Mansoura University	**Second term**
Faculty of Science	**Final exam in Organic Chemistry II**
Chemistry Department	**2nd level program: Chemistry**
Date: 2 /6 / 2014	**Code : Ch 233**
	Time: 2hrs Total marks: 60

Answer all the following questions

1-Suggest a mechanism for each of the following reactions and give short comment on each case .   **(20 marks)**
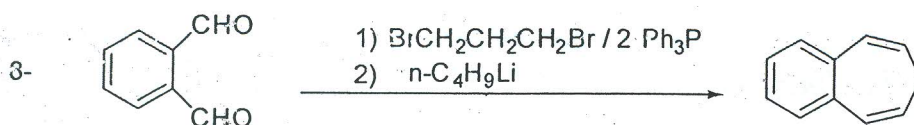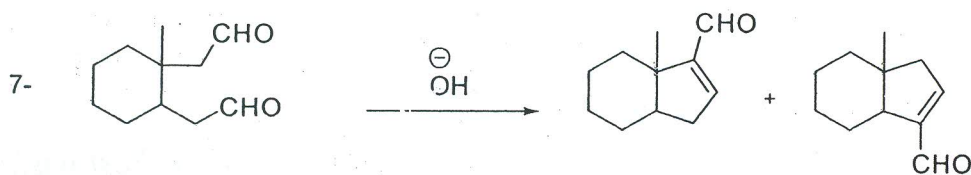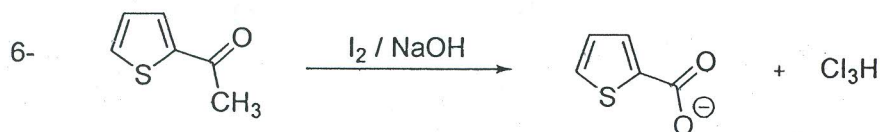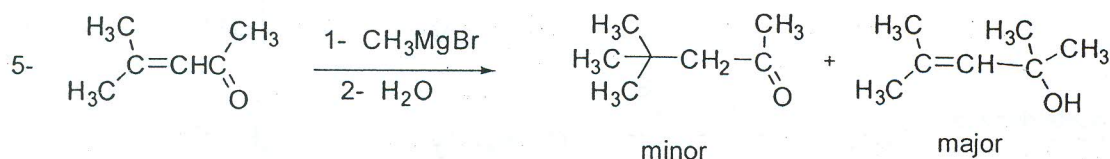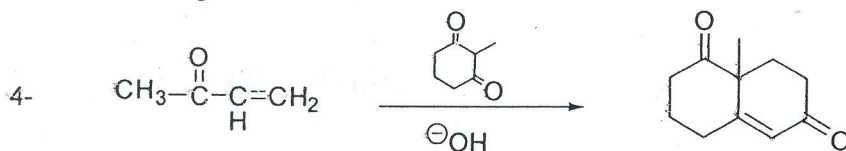
2- How can you synthesize the following compounds ?   (20 marks)

1) cyclopentylidene-CH_3 (ethylidenecyclopentane)

2) $Ph-CH=C(CN)Ph$

3) $HOH_2C-C(CH_2OH)(CH_2OH)-CHO$

4) $Ph-CO-CH_2-CH(Ph)-CH_2-NO_2$

5) $Ph-CH(OH)-CH_2COOC_2H_5$
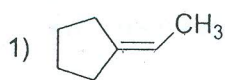
3- Give the structures of compounds from A to J   (20 marks)

naphthalene-CH_2OH $\xrightarrow{\text{pyridiniumchlorochromate}}$ **(A)** $C_{11}H_8O$ $\xrightarrow[\text{H}^{\oplus}]{2\ CH_3CH_2SH}$ **(B)** $C_{15}H_{18}S_2$ $\xrightarrow{\text{Raney Ni}}$ **(C)** $C_{11}H_{10}$

From (A):

- $\xrightarrow{\text{alcoholic CN}^{\ominus}}$ **(D)** $C_{22}H_{16}O_2$

- $\xrightarrow{\text{BrCH}_2\text{COOC}_2\text{H}_5\ /\ Zn}$ $C_{15}H_{16}O_3$ **(E)**

From (E):

- $\xrightarrow{\text{DIBAL-H}}$ **(G)** $C_{13}H_{12}O_2$
- $\xrightarrow{\text{LiAlH}_4}$ **(F)** $C_{13}H_{14}O_2$

