



A-1522

**M.Sc. (Part - II) (Sem. III) (Regular & Evening)
Examination**

March / April – 2015

Organic Chemistry : Paper - II
(Industrial Techniques & Analysis)

Time : 3 Hours]

[Total Marks : 70

Instructions :

(1)

नीचे दृश्यावलोकन निशानावाणी विगतो उत्तरवही पर अवश्य कर्तव्य. Fillup strictly the details of signs on your answer book.	Seat No. :
Name of the Examination :	<input type="text"/>
<input type="checkbox"/> M.SC. (PART - II) (SEM. III) (Regular & Evening)	<input type="text"/>
Name of the Subject :	<input type="text"/>
<input type="checkbox"/> ORGANIC CHEMISTRY : PAPER - II	<input type="text"/>
Subject Code No. : <input type="text" value="1"/> <input type="text" value="5"/> <input type="text" value="2"/> <input type="text" value="2"/>	<input type="text"/>
Section No. (1, 2,.....) : <input type="text" value="Nil"/>	
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) (i) Discuss how $^1\text{H-NMR}$ and $^{13}\text{C-NMR}$ spectroscopy are useful for the determination of organic compounds? Explain and justify which one is better to elucidate the structure of compounds.
- (ii) By using $n + 1$ rule predict the splitting patterns and signals in the following compounds with justification;- $\text{C}_2\text{H}_5\text{OC}_2\text{H}_5$; $\text{CH}_3\text{CHBrCH}_3$;
 $\text{CH}_3\text{CCl}_2\text{CH}_3$; $\text{CH}_2\text{BrCHCl}_2$ & $\text{CH}_3\text{CH}(\text{CH}_3)\text{CH}_3$
- (b) Discuss the importance of mass spectroscopy. Enlists the different methods of ion source and discuss chemical ionization method.
- (c) (i) Explain examples coupled and decoupled protons in $^{13}\text{C-NMR}$.
- (ii) Calculate the ^{13}C chemical shift in 2,2-dimethylpentane and pentanol.

- (d) Name the different solvents used in $^1\text{H-NMR}$. Why deuterated solvents are used in $^1\text{H-NMR}$ spectroscopy?
- (e) An organic compound with molecular formula $\text{C}_4\text{H}_9\text{NO}$ that absorbs at 220nm; ϵ max 63 and shows following spectral data: IR : 3500(m), 3402(m), 2960(w), 1682(s), 1610(s), 1398(m), 700(br,s) and 650(m) Cm^{-1} .
 $^1\text{H-NMR}$ τ value) : 9.0 (d, 6H); 7.9 (m, 1H), and 1.92 (br,s,2H);
 $^{13}\text{C-NMR}$ (δppm): 177.5, 37.6, and 19.4 and m/z : 43, 71 and 87
 identify the compound.

2 Answers any three of the following. **18**

- (a) Compare between the isocratic and gradient elution. Describe the liquid and solid stationary phase use in HPLC.
- (b) Differentiate between the normal and reverse phase chromatography.
- (c) Discuss the factors affecting TGA results. What are the limitations of TGA
- (d) Give characteristics of an ideal detector? Describe in brief the RI detector.
- (e) Discuss the experimental factors prevalent in thermal gravimetric analysis.

3 Answers any three of the following **18**

- (a) Describe the effects of oxides of Sulphur on living and non living things? Give one method for SO_x determination.
- (b) What are wet oxidation and ion exchange processes? Discuss their applicability in waste water treatment.
- (c) Give the physiological effects of oxides of carbon. Give one method for determination of carbon monoxide?
- (d) Give the name of the industries which emit organic pollutants. Discuss the effects of organic pollutants on water bodies.
- (e) Discuss the schematic diagram of the instrument used in Chemiluminescence method for NO_x determination.

4 Answers any four of the following

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- (a) (i) Explain the terms: Multiplicity, Base peak and radical cation.
- (ii) A compound having molecular formula C_4H_9Br has 1H -NMR data; 1.06(d, 6H); 1.53(m, 1H) and 3.32 (d, 2H) deduce the structure with justification.
- (b) (i) With example explain shielding and deshielding.
- (ii) Indicate the major fragments that could be formed in mass spectra of the following compounds;
- (i) 2-pentanone, (ii) Ethyl benzoate.
- (c) What is the principle of displacement chromatography? Give the standard curve obtained in displacement chromatography.
- (d) Discuss the interference in COD determination. How COD is determined using Spectrophotometric method in modern times?
- (e) Discuss the significance of reverse osmosis and electro dialysis for water in brief.
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