



Reg. No. :

Name :

**Combined First and Second Semester B.Tech. Degree Examination,
April 2014
(2013 Scheme)**

13.103 : ENGINEERING CHEMISTRY (ABCEFHMNPRSTU)

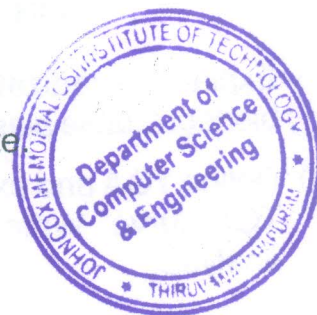
Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **2** marks.

1. Briefly describe the preparation and properties of Bakelite.
2. What is biodegradable plastic ? Give an example.
3. What is chemical shift in NMR spectroscopy ?
4. For the cell $Fe/Fe^{2+} // Ag^+/Ag$, calculate the emf of the cell at 298 K if standard electrode potentials of Fe and silver electrodes are -0.44 V and 0.8 V respectively.
5. State Pilling Bedworth rule.
6. What is hardness of water ? Which are the different types of Hardness ?
7. Define BOD and COD.
8. What is refractoriness ? How is it measured ?
9. Give the applications of pigments.
10. What is a reference electrode ? Give an example.



**PART – B**

Answer **any one full** question from **each** Module. **Each** question carries **20** marks.

(20×4=80)

Module – I

11. a) What are elastomers ? Write in detail on the preparation, properties and uses of synthetic rubbers taking Buna S, Butyl rubber and neoprene as examples.
- b) Write the expression for vibrational energy and fundamental vibrational frequency. Explain the different types of vibrational frequencies and the applications of vibrational spectroscopy to structural studies.

OR

12. a) Explain vulcanization of rubber. What are its advantages ? Write a note on biodegradable plastics.
- b) Define TGA and explain the instrumentation of TGA. Explain the features of a TGA curve. Write the applications of TGA in qualitative and quantitative analysis.

Module – II

13. a) How will you determine the pH of a solution using glass electrode ?
- b) Explain chromate coating and anodizing.

OR

14. a) Derive Nernst equation for electrode potentials. Write a note on Helmholtz electrical double layer and single electrode potential.
- b) Write a note on galvanic corrosion. Describe the action of corrosion inhibitors with suitable examples.

Module – III

15. a) Describe the scale and sludge formation in boiler, its disadvantages and removal.
- b) Explain any three methods for the control of air pollution.

OR



16. a) Explain trickling filter method and USAB process for the treatment of sewage water.
- b) Describe the ion exchange method for the softening of boiler feed water using polymer resin.

Module – IV

17. a) What is calorific value of a fuel ? Explain the determination of calorific value of coal using bomb calorimeter.
- b) Explain the manufacture of Portland cement with the relevant chemical equations.

OR

18. a) Write a note on the synthesis, properties and applications of TiO_2 pigment.
- b) What are refractories ? Explain porosity and dimensional stability of refractories.