(G) $C_{13}H_{12}O_2$ $\xrightarrow{\text{heat , H}^{\oplus}}$ **(H)** $C_{13}H_{10}O$ $\xrightarrow[\ominus OH]{\text{acetaldehyde}}$ **(I)** $C_{15}H_{12}O$

(I) $\xrightarrow[\text{PPh}_3]{CH_2=}$ **(J)** $C_{16}H_{14}$
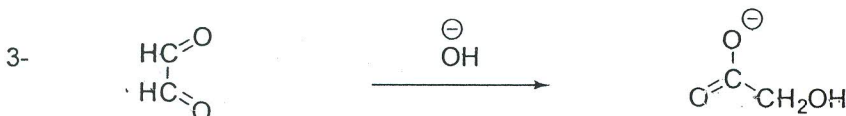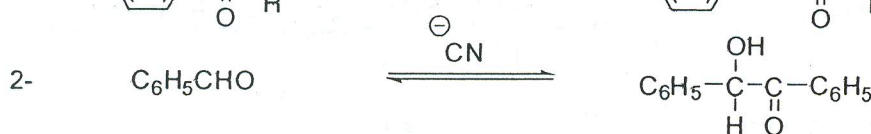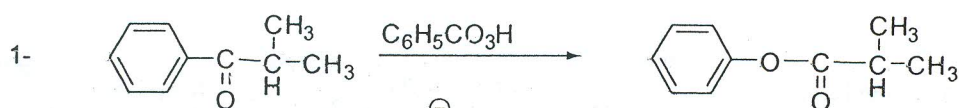
With Best wishes

Examiner

Dr. Soha M. Abdelmageed

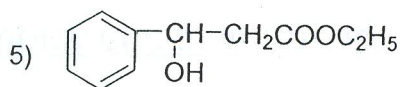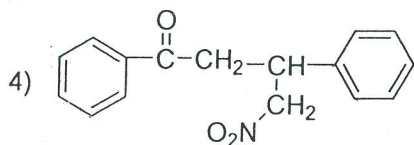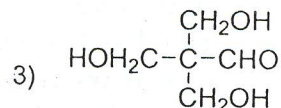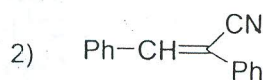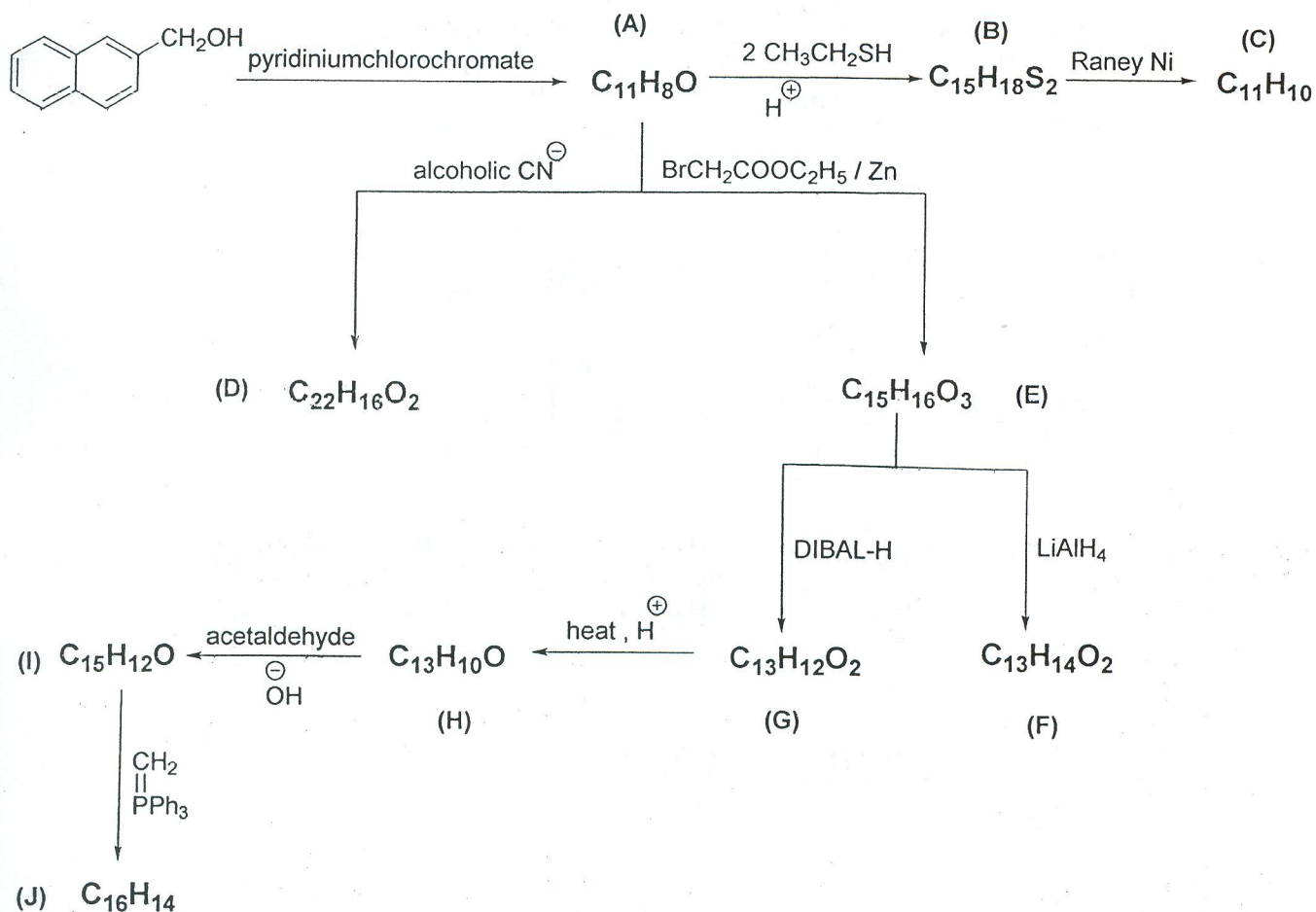| Mansoura University Faculty of Science Chemistry Department Subject : Chemistry Course(s):Chem (245) Physical Chemistry of liquids and solutions		Second Term Second year Students Special Chemistry-level 2 Date : June 2014 Time Allowed : 2 hours Full Marks : 60 Marks

