of black body radiation and to lead to the two fundamental laws of thermal radiation: Discuss the above statement. [12] Mark

[2-a] Light of wavelength 3000 A strikes a certain metal which has a photoelectric work function of 2.16 eV. Find:
(a) the energy of the photon in eV,
(b) the kinetic energy of the most energetic photoelectron in ergs and in eV,
(c) the velocity of these electrons, and
(d) the stopping potential. [10] Mark

[2.b] Employing the Compton scattering, prove that the scattered wavelength is always greater than the incident wavelength. [10] Mark

[3] The Bohr atomic model was a first step in understanding the structure of the atom, discuss the main concepts of the Bohr model to interpret the spectrum of hydrogen atom. [20] Mark

[4-a] In quantum mechanics we use the wave function to describe the dynamic of particles, State the properties of wave function. [8] Mark

[4-b] derive the time independent Schrodinger equation in case of finite potential well when kinetic energy is greater than potential energy. [12] Mark

My best wishes
Prof. Dr. Ahmed Elgarayhi

Examiners: 1- Prof. Dr. Abd-Elassem Al-Kholy 2- Prof. Dr. Essam Arafa

3- Prof. Dr. Ahmed Elgarayhi 4- Dr. Doaa Abd-Elatef

المستوى الثانى كيمياء - الأحماض الأمينية والبروتينات د/ع CVA

Mansoura university
Faculty of science
Chemistry Department
Subject : Biochem.279
Course : Amino aids & Proteins

Final Exam second Term 2012
Second Level Chem Students
Date : 20th June, 2012
Time Allowed : 2 hours
Total Mark : 80 Marks

Answer the following questions
Provide your answer with formula, equations, pathways, figures or tables wherever possible

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[1] Write briefly on the following: **[30 Marks]**

A) Sccond messengers.
B) Krebs cycle
C) Phospholipids

[2] Write the structure formula and functions of the followings: **[20 Marks]**

A) Ribiflavin
B) Adenosine triphosphate
C) Mannoseamine
D) Hyaluronic acid
E) Folic acid

[3] Give an account of the following: **[30 Marks]**

A) Galactose metabolism
B) Membrane protein
C) Coenzymes of water soluble vitamins

Prof. A.F. Abdel-Aziz Fatouh
Prof. M. Al far

المستوى الثاني . كيمياء ، الكيمياء النووية التماثل وربط

Chemistry Department
Faculty of Science
Mansoura University

Date: 6th June 2012
Time: 2 hours
Marks: 60

Final Exam in Nuclear and Structure, Bonding and Symmetry for Second Level Chemistry Students (Chem 222)

Answer The Following Questions

Part 1; Nuclear Chemistry (30 marks)

1) a-Write shortly on (9 marks)

1.a) The binding energy of the nucleus-radioactive series

2.a) Neutron to proton ratio in the nucleus

1) b- Write on the different interactions of gamma rays with matter (6 marks)

2) a- Explain the different applications of radioactive isotopes (8 marks)

2)b- The amount of ^{14}C isotope in a piece of wood is found to be one-fifth present in a fresh wood. Calculate the age of wood. Half life of ^{14}C = 5666 years (7 marks)

Part 2; Structure, Bonding and Symmetry (30 marks)

1)Complete or choise in the following: (7.5 marks)

1) Ionic molecule of the type AB, with rc/ra = 0.414 has CN .... with geometry .... and (occur – not occur) in close-packed structure.

2) Due to the mobility of valence electrons, metals have .... and .... which can help in their use as .... and ....

3) Florite salt, has (AB – AB_2) form with rc/ra 0.77, indicating .... structure with CN .... and geometry .... Floride ions occupying .... Holes

4) Metallic bond is formed between ..... due to .....; please draw and explain

5) Rutile, TiO_2, has coordination (4:4 – 6:6 – 6:3) with (ccp – hcp) occupation.

2)Choose the most correct answer:- (7.5 marks)

1) ..... is a molecules with only identity element of symmetry

a)CH_4 b) CHBrClI c) SF_6 d) CHFCl-CHFCl e) b & d

2) NaCl salt has

a) rc/ra 0.72 b) Na^+ present in tetrahedral holes c) coordination 4 : 4

d) Cl^- present in octahedral holes e) all the above are correct

3) On the bases of MOT, Li_2 has electronic configuration.....

a) σ2, σ*1 b) σ2, σ*2 c) σ2, σ*0 d) σ3, σ*0 e) σ1, σ*0

4) CsCl has bcc with

a) coordination 4:4 b) coordination 6:6 c) coordination 3:3 d) coordination 8:8

e) coordination 6:4

5) CH_4 has .....

a) C_3 b) i c) C2 d) a & b e) a & c

3) True and Faulse; circulate the suitable response and please correct the false one (7.5 marks)

1- T - F Cyclopentadinyl ring has elements of symmetry C5, E, S_6 and i

2- T - F CaO is covalent molecule as the electronegativity difference is 24

3- T - F NH_3 has C_2 axes of rotation

4- T - F Holes in close packing have octahedral structure as rc/ra round 0.414

5- T - F ZnS blende, rc/ra 0.4 with Zn^{2+} occupied full tetrahedral holes

6- T - F Both arrangements in ccp and hcp are the same

4)What are the symmetry elements present in the following molecules:- (5 marks)

1) H_2O
2) NH_3
3) Benzene ring
4) Staggered CH_3-CH_3
5) CO_2

5) Discuss the structure of ZnS (Sphalerite) with $r_{Zn}/r_S = 0.42$ the structure shown below (2.5 marks)