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Reg. No. : .....

Name : .....

Combined First and Second Semester B.Tech. Degree Examination, May 2015
(2013 Scheme)
13.103 : ENGINEERING CHEMISTRY (ABCEFHMNPRSTU)

Time : 3 Hours Max. Marks : 100

PART – A

Answer **all** questions. **Each** question carries **2** marks. **(10×2=20 Marks)**

1. Differentiate between addition and condensation polymers.
2. What are the requirements for a molecule to be vibrationally active