Answer the following questions :

1. a) Explain the partial molar volume and its methods of determination.
(10 marks)

   b) At 25°C, the osmotic pressure of 100 ml ß-lactoglobulin solution containing 3.12 gram of that protein was found to be 0.04 atms . Calculate the molecular weight of the protein. (10 marks)

2. a) Write shortly on the different colligative properties of solutions and Van't Hoff factor , methods of determination of the last and the relation between the two. (10 marks)

   b) A current of 0.1 ampere is passed through an aqueous copper sulphate solution for 10 minutes using platinum electrodes. Calculate the amount of copper deposited at the cathode and the number of copper atoms deposited. (10 marks)

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

   b) The resistance of 0.01 mol .solution of acetic acid in a cell (cell constant =0.406 cm^{-1}) was found to be 681 ohm .What is the degree of ionization of this acid. Limiting equivalent conductance of acetic acid equal to 323.01 Ohm^{-1} m^2. (10 marks)

(R =0.82 L atm, F= 96500 Coulomb, molecular weight of Cu =63.5)

With best wishes ; Prof.Dr.Esam Gomaa

ANSWER THE FOLLOWING QUESTIONS

1. Give an account about formol titration of amino acids (Sorenson).

[20 Marks]

2. Write about :

   Fatty acids and β-oxidation

[20 Marks]

3. a) Show effect of substrate concentration on enzymatic activity

[20 Marks]

   b) Show hydrolysis of nucleic acids

[20 Marks]

أطيب التمنيات بالتوفيق

أ.د محمد عبد الحافظ الفار

دور مايو ٢٠١٤		الفرقة: الثانيــــــــــــــــة
الزمن: ساعتــــان		الشعبة: كيمياء- كيمياء حيوية -كيمياء/ نبات –
التاريخ: ٢٠١٤/٦/١٢		كيمياء/حيوان-علوم بيئة-جيولوجيا
	كلية العلوم – قسم الرياضيات	المادة: ر ٢٠١- رياضيات بحتة

أجب على الأسئلة الآتية:

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[1]أ. اختبر وجود النهايات المتكررة و النهاية العامة للدالة $f(x,y) = \dfrac{2xy}{x^2 + y^2}$ ، وذلك عندما $(x,y) \to (0,0)$.

