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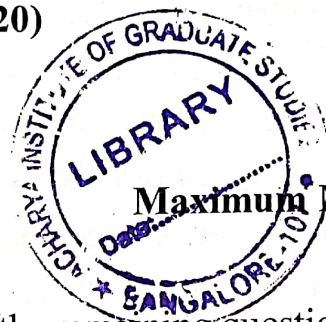
I Semester M.Sc. Degree Examination, June/July - 2022

CHEMISTRY

Analytical Chemistry - I

(CBCS Scheme 2019-20)

Paper: CH-104



Time : 3 Hours

*Instructions to Candidates:*

Answer question No. 1 and any **five** of the remaining questions. Figures to the right indicate marks.

Answer any **Ten** of the following:

(2×10=20)

1. a) Define accuracy and precision.
- b) What are determinate errors? and give appropriate examples.
- c) Explain volhard indicators in precipitation titration.
- d) Comment on the titration curve for  $H_3PO_4$ .
- e) Explain the Nernst distribution law.
- f) In a gravimetric analysis, the sample weight is noted as 0.235 g instead of 0.0235 g. Find the absolute and relative error.
- g) Calculate the molar extinction coefficient, if absorption of a 0.045 M solution is 0.93 in a cuvette of 1 cm pathlength.
- h) What are electromagnetic radiations? Arrange them with increasing wavelength or decreasing energy.
- i) What is the concentration of a solution having absorbance ( $A$ )=0.48 at  $\lambda_{max}$  after diluting to 25 times, and the slope of a calibration plot [  $A$  vs. Concentration(ppm)] is 0.2385.
- j) State the principle of solvent extraction and mention the types.
- k) Write and explain the terms the Van-Deemter equation.
- l) Briefly explain the principle of electrophoresis.

[P.T.O.]





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2. a) Find the standard deviation and variance for the following values ( $N=8$ ): 5.12, 5.10, 5.15, 5.13, 5.18, 5.11, 5.16, 5.14.  
b) Discuss on the safety measures in chemical laboratory. (5+5=10)
3. a) Explain the EDTA titrations and different forms of EDTA in a solution as a function of pH.  
b) Explain the theory of redox indicators. (5+5=10)
4. a) Explain the principle, instrumentation and working of single beam spectrophotometer.  
b) Derive Beer-Lambert's law and comment on  
i) Standard addition.  
ii) Internal addition methods. (5+5=10)
5. a) State and explain the nernst distribution law and factors affecting the partition.  
b) Explain the principle and working of HPLC. (5+5=10)
6. a) State and explain the  $F$ -test and students'  $t$ -test.  
b) Comment on the  
i) Handling of liquid bromine, nitrogen and mercury  
ii) Distribution of random errors. (5+5=10)
7. a) Explain  
i) Conditions for precipitation.  
ii) Advantages of precipitation from homogenous solution.  
b) Explain  
i) Estimation of  $Mg^{2+}$  from a mixture of  $Ca^{2+}$  and  $Mg^{2+}$  solution using EDTA titration based on masking  
ii) Estimation of  $Ni^{2+}$  by gravimetry using DMG. (5+5=10)
8. a) Explain the principle of column chromatography and factors affecting column efficiency: What is plate theory?  
b) Comment on  
i) Sandell's sensitivity  
ii) Ringbom plot. (5+5=10)

