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DF-1522

M. Sc. (Part - II) (Sem. III) Examination

March / April – 2016

Organic Chemistry : Paper - II

(Instrumental Techniques & Analysis)

(Regular & Evening)

Time : **3** Hours] [Total Marks : **70**

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 - II) (Sem. III)**

Name of the Subject :

☛ **Organic Chemistry : Paper - II**

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

Seat No. :

Student's Signature

(2) All questions are compulsory.
(3) Figures to the right indicate full marks of the questions.

1 Answers any three of the following : 18

(a) Explain flipping in NMR. Discuss with example: shielding, multiplicity and J-value.

(b) (i) With example explain chamical and magnetic equivalence.

(ii) How many ^{1}H-NMR signals that can be obtained in the following compounds : Phenyl ethyl ketone, sec. butyl alcohol and *p*-methoxy acetophenone.

(c) Explain with example coupled and decoupled proton in ^{13}C-NMR. Calculate the ^{13}C chemical shift in 2-chloropentane and 3-methyl pentane.

(d) Enlists the different methods of ionization used in mass spectroscopy. Discuss in brief chemical ionization method.

(e) A sample of Dacron (Terylene) was hydrolyzed to give acidic nature compound A which was isolate from the reaction mixture. Deduce the structure of compound A from following spectral data.

Molecular formula : $C_8H_6O_4$

^1H NMR : 8.2 (4H.S), 12.5 (1H, broad singlet)

^{13}C NMR : δ = 130 (4C,d), 140 (2C, S), 176 (2C, S)

MS : M^+, m/z 166.

2 Answer any three of the following : 18

(a) What criteria should be considerd in selecting inert solid supports ? Describe such supports widely used and how liquid stationary phase is coated on this ?

(b) Give importance of gradient elution in HPLC. Explain that it is parallel to temperature programming in GC.

(c) Explain the use of guard column in HPLC. Discuss the working of UV absorption, compared it with other detector.

(d) Compare GC with LC. Discuss the working usefulness and limitations of UV detector used in HPLC.

(e) Discuss the factors affecting TGA results. What are the limitations of TGA ?

3 Answer any three of the following : 18

(a) How 'Dissolved Oxygen' is determined using Winkler's methods ? Explain the interference in this method.

(b) What are the characteristic of oxides of sulphur ? Give the colorimetric method for its estimation.

(c) Discuss the application of wet oxidation and ion exchange processes in waste water treatment.

(d) What is the effect of NO_x on human beings ? Why the concentration of Ozone depends upon the NO in atmosphere?

(e) Why secondary treatment is a must for the effluent of sugar industry ? Describe the characteristics and treatment given to effluent water in sugar industry.

4 Answers any four of the following : 16

(a) (i) An organic compound with molecular weight 60, on heating with sodium hypobromite gives out nitrogen with effervescence. In PMR, it shows broad band at δ 7.5, in UV it absorbs at 222 nm $(\in_{max} 62)$. The band observed in the IR spectrum are 3490 cm^{-1} (m), 3385 cm^{-1} (m) and 1675 cm^{-1}(s). Determine the structure.

(ii) Explain the terms: base peak and parent ion peak.

(b) (i) Indicate the major fragments that could be formed in mass spectra of the following compounds; (i) sec. - Butyl alcohol, and (ii) anisol.

(ii) Why deutarated solvents are used in ^{1}H-NMR ? Enlists the different solvents used in PMR spectroscopy.

(c) Give the criteria to select mobile phase in HPLC.

Describe the liquid mobile phase use in LC/HPLC.

(d) Give the name of the industries which emit inorganic pollutants. Discuss the effects of inorganic pollutants on environment.

(e) Write a short note on the environmental pollution cause by detergents.