[١٠ درجات]

ب. حل مسألة الشرط الابتدائي : $y' = \dfrac{x+y-4}{x+y+4}$, $y(2)=0$

[١٠ درجات]

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[2]أ. إذا كانت $z = \sec^{-1}\left(\dfrac{x^5+y^5}{x-y}\right)$ ، فأثبت أن : $x\dfrac{\partial z}{\partial x} + y\dfrac{\partial z}{\partial y} = 4\cot z$

[١٠ درجات]

ب. إذا كانت $z = f(x+3y)+g(x-3y)$ ، حيث f , g دوال قابلة للاشتقاق مرتين على الأقل
فأثبت أن : $z_{yy} = 9\, z_{xx}$.

[١٠ درجات]

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[3]أ. اوجد الحل العام للمعادلة التفاضلية : $(\cos 2y - 3x^2y^2)dx + (\cos 2y - 2x\sin 2y - 2x^3y)dy = 0$ ، ثم
استنتج الحل الخاص الذي يحقق الشرط : $y(3) = 0$.

[١٠ درجات]

ب. احسب قيمة التكامل : $I = \displaystyle\int_{0}^{4} \int_{x/2}^{2} \cos(y^2)\,dy\,dx$

[١٠ درجات]

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[4]أ. اوجد الحل العام للمعادلة التفاضلية : $(2xy^5 - y)dx + 2x\,dy = 0$

[١٠ درجات]

ب. اثبت أن قيمة التكامل الخطي: $\displaystyle\int_{(1,1)}^{(2,4)} (2x + 4xy)dx + (2x^2 + y)dy$

لا تعتمد على المسار الواصل بين النقطتين $(1,1)$ ، $(2,4)$ ، ثم احسب قيمته على الخط الواصل بين النقطتين.

[١٠ درجات]

مع التمنيات بالتوفيق!

| Mansoura University		Second Term
Faculty of Science		2rd Level :
Chemistry Department		Chemistry program
Subject: Chemistry		Date: 19 June. 2014
Course: Chem. 234		Time Allowed: 2 hrs
Organic Spectroscopy		Full Mark: **80** Marks

Answer All Questions;

Question 1:   **Answer** with discussion the following questions   (20 Marks

(1) Ethyne does not show IR absorption in the region 2000-2500 cm-1 because.....

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(2) What is the structure for the compounds (C8H18) & ($C_{12}H_{18}$) which in their 1H NMR spectra gives only one singlet signal.

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(3) Compound A & B have the formula $C_{10}H_{14}$ and on Hydrogenation all yields decalin. Their UV spectra show the following values λmax (A) 283 nm &   (B) 234 . What is the structure for (A) & (B).


decalin

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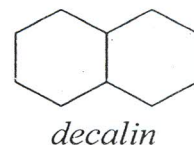
(3) A compound C_5H_8O shows IR absorption at 3600-3300 (br.) and 2210 . Its 1H NMR spectrum contained singlets at 1.5, 2.2 and 2.9 ppm in a ratio 6 : 1 : 1. Name the compound.

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(5) How does the O-H stretch in the IR spectrum of a carboxylic acid differ from the O-H stretch of an alcohol?

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(6) Explain why compound (A) has a carbonyl stretch frequency at a much lower wave number than the compound (B) in the infrared spectrum.

