



SB-3429

M. Sc. (Part - I) (Self Finance) Examination

March / April - 2011

Chemistry : Paper - IV

(Instrumental Methods)

(Old Course)

Time : 3 Hours]

[Total Marks : 54

Instructions :

(1)

नीचे दृष्टावेक निशानीवाणी विगतो उत्तरवही पर अवश्य कभवी.
 Fillup strictly the details of signs on your answer book.

Name of the Examination :
 M. SC. (PART - 1) (SELF FINANCE)

Name of the Subject :
 CHEMISTRY - 4 (OLD)

Subject Code No. : 3 4 2 9 Section No. (1, 2,.....) : 1&2

Seat No. :

Student's Signature

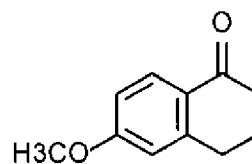
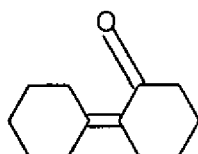
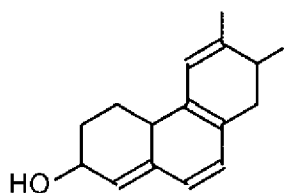
- (2) Answers to the two sections should be written in separate answer books.
- (3) Figures to the right indicate full marks of the questions.

SECTION - I

- 1 (a) Which different transitions are responsible for the absorption of radiation in UV-Visible region ? Arrange them in decreasing order of energy. 9
- (b) Differentiate $\pi \rightarrow \pi^*$ and $n \rightarrow \pi^*$ transition with example.
- (c) Give the selection rule of IR spectroscopy.

OR

- 1 (a) Calculate the λ_{\max} of the following compounds : 9



- (b) Give the range of vibrational spectral region of IR and discuss the different bending vibrations in IR spectra.
- (c) Differentiate the following pairs of compounds by IR spectroscopy :
n-hexanol and hexanal; Acetophenone and Acetone.

- 2 (a) Why TMS is used as International standards in NMR ? – Explain. **9**
- (b) With example explain chemical and magnetic equivalence.
- (c) Discuss the basic principle of mass spectroscopy. Name the different methods of ionization used in mass spectroscopy.

OR

- 2 (a) 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. **9**
- (b) Why deuterated solvents are used in 1H -NMR ? Enlists the different solvents used in PMR spectroscopy.
- (c) Give the different methods of fragmentation in mass spectra and give the example of hemolytic and heterolytic fragmentation.

- 3 (a) Explain the principle of gas chromatography and describe the Instrumentation of GC. **9**
- (b) What is the role of carrier gas ? Name the carrier gas used in GC and describe the sample injection system.
- (c) Explain the terms : resolution, retention, time, retention factor and selectivity factor in chromatography.

OR

- 3 (a) Give the classification of separation methods and discuss the basic principle of chromatography. **9**
- (b) Describe the Van Dempter plot equation and give the applications of GC.
- (c) Enlists the different column used in GC and describe any one of them in detail.

SECTION - II

- 4 (a) Give the principle of solvent extraction. Explain two dimension paper chromatography. 9
(b) Explain the principle of ion exchange in IFC. Give the two reagents used for derivatization process in HPLC.
(c) Describe the stop flow injection method for sample inlet system in HPLC.

OR

- 4 (a) What is the function of guard column ? Give short account on bonded Phase support. 9
(b) Explain reciprocating pump and pneumatic pump. Why derivatization is used in HPLC ?
(c) How TLC plate prepared ? Discuss two techniques of spotting used in TLC. Give the advantages and applications of TLC.

- 5 (a) Explain the principle of liquid membrane electrode and gas sensing electrode. 9
(b) Give the principle of cyclo voltametry and discuss the voltamogram of $K_3Fe(CN)_6$.
(c) What is half wave potential ? Explain diffusion current.

OR

- 5 (a) Explain the Instrumentation of DSC. 9
(b) Discuss two step of stripping voltametry.
(c) Discuss in brief chromic polarization and over voltage.
- 6 (a) Explain the principle of static light scattering in detail. 9
(b) Discuss the applications of small angle neutron scattering in the field of polymer science.
(c) Discuss the working of transmission electron microscope.

OR

- 6 (a) Explain the principle of dynamic light scattering in detail. 9
(b) Describe any two method for determination of crystal structure using X-ray diffraction.
(c) Give the principle and working of small angle neutron scattering.