



Avinashilingam Institute for Home Science and Higher Education for Women
(Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956)
Re-accredited with 'A+' Grade by NAAC. Recognised by UGC Under Section 12B
Coimbatore - 641 043, Tamil Nadu, India

Bachelor's Degree Examination – August 2020
VI Semester

Class : III UG
Major : Chemistry

Time : 2 Hours
Max. Marks : 50

15BCHC24 Analytical Chemistry

Part A

10 x 1 = 10

Choose the Correct Answer

- Precision is expressed in terms of
 - error
 - range
 - deviation
 - median
- Name the reagent used in the detecting Nickel ion.
 - DMG
 - KIO₃
 - NH₄CNS
 - Aluminon
- Differential thermal analysis (DTA) is a plot between
 - Δt vs temperature
 - ΔH vs temperature
 - dw/dt vs temperature
 - Temperature vs volume
- In C-V curve the current at the beginning which remains constant is known as
 - limiting current
 - diffusion current
 - residual current
 - all the above
- Which of the following spectra undergoes a transition from the lower energy level to the higher energy level?
 - Absorption spectra
 - Emission spectra
 - Rotational spectra
 - Vibrational spectra
- The wavelength of UV and visible regions of the electronic spectrum by a molecule or an ion
 - 200-300nm and 400-750 nm
 - 100-300nm and 400-500 nm
 - 100-400nm and 400-750 nm
 - 100-600nm and 400-750 nm
- In a non-linear molecule, the number of translational degrees of freedom is
 - 4
 - 3
 - 2
 - 1
- When light of frequency is scattered by molecules of a substance gives the lines of frequency is known as
 - Tyndall effect
 - Raman effect
 - Zeeman effect
 - Brownian movement
- Number of PMR signals given by methanol molecule is
 - 1
 - 2
 - 3
 - 4
- The difference between the magnitudes of the magnetic field in NMR spectrum is known as
 - isomer shift
 - bathochromic shift
 - chemical shift
 - none of the above

Part B

3 x 6 = 18

Answer any Three questions

Each answer should not exceed 400 words or two pages

11. What are indeterminate errors? Explain with examples.
12. Washing precipitates before drying in gravimetric analysis is mandatory. Why?
13. Explain with help of a block diagram of DTA the components of the instrument.
14. Explain the TGA curve for $\text{Ca}(\text{CH}_3\text{COO})_2 \cdot \text{H}_2\text{O}$
15. Describe the properties of electromagnetic radiation.
16. Explain the different electronic transitions observed in UV-Visible spectroscopy.
17. Elaborate on the various sampling techniques involved in IR spectroscopy.
18. Point out the differences between IR and Raman spectroscopy.
19. If the observed shift from TMS is 250Hz and the operating frequency of the instrument is 100 MHz, calculate the chemical shift.
20. Write a brief note on chemical shift and coupling constant, J.

Part C

2 x 11 = 22

Answer any Two questions

Each answer should not exceed 800 words or four pages

21.
 - i. What are crucibles? How are they classified? Explain their uses.
 - ii. Discuss about disposal of Waste chemicals and fumes in chemistry laboratory.
 - iii. What is meant by mean and median?
22.
 - i. What are errors? How are they classified? Briefly explain.
 - ii. Distinguish between co-precipitation and post-precipitation.
 - iii. Discuss standard deviation and confidence limits.
23.
 - i. Write the basic principle and any four applications of amperometric titrations.
 - ii. Discuss the principle and applications of thermometric titrations.
24.
 - i. Write the Ilkovic equation and express the terms involved in it.
 - ii. What are the factors that affecting TGA and DTA curves?
25.
 - i. Discuss with examples : A. bathochromic shift B. chromophore.
 - ii. Explain in detail the various factors that affect λ_{max} in electronic spectroscopy.
26. Explain the rotational spectrum of a diatomic molecule as non-rigid rotor.
27. Discuss the IR spectrum of a simple harmonic oscillator model.
28.
 - i. What are the differences between IR and Raman spectroscopy?
 - ii. What are Rayleigh lines, Raman stokes and anti-stokes lines?
29. What is the principle of NMR? Explain with suitable diagram the NMR spectrometer.
30. Sketch the NMR spectrum of acetone, benzaldehyde, ethyl bromide and toluene and explain.