Seat No:_____ **Enrollment No:_____**

PARUL UNIVERSITY
FACULTY OF APPLIED SCIENCE
M.Sc., Winter 2017-18 Examination

Semester: 3 **Date: 27/12/2017**
Subject Code: 11205204 **Time: 10:30am to 1:00pm**
Subject Name: Spectroscopy of Organic Compounds. **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1. A) Write a brief note on the following questions. **(08)**
(a). Explain Wood-Ward Fieser rules for calculating λ_{max} for conjugated dienes with example.
(b). Write a brief note on Chromophores with example.

Q.1. B) Answer the following questions (Any two)
(a) **(04)**
1. What is conjugated diene system? Give one example.
2. Differentiate UV and IR spectroscopy. (Two points each).

(b). Explain σ (sigma) → σ* transitions. **(04)**
(c) Write the applications of UV and IR spectroscopy (Four points each). **(04)**

Q.2. A) Answer the following questions.
(a) **(04)**
1. What is coupling constant? Write the factors which affect coupling constant.
2. Differentiate ^{1}H-NMR and ^{13}C-NMR

(b) Describe Shielding and De-shielding of magnetic nuclei in case of NMR spectroscopy. **(04)**

Q.2. B) Answer the following questions (Any two)
(a) Define chemical shift and write the factors which affect chemical shift. **(03)**
(b) Explain why NMR spectrum of benzene is observed at a lower field whereas that of Acetylene is observed at a higher field? **(03)**
(c) Write a note on the use of solvents in NMR spectrum. **(03)**

Q.3. A) Explain in details. **(08)**
(a). Write a note on McLafferty Rearrangement and ortho effect.
(b). Write a note on Principle and Instrumentation of GC-MS techniques.

Q.3. B) Answer the following questions (Any two)
(a) **(04)**
1. Define Molecular-Ion effect.
2. Mention main point of application of Mass spectroscopy.

(b) Describe the Retro Diels –Alder fragmentation. **(04)**
(c) What is Fragmentation in Mass spectroscopy? Explain fragmentation pattern in Ethanol. **(04)**

Q.4. Answer the following questions.
a) 1. Write the Principle of Auger Electron Spectroscopy (AES). **(04)**
2. Write the Principle and applications of Photoelectron Spectroscopy (PES).

b) Write the principle of Raman spectroscopy? Name the different types of lines present. **(04)**

Q.4. B) Answer the following questions (Any two)
(a) Differentiate IR and Raman Spectroscopy. **(03)**
(b) Assign the types of ^{1}H-NMR-Signals present in 1-Propanol and Propane. **(03)**
(c) Alpha-Terpene is homo nuclear diene (conjugated) (λmax = 253 nm) and has one Methyl and one Isopropyl group. Calculate λmax and elucidate the structure for Alpha-Terpene. **(03)**