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RF-3553-54

M. Sc. (Part-II) Examination

April / May – 2010

Organic Chemistry : Paper-II

(Industrial Chemicals & Industrial Analysis)

[New Course]

Time : **3** Hours] [Total Marks : **100**

RF-3553

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **M. Sc. (Part-2)**

Name of the Subject :

☛ **Organic Chemistry : P-2 (New)**

☛ Subject Code No. : **3 5 5 3** ☛ Section No. (1, 2,.....) : **1**

Seat No. :

Student's Signature

(2) Answer to the two sections should be written in separate answer books.

(3) Figures to the **right** indicate **full** marks of the question.

1 (a) What are unit operations? Discuss industrially important chemicals that are obtained from naphthalene by sylphonation. **12**

(b) What are helogenations? Enlist different halogenating agents and discuss industrially important chemicals that are obtained by chlorination.

(c) What is nitration? State the nitrating agents used for nitration. Give the reaction mechanism of nitration process. Discuss industrially important chemicals that are obtained from naphthalene by nitration.

OR

1 (a) Explain unit process. How is amination carried out? Give industrially important chemicals that are obtained by ammonolysis. **12**

(b) What is alkylation? Discuss industrially important chemicals that are obtained by alkylation.

(c) What are sulphonation and sulphotion? Discuss industrially important chemicals that are obtained from naphthalene by sulphonation.

2 (a) Discuss industrially important chemicals that are obtained from C_2-cuts. **12**

(b) Discuss the industrial manufacture and uses of elastomers and polyolefins.

(c) Write note on : Polyvinyl plastics.

OR

2 (a) Discuss industrially important chemicals that are obtained from toluene and xylene. **12**

(b) Discuss the industrial manufacture and uses of polysters and polyacrylate.

(c) Give a brief account of techniques of polymerisation.

3 (a) Give manufacture and uses of citric acid. **12**

(b) What do you mean by pesticides? Give the manufacture and uses of D.D.T. and parathion.

(c) Discuss chemicals used in perfumery.

OR

3 (a) Discuss the process for power alcohol by fermentation. **12**

(b) Give the manufacture and uses of nitro musks and civetone.

(c) Give the manufacture and uses of anionic detergents.

RF-3554

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(1)

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Name of the Examination :

☛ **M. Sc. (Part-2)**

Name of the Subject :

☛ **Organic Chemistry : P-2 (New)**

☛ Subject Code No. : **3 5 5 4** ☛ Section No. (1, 2,.....) : **2**

Seat No. :

Student's Signature

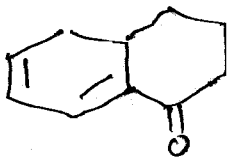
(2) Answer to the two sections should be written in separate answer books.
(3) Figures to the **right** indicate **full** marks of the question.

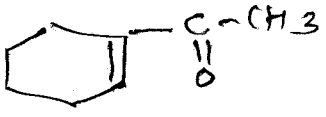
4 (a) (i) How will you distinguish following pairs of compounds by technique as shown with each pair : **12**

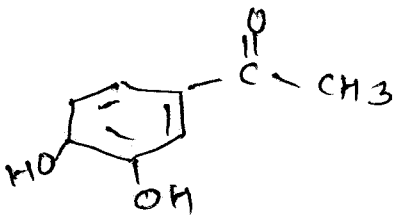
(a) $C_6H_5COOC_2H_5$ and C_6H_5COCl → IR spectra

(b) Neopentene and 2-methyl butane → NMR

(ii) Calculate λ_{max} of the following compounds :

(a) 

(b) 

(c) 

(b) (i) Explain the terms :

(a) Base peak

(b) Parent peak and

(c) Metastable ions in mass spectrometry.

(ii) What are advantages of FTIR spectrophotometer over conventional method?

(c) Deduce the structure giving reasons for an organic compound from the following data:

MF : $C_9H_{10}O_2$

IR : 1745, 1480, 1225, 749, 697 cm^{-1}

NMR : Singlet : δ = 7.22

Singlet : δ = 5.0

Singlet : δ = 1.96

M/Z : 150, 108, 91, 77, 43

OR

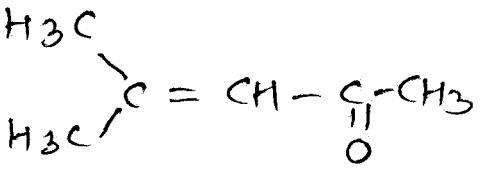
4 (a) (i) Explain how the isotope effect can be used to determine the possible molecular formula. **12**

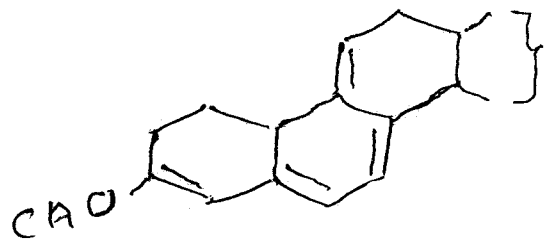
(ii) Why is KBr used as mulling agent in IR? Differentiate the following pairs of compounds using IR spectroscopy :

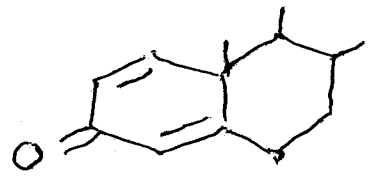
(a) Ethyl benzoate and benzoic acid

(b) n-Hexanol and n-hexanoic acid.

(b) (i) Calculate λ_{max} of the following compounds :

(a) 

(b) 

(c) 

(ii) Explain the importance of coupling constants in the interpretation of NMR spectra.

(c) Deduce the structure of compound using following spectral data :

MF $C_8H_{10}O$ UV : λ_{max} 257 nm

IR : 3350 (b), 3090, 3070, 750, 700 (s) cm^{-1}.

NMR : Singlet : δ = 7.2 (5H)

Triplet : δ = 3.7 (2H)

Singlet : δ = 3.15 (2H) (disappears with D_2O)

Triplet : δ = 2.7 (2H)

M.S. M/e. 122, 92, 91.

5 (a) State the limitations of GC. Why LC did not become popular in early days? How it becomes superior to GC in modern times? Compare GC with LC. **12**

(b) Explain the working of FID and compare it with TCD.

(c) Discuss the stationary phase including bonded phase supports used in LSC.

OR

5 (a) How is TLC better than paper chromatography? Explain derivatisation in HPLC with two illustrations. **12**

(b) Describe UV absorption detector used in HPLC. Give its characteristics.

(c) Differentiate between packed column, WCOT and SCOT. Compare their merits and demerits.

6 (a) How is COD of water sample determined? How interferences are avoided? Calcualte theoretical COD for ethanol solution having concentration 460mg/litre. **12**

(b) How is sample of polluted air collected? Explain chemiluminescence method to determine nitrogen oxide in air sample.

(c) Write a note on industrial pollution of drug industries.

OR

6 (a) Describe the method for estimation of BOD in water sample. **12**

(b) Explain oxides of N and S and their effect in atmosphere,

(c) How is effluent water of sugar industries treated?