

10. a) Write the principle involved for the ionization in ESI Tandem MS.
- b) Write short notes on (*any two*) $1\frac{1}{2} \times 2$
- Field desorption (FD)
 - Quadrupole analyzer
 - Ion-trap analyzer.
11. Comment on the distinct characteristics of ^{31}P -NMR with respect to ^1H -NMR spectroscopy. Explain the J-modulated spin echo technique and rationalize the ^{13}C -NMR signal for CH and CH_2 units of such experiment (APT). $2+3$
12. Write down the principle behind the two-dimensional correlation spectroscopy (COSY) experiment? Explain the positive and negative NOE using spin populations at α and β -state. $2+3$
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M. SC. CHEMISTRY EXAMINATION, 2017

(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 - 3101Answer *any five* questions

- Write down the polarographic reduction wave equation. What do you mean by 'log-plot analysis' in polarography? Mention the significant aspects of this 'log-plot analysis'. $1+1+3$
- Write a short note on Pulse Polarography. 5
- Briefly enumerate the principle of 'Stripping Voltammetry'. Distinguish between Cathodic Stripping Voltammetry (CSV) and Anodic Stripping Voltammetry (ASV). $2+1$
 - How do you test for the quasi-reversibility of a redox reaction in CV? 2
- Define ion-selective electrode. Write a concise note on solid-state Fluoride ion-selective electrode. $1+4$

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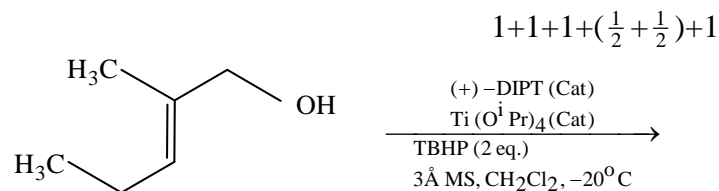
[2]

5. Describe the working-principle of 'Oxygen Sensor'. Name an enzyme based electrode. 4+1
6. a) Mention the limitations in conventional DC polarography. 1
- b) Compare and contrast between LSV and CV. Write down the Randles Sevcik equation as used in CV. 3+1

UNIT - 3102

Answer *any five* of the following questions

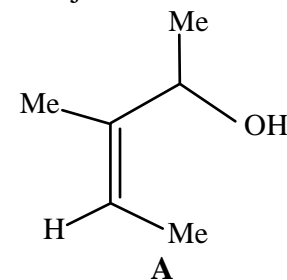
7. In what respect Titanium is special in terms of its application in catalytic asymmetric epoxidation of allylic alcohol compared to many other elements in the periodic table? Give the proposed structure of the loaded catalyst in Sharpless - Katsuki epoxidation reaction. Write the catalytic recipe and name two functional groups those are incompatible under the Sharpless-Katsuki epoxidation condition. Give the structure of the major product of the following reaction :



8. a) Compound **A** on epoxydation with VO(acac)₂/TBHP produces selectively one epoxide whereas the same

[3]

substrate on epoxydation with mCPBA generates its diastereomer as the major product. Write the structure of the major product in the first reaction and account for its formation as major over the other. 2



- b) Write the catalytic cycle of Sharpless catalytic asymmetric aminohydroxylation. With the help of the mnemonic device depict the structure of the major product obtained from ethyl cinnamate on aminohydroxylation using (DHQD)₂ PHAL, K₂O & O₂(OH)₄ and BnOCONCINa in aq. *tert.* butanol. 1 $\frac{1}{2}$ + 1 $\frac{1}{2}$
9. a) Mention the important differences between chemical ionization (CI) and electron impact (EI) mass spectrometry. 1
- b) Show the fragmentation pattern of dioctyl phthalate in chemical ionization (CI) spectrum. 2
- c) What is protein mass fingerprint (PMF)? Write the experimental procedure involved in this technique. 2

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