Roll No. ..... Total Pages : 4

GSQ/D-21 **1073**

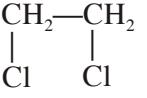
CHEMISTRY
(Organic Chemistry)
Paper–XVII-CH-303

Time : Three Hours] [Maximum Marks : 32

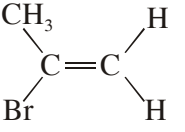
Note : Attempt *five* questions in all. Q. No. 1 is compulsory. Attempt *four* more questions, choosing *two* questions from each section.

Compulsory Question

1. (a) How many PMR signals are expected from the following ?

(i) 

(ii) $CH_3–O–CH_3$

(iii) 

(iv) $CH_3–O–CH_2–CH_3$ 2

(b) What is mutarotation ? Explain. 2

(c) Give *two* methods of preparation of organolithium compounds. 2

(d) What are anomers and epimers ? Explain by taking examples. 2

SECTION–A

2. (a) What do you mean by chemical shift ? How it is measured relative to TMS in δ (delta) scale and τ (tau) scale.

(b) Explain shielding and deshielding effects in PMR spectroscopy by taking examples. 2

(c) Write structural formulae for compounds with the following molecular formulae, which give rise to any one PMR signal. 2

(i) C_5H_{12}

(ii) C_2H_6O

(iii) $C_6H_4Cl_2$

(iv) C_8H_{10}.

3. (a) Explain the terms :

(i) Coupling constant and its units. 2

(ii) Enantiotopic protons and diastereotopic protons.

(b) Using PMR spectroscopy how can you differentiate between :

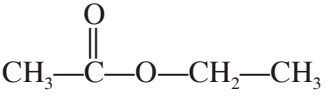
(i) Vic. dibromoethane and Gem. dibromoethane.

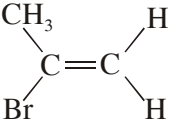
(ii) Ethanol and Methoxymethane. 2

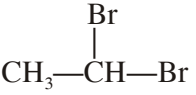
(c) How many PMR signals would cis and trans 1, 2–dibromocyclopropane show ? 2

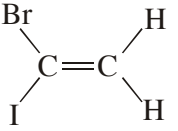
4. (a) PMR spectrum of an organic compound recorded on a 60 MHz instrument shows a signal at 84 Htz. Compute the position of the signal using 100 MHz instrument. What would be the position of the signal in δ scale in each instrument ? 2

(b) Given below are the formulae of some compounds which of these compounds would exhibit spin-spin coupling in their PMR spectra and indicate the multiplicity of various signals.

(i) 

(ii) 

(iii) 

(iv)  2

(c) What are equivalent and non-equivalent protons ? Explain with examples. 2

5. (a) An organic compound having molecular formula $C_9H_{11}Br$ gave the following PMR data :

(i) Multiplet δ 2.15, 2H

(ii) Triplet δ 2.75, 2H

(iii) Triplet δ 3.38, 2H

(iv) Singlet δ 7.22, 5H.

Assign the structure to the compound on the basis of the above data. 2

(b) Discuss the applications of PMR spectroscopy. 2

(c) Why do we take TMS as a reference compound in PMR studies ? 2

SECTION–B

6. (a) What are disaccharides ? Explain with examples. 2

(b) Write Haworth projection formula of

(i) α-D(+) Glucopyranose.

(ii) β-D(+) Glucopyranose. 2

(c) Write the modern mechanism for the formation of glucosazone. 2

7. (a) What do you mean by invert sugar ? Explain. 2

(b) What are glycosides ? Give their structures. 2

(c) What is the procedure, precautions for the formation of Grignard's reagent. 2

8. (a) Explain the following :

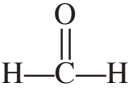
(i) The Ruff degradation.

(ii) Erythro and threo diastereomers. 2

(b) What are polysaccharides ? Explain the structure of amylase component of starch. 2

(c) What happen when ethylmagnesium bromide react with

(i) Carbon dioxide

(ii)  2

9. (a) Why glucose does not react with $NaHSO_3$ even though it contains an aldehyde group ? 2

(b) How can Grignard reagent be used for the synthesis of 1°, 2° and 3° alcohols ? 2

(c) Why organolithium compounds are more reactive than Grignard reagent ? 2