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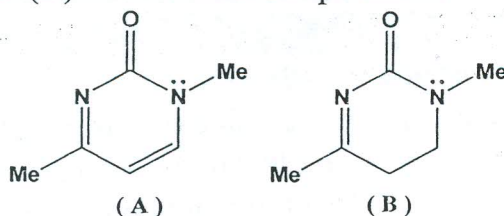
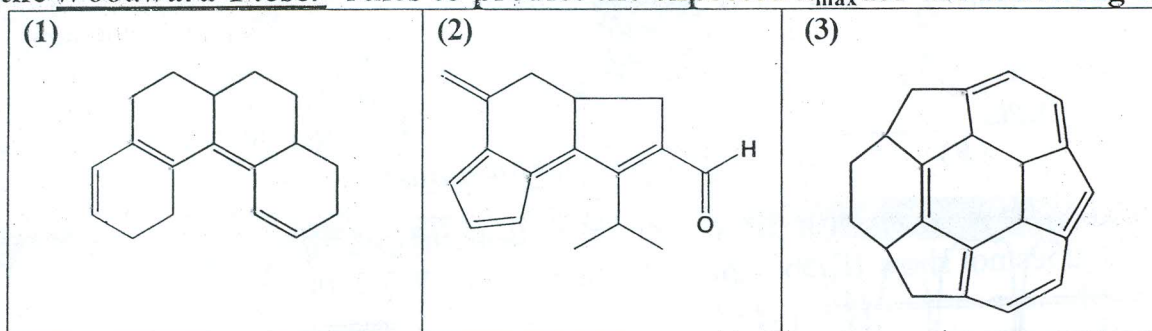(7) What is the number of the expected signals and types of splitting in 1H NMR spectra of the following compounds:
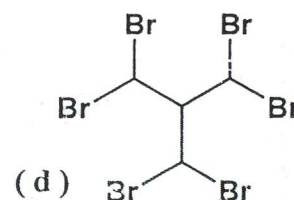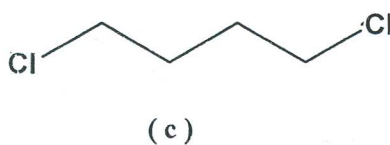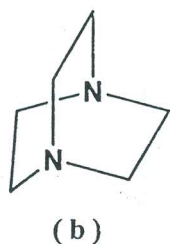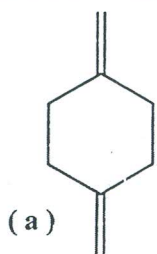
With My Best Wishes
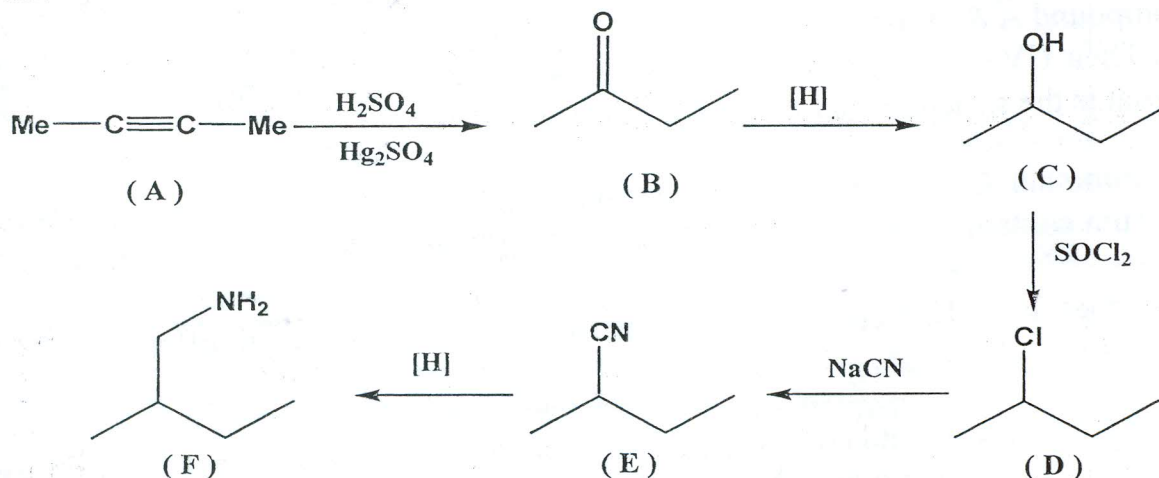*Prof. Dr. El-Sayed I. El-Desoky*

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

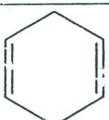II) Explain, by using the specroscopic techniques, how you can follow up the following sketch?
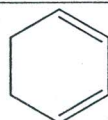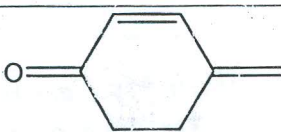
Write shortly what you know about the following:

A) Hook's law and the factors effecting in the value of wve number.

