

Roll No. :

Total No. of Questions : 11]

[Total No. of Printed Pages : 3

BPP-1081

M.Sc. (Previous) Examination, 2022

CHEMISTRY

Paper - IV CH-404

(Analytical Chemistry)

Time : 3 Hours]

[Maximum Marks : 75

Section-A

(Marks : 2 × 10 = 20)

Note :- Answer all *ten* questions (Answer limit **50** words). Each question carries **2** marks.

Section-B

(Marks : 5 × 5 = 25)

Note :- Answer all *five* questions. Each question has internal choice (Answer limit **200** words). Each question carries **5** marks.

Section-C

(Marks : 10 × 3 = 30)

Note :- Answer any *three* questions out of five (Answer limit **500** words). Each question carries **10** marks.

Section-A

2 each

1. (i) What is Exchangeable acidity of soil ?
- (ii) What are different parameters for water analysis ?
- (iii) What do you mean by indicator electrode in potentiometry ?

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- (iv) What is Stripping Voltammetry ?
- (v) What is significance of an atomic spectrum ?
- (vi) State Franck-Codon principle.
- (vii) What is zero point energy ?
- (viii) State the rule of mutual exclusion.
- (ix) What is low energy electron diffraction ?
- (x) What is significance of Wierl equation ?

Section-B

5 each

2. What are different protocols for analysis of standard drugs ? Explain.

Or

Explain preservatives (both class-I and class-II) as per PFA Act.

3. Discuss the basic principle and significance of cyclic potential sweep voltammetry (CV).

Or

Explain the basic principle and experimental technique of potentiometry.

4. Describe atomic spectra of alkali metal atoms by taking example of sodium.

Or

Write a note on electronic spectra of polyatomic molecules.

5. Calculate rotational constant of HCl. (Given $h = 6.626 \times 10^{-34}$ Js, Bond length of HCl = 136 pm)

Or

Explain Fourier transform infrared spectroscopy.

6. How will you elucidate the structure of magnetically ordered unit cell by neutron diffraction ? Explain.

Or

What is Ramchandran diagram ? How it helps to understand three dimensional structure of proteins ? Explain.

Section-C

10 each

7. (i) Write a brief note on food standard and specifications.
(ii) How the following analyses are done ?
(a) Moisture content in soil
(b) Chemical Oxygen Demand (COD) in water analysis 4+3+3=10
8. Explain the basic principle, instrumentation and experimental technique of differential scanning calorimetry. 3+3+4=10
9. Discuss the following :
(i) Koopman's theorem
(ii) Basic principle and chemical application of photoacoustic spectroscopy 4+6=10
10. Explain the following :
(i) Vibrational Raman spectra
(ii) FT-NMR 5+5=10
11. Write short notes on the following :
(i) Phase problem
(ii) Identification of unit cells from systematic absences in diffraction pattern 4+6=10