U.G. 5th Semester Examination - 2020

CHEMISTRY

[HONOURS]

Discipline Specific Elective (DSE)
Course Code : CHEM-H-DSE-T-2A

(Analytical Methods in Chemistry)

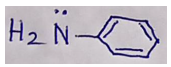
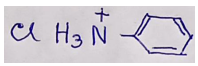
Full Marks : 40 Time : $2\frac{1}{2}$ Hours

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

a) Distinguish between accuracy and precision.

b) Which will have greater λ_{max} in uv spectroscopy and why?

 and 

c) How many fundamental vibrational frequencies would you expect to observe in the i.r. absorption spectrum of H_2O?

d) What is the main use of automatic Thermo Gravimetric analysis?

e) What are potentiometric titrations? Give example.

f) Write down the advantages of Thin Layer Chromatography.

g) What is the effect of stationary phase film thickness on gas chromatography?

h) State the fundamental difference between Adsorption chromatography and paper chromatography.

2. Answer any **two** questions: 5×2=10

a) Distinguish between relative error and absolute error. How is relative error expressed? What are the sources of indeterminate error? 2+1+2=5

b) What are the advantages of single-beam i.r. spectrophotometer? How their difficulties are overcomed in double-beam spectroscopy to organic compound? 2+2+1=5

c) Write down the principle of solvent extraction. Justify the statement that in the process of solvent extraction the solvent should be used in part instead of using whole liquid in one lot. 2+3=5

d) What is the principle of High Performance Liquid Chromatography (HPLC)? Compare between HPLC and GLC. How will you measure column efficiency in HPLC? 2+2+1=5

3. Answer any **two** questions: 10×2=20

a) Draw the diagram of arrangements of Atomic Absorption Spectroscopy (AAS). What are the differences between atomic absorption spectroscopy over flame emission spectroscopy? How are chemical interferences prevented or corrected for in atomic absorption determinations? State one application of AAS in quantitative chemical analysis.

3+3+2+2=10

b) What is thermogravimetric analysis? State the factors which affect thermogravimetric curve. Draw a qualitative thermogram when $CaC_2O_4.H_2O$ is gradually heated in air at a uniform rate of increasing temperature and discuss its mode of decomposition. How will you determine the composition of Ca and Mg from their mixture using thermogravimetric analysis? 2+2+3+3=10

c) What is conductometric titration? What are the advantages of conductometric titration? What is the principle of potentiometric titration? Explain with the help of diagram. Write down the basic principle of pH metric titration.

1+2+3+4=10

d) Write down the principles of separation of metal ions by Ion Exchange chromatography. What are batch operation and column operation in ion exchange chromatography? How will you prepare deionised water in your laboratory by using suitable cation and anion exchanger?

3+3+4=10

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