B) Define clearly what is the meaning of the following expressions:

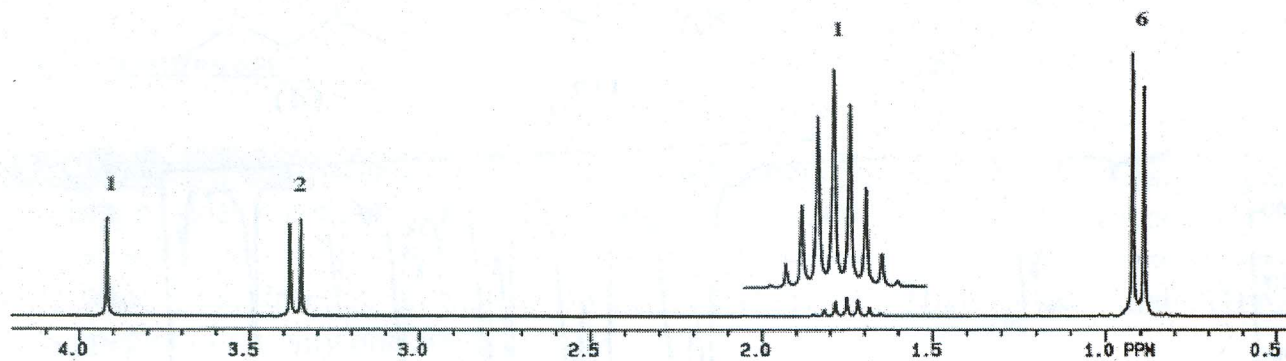   (Bathcromic and hypschromic shift, Stretching and bending vibrations , Chemical shift)

C) How might you use spectroscopic techniques to distinguish between the following pairs

No	(A)	(B)
1	Cis 1,4-dichioro-2-butene	Trans 1,4-dichloro-2-butene
2		
3	Phthamide	Phthalimide
4		

1) What is the structure for Compound **A:**   Molecular formula = $C_4H_{10}O$.
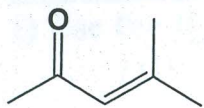
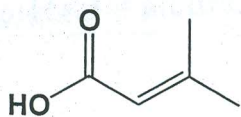

