9. a) Write down the ionization procedure involved in MALDI-MS. Mention two important applications of this mass spectrometer. $1\frac{1}{2}+2$

   b) What are Quasimolecular ions ? How are they formed in CI-MS ? $\frac{1}{2}+1$

10. a) Write short notes on ***(any two)*** $1\frac{1}{2}\times2$

   i) Quadrupole analyzer

   ii) Field ionization

   iii) Time of Flight (TOF) analyzer.

   b) Mention the important differences between MALDI-MS and ESI-Tandem-MS. 2

11. i) Explain the 'Spin-echo' technique with its pulse sequence and mention its importance. 2

   ii) Explain with pulse-sequence of NMR-method of 'Attached Proton Test' (APT) for ^{13}C-NMR and explain the nature of the signals (^{13}C) obtanied for CH and CH_3 units with proper reason. 3

12. i) Write down the principle of Nuclear Overhauser effect (NOE). 2

   ii) Comment on the stereoelectronic effect on ^{31}P-NMR chemical shift. $1\frac{1}{2}$

   iii) Explain the principle behind the Jeener experiment (COSY) with proper pulse sequence. $1\frac{1}{2}$

Ex/M.Sc/CH/3/U-3101/12/2018

M. Sc. Chemistry Examination, 2018

(3rd Semester)

Advanced General Chemistry - II

Paper - X

Time : Two hours Full Marks : 50

(25 marks for each unit)

Use a separate answerscript for each unit.

UNIT - 3101

Answer ***any five*** questions .

1. a) Write down the Randles Sevcik equation as used in CV. Mention the units of the various parameters involved in this equation. 1+2

   b) How do you test for the reversibility of a redox reaction in CV ? 2

2. Deduce the polarographic reduction wave equation. Write down the form of this equation in case of an anodic process. 4+1

3. Write a short note on ''Chronopotentiometry''. 5

4. a) Enumerate the principle and advantage(s) of ''Amperometric Titration''. Provide suitable examples. 1+1+1

   b) Write down the name and structure of an important enzyme mediator as used in Glucose Biosensor. Show its redox cycle to substantiate its mediation. 1+1

5. a) ''CV is a logical extension of LSV'' - Justify the statement. 2

   b) Write a concise note on ''OTTLE''. 3

6. a) Mention the underlying principle of an ion selective potentiometric probe. 3

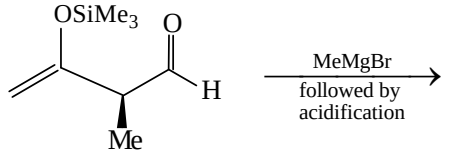
   b) Briefly mention the principle of a carbon dioxide sensor. 2

UNIT - 3102

Answer any ***five*** of the following questions .

7. i) Draw the catalytic cycle of Sharpless catalytic asymmetric bis-hydroxylation of olefin. Give a suitable example on the mnemonic device which helps to predict the enantioselectivity of such reactions. Write the names of the reagents used for such reactions. $1\frac{1}{2}+1\frac{1}{2}+1$

   ii) Write the structure of the major product with proper stereochemical outcome from the following reaction. 1



8. i) Give the structure of the reagents used for catalytic asymmetric epoxidation of unfunctionalized olefin. Draw the corresponding catalytic cycle. Discuss on the mnemonic device with the help of that enantioselectivity of such reaction can be predicted. $1\frac{1}{2}+1+1\frac{1}{2}$

   ii) Write the structure of the major enantiomer and regioisomer obtained in the following reaction. 1