

U.G. 5th Semester Examination - 2020

CHEMISTRY

[HONOURS]

Discipline Specific Elective (DSE)

Course Code : CHEM-H-DSE-T-2B

Full Marks : 40

Time : 2½ Hours

*The figures in the right-hand margin indicate marks.**Candidates are required to give their answers in their own words as far as practicable.*

1. Answer any **five** questions: 2×5=10
- What is the difference between atomic and molecular spectroscopy?
 - Predict the number and give the names of the fundamental mode of vibration of HCl.
 - What is meant by dual nature of light?
 - What causes chemical shift in NMR spectroscopy?
 - Define coupling constant.
 - What are the two phenomenon on which the basis of chromatography?

- What are the analytical techniques for trace analysis?
 - What is the principle of voltameter?
2. Answer any **two** questions: 5×2=10
- KCl and not NaCl is used in a salt bridge – explain.
 - What are the advantages of potentiometric titration? 2+3=5
 - State Beer's law. What are their limitations?
 - Define transmittance and absorbance. 1+2+2=5
 - What is Neutron activation analysis? Discuss its advantages and limitations. 2+3=5
 - Give the principle of gas chromatography.
 - What is R_f value?
 - How does GC/MS score over GC (Gas Chromatography)? 2+2+1=5
3. Answer any **two** questions: 10×2=20
- Define the emission and transmission.
 - Write short note on different types of molecular energies.

- iii) Write the advantages of Fourier Transformation (FTIR).
- iv) Write the application of IR spectroscopy to quantitative analysis.
- v) An X-ray has wavelength of 1.68 Å. Calculate the energy of the photon (in eargs) associated with the X-ray.
2+2+2+2+2=10
- b) i) Write the principle of HPLC.
- ii) Explain the term connection to chromatography like Elute and chromatogram.
- iii) Write the advantages of Double beam instrument.
- iv) Write application of UV absorption spectroscopy.
- v) In What respect FTIR superior to IR?
2+2+2+2+2=10
- c) i) How will you determine particle size by X-ray diffraction?
- ii) Deduce Brag's equation and discuss its use in X-ray spectroscopy.
- iii) Write the factor affecting chemical shift.
- iv) Write the application of X-ray diffraction methods to complex.
- v) Which nuclei are NMR active?
2+2+2+2+2=10
- d) i) What are advantages of atomic adsorption spectroscopy?
- ii) How will you determine metallic element in food industry?
- iii) Write the Principle of NMR.
- iv) Write about sensitivity and S/N ratio.
- v) Convert the wave number 2500 cm⁻¹ to wavelength in Å. 2+2+2+2+2=10
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