2) Compound **B**: Molecular formula = C_4H_9Br
1.
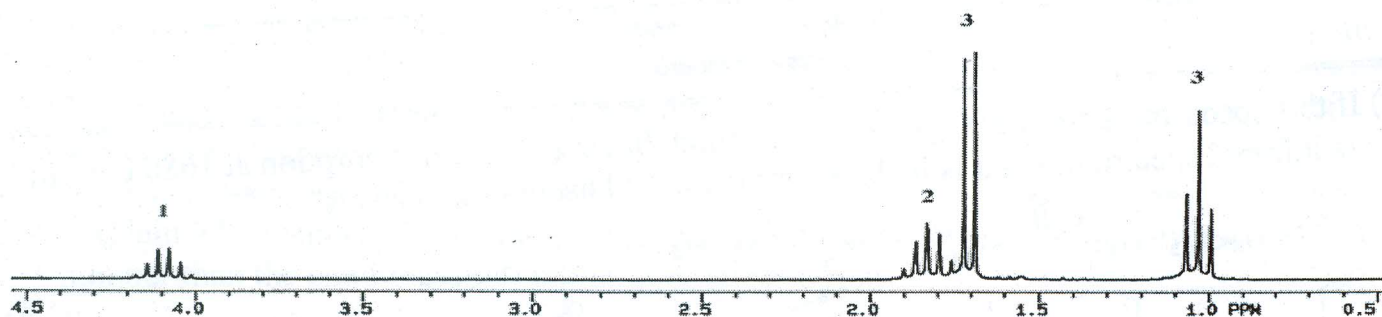
3) Compound **C** : Molecular formula = $C_{11}H_{14}O_2$: IR signal: 3300 (broad), 1701cm-1
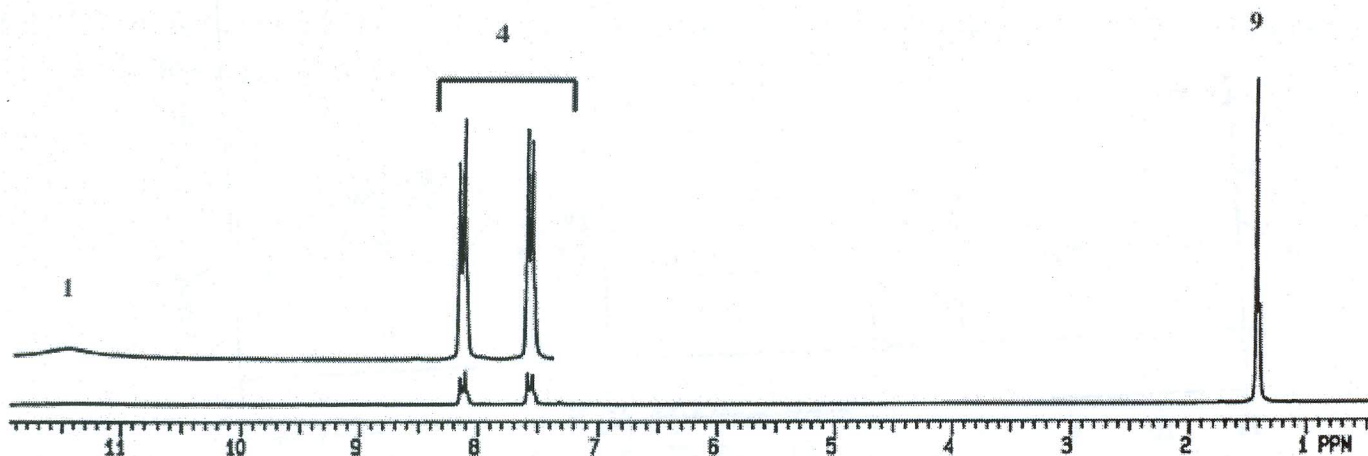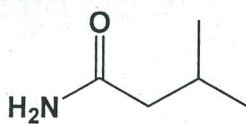
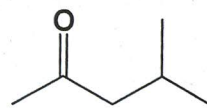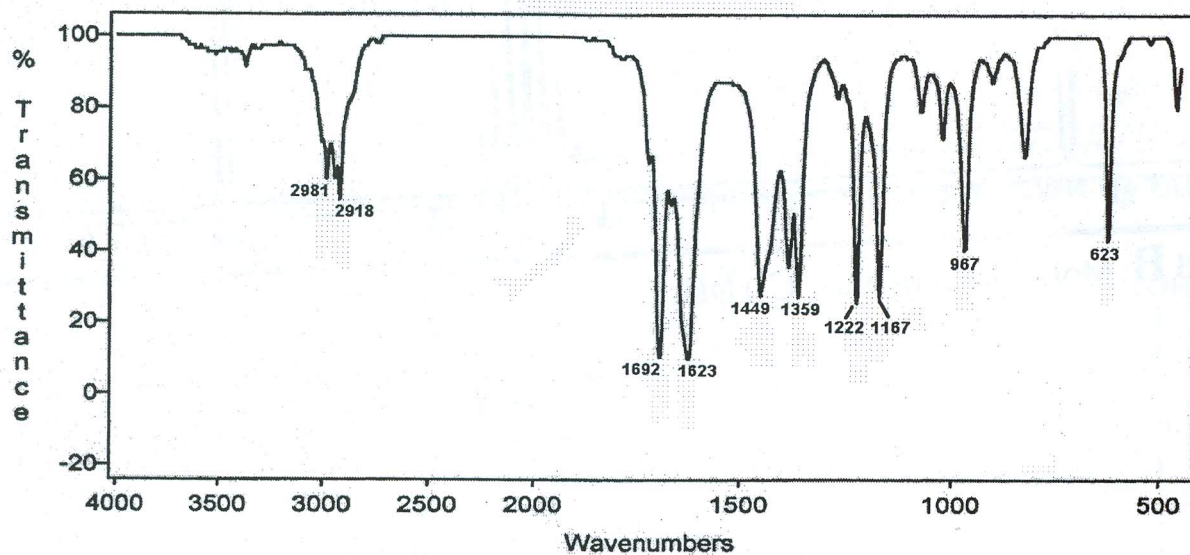4) Which of the following structures best fits with IR spectrum shown below? Discuss the reasons.
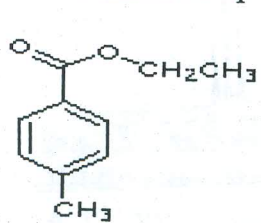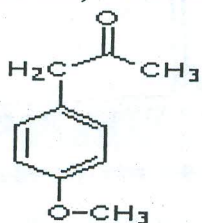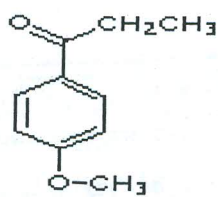
(a)   (b)   (c)   (d)

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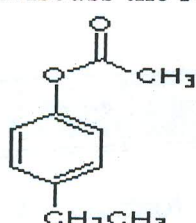
A   B   C   D