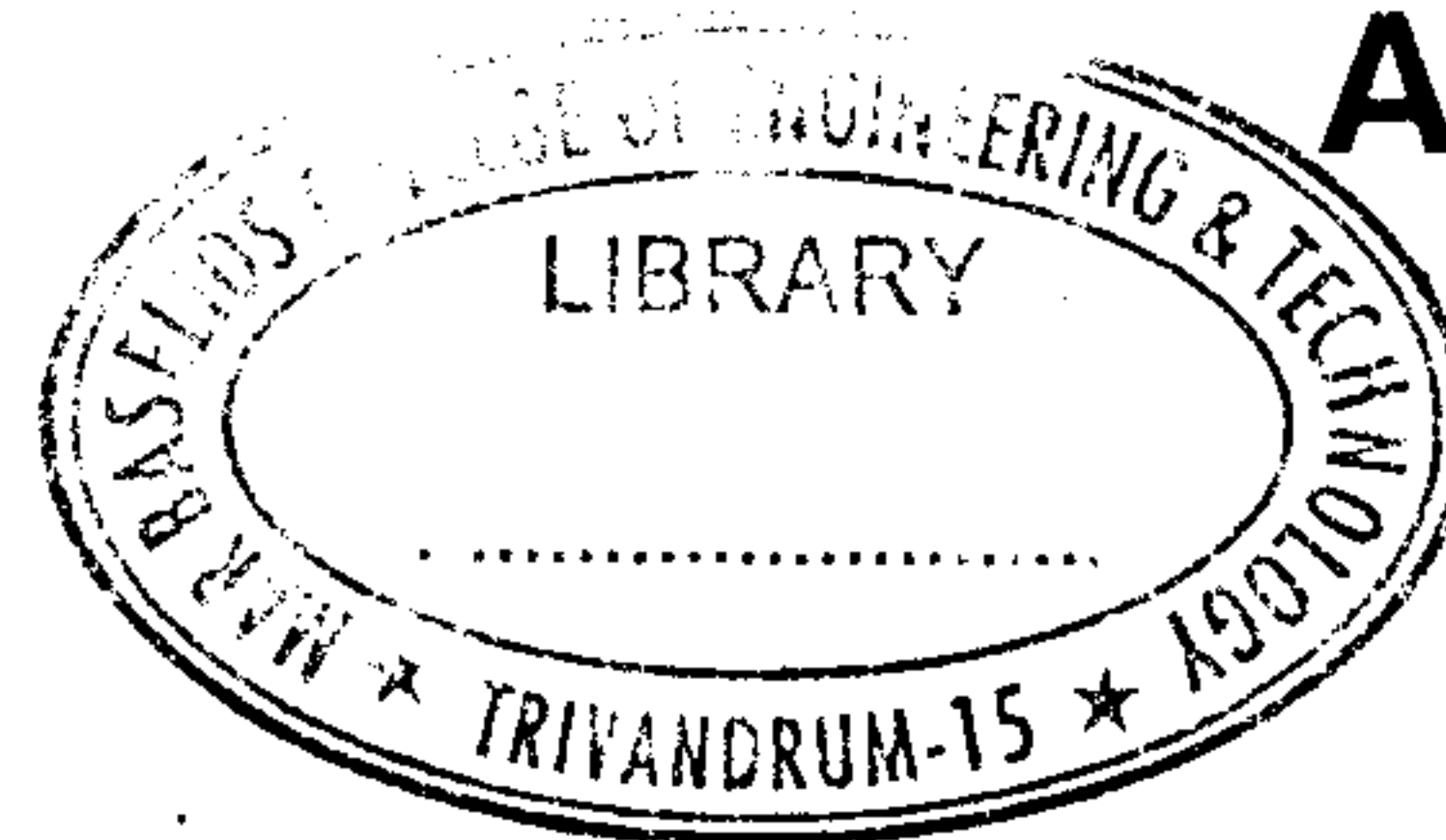




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A – 6612



Reg. No. :

Name :

**Combined First and Second Semester B.Tech. Degree
Examination, December 2016
(2013 Scheme)**

13.103 : ENGINEERING CHEMISTRY (ABCEFHMNPRSTU)

Time : 3 Hours

Max. Marks : 100

PART – A

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

(2×10=20 Marks)

1. Explain Tacticity with example.
2. What are doped conducting polymers ?
3. How will you distinguish intramolecular and intermolecular hydrogen bonding using IR spectroscopy ?
4. Calculate the concentration of Cu^{2+} in the concentration cell
 $\text{Cu} | \text{Cu}^{2+} (0.15\text{M}) || \text{Cu}^{2+} (?) | \text{Cu}$ whose cell potential is 0.05 V.
5. Explain passivity.
6. Give differences between anodic and cathodic coatings.
7. Calculate permanent hardness from the following 500 ml of water sample is boiled for one hour. It is then cooled and filtered. The filtrate is made upto 500 ml. 50 ml of this solution requires 10 ml of N/50 EDTA.
8. List the advantages and disadvantages of zeolite process.
9. Write the preparation of biodiesel.
10. Give the applications of CNT.

P.T.O.



PART – B

Answer **any one full** question from **each** Module. **Each** question carry **20** marks.
(20×4=80 Marks)

Module – I

11. a) Give the preparation, properties and applications of Bakelite and Neoprene.
b) Give the principle, instrumentation and applications of HPLC.

OR

12. a) Give the preparation, properties and uses of PMMA, Nylon, Buna-S and Butyl rubber. 10
b) Calculate the force constant of HCl molecule (At. mass H = 1, Cl = 35) if its fundamental vibrational frequency is 2990.6 cm^{-1} . 6
c) A solution gave a transmittance of 20 % when taken in a cell of 2.5 cm thickness. Calculate the molar extinction coefficient concentration = 2.32 mol/L. 4

Module – II

13. a) Write an essay on the factors affecting the rate of corrosion. 10
b) Write the cell reaction and calculate the emf of the following cell
 $\text{Al} | \text{Al}^{3+} (0.1\text{M}) || \text{Ni}^{2+} (0.5\text{M}) | \text{Ni}$, $E^\circ \text{Al}^{3+} | \text{Al} = -1.7\text{V}$ and
 $E^\circ \text{Ni}^{2+} | \text{Ni} = -0.25\text{V}$. Also calculate the maximum work at the standard condition. 5
c) Write notes on corrosion inhibitors. 5

OR

14. a) Write notes on Helmholtz electrical double layer, standard hydrogen electrode and calomel electrode. 10
b) Find out the pH of a solution in which a glass electrode is setup and coupled with saturated calomel electrode.
The cell emf is 0.430V at 25°C and $E^\circ_{\text{Glass}} = 0.011\text{V}$. 3
c) What is corrosion and explain chemical corrosion? 7



Module – III

15. a) Explain the polymer ion exchange process of water purification.
b) Write notes on photochemical smog, ozone depletion and green house effect.

OR

16. a) 1 g of CaCO_3 was dissolved in dilute HCl and diluted to 1l. 100 ml of this solution required 90 ml EDTA. 100 ml sample water required 40 ml EDTA. 100 ml boiled sample water required 20 ml EDTA. Calculate each type of hardness in ppm.
b) Discuss in detail the municipal water treatment.

Module – IV

17. a) Explain the determination of calorific value of solid fuels.
b) Explain the manufacture of Portland cement.

OR

18. a) Give the classification, preparation, properties and applications of nano materials.
b) Give the classification and discuss the properties of refractories.

