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RF-5367-68

M. Sc. (Part-I) Examination

April / May – 2010

Self Finance Chemistry : Paper-IV

(Instrumental Methods)

Time : **3** Hours] [Total Marks : **54**

RF-5367

Instruction :

(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-I)**

Name of the Subject :

☛ **Self Finance Chemistry : P-4**

☛ Subject Code No. : **5 3 6 7** ☛ Section No. (1, 2,.....) : **1**

Seat No. :

Student's Signature

(2) Answers to the **two** sections should be written in **separate** answer books.,

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

1 (a) How UV/Visible spectroscopy is applicable for organic compounds? Explain. **9**

(b) (i) Differentiate $n \rightarrow \sigma^*$ transition over $n \rightarrow \pi^*$ transition.

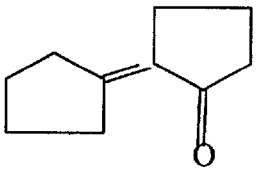
(ii) Explain the term bathochromic and hypsochromic effect.

(c) (i) Discuss the selection rule in IR spectroscopy. Name the different stretching and bending bands in IR.

(ii) Calculate the wave number of 8.5 micrometer in IR.

OR

1 (a) Calculate the λ_{max} of the following compounds. **9**



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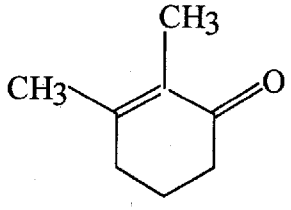

(b) (i) Why KBr is used as mulling agent in IR? Explain.
(ii) Name the different components of IR spectrophotometer. Describe the source use to set IR radiation.

(c) Discuss how samples can be prepared and analyzed by IR? Explain.

2 (a) Why TMS is used as International standards in NMR? Explain. **9**

(b) Explain shielding and deshielding with suitable examaple.

(c) Indicate the major fragments that could be formed in mass spectra of the following compoudns;
(i) n-Butanol
(ii) Phenitol and
(iii) m-Cresol

OR

2 (a) A compound having molecular formula C_4H_9ON has ^{1}H-NMR data; 1.12(t, 3H); 1.93 (s,3H); 3.22 (q,2H) and 8.15 (s,b, 1H) deduce the structure with justification. **9**

(b) By using n+1 rule predict the splitting patterns and signals in the following compounds with justification; CH_2CH_3; $CH_3CH_2CH_3$; $CH_3CHClCH_3$; $CH_2BrCHBr_2$ and $CH_3CH(CH_3)CH_3$.

(c) Explain the fragmentation rule. Enlists the different methods of fragmentation. Write in short McLaferty rearrangement with example.

3 (a) Give the classification of separation methods and discuss the basic principle of chromatography. **8**

(b) Enlists the different column used in GC and describe any one of them in detail.

(c) What do you mean by GC-MS? Give the general applications chromatography.

OR

3 (a) Explain the principle of gas chromatography and describe the Instrumentation of GC. **8**

(b) Decribe the Van Dempter plot equation with application in chromatography.

(c) Which carrier gases used in GC? Describe the sample injection system.

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Name of the Examination :

☛ **M. Sc. (Part-I)**

Name of the Subject :

☛ **Self Finance Chemistry : P-4**

☛ Subject Code No. : **5 3 6 8** ☛ Section No. (1, 2,.....) : **2**

Seat No. :

Student's Signature

(2) Answers to the **two** sections should be written in **separate** answer books.,

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

4 (a) Giving reason predict the order of elution for; **9**

(i) Na^+, K^+, Li+, Cs^+, Rb^+ and

(ii) Na^+, Ca^{+2}, La^{+3}, Th^{+4}.

(b) Enlist the different detector used in HPLC and describe any two of them.

(c) Discuss the solvent programming in HPLC.

OR

4 (a) What is ion exchange? How α-amino acid can be separated in IFC? **9**

(b) Give the basic principle of solvent extraction. Differentiate the normal phase and reverse phase chromatography.

(c) Give a short account on 'Craig extraction.

5 (a) Give applications of TGA in $CaC_2O_4.H_2O$. **9**

(b) What is nonselective membrane electrode? Explain the principle of enzymatic or biocatalytic electrode.

(c) What do you mean by TG & DTG? What advantage of DTG curve over TG? Give the TG curve of $CuSO_4$, $5H_2O$ at lower heating rate.

OR

5 (a) Discuss the thermometric titration. **9**

(b) Give the principle of glass electorde and the errors in glass electrode.

(c) Explain thge nature of DC polarogram and draw the polarogram.

6 (a) Discuss the working and application of polarized microscope. 8

(b) Give the principle and working of small angle neutron scattering.

(c) Explain Bragg's law for X-ray diffraction.

OR

6 (a) Enlists the applictions of X-ray diffraction and discuss any three in detail. 8

(b) Discuss the working of transmission electron microscope.

(c) Explaint he principle and applications of electron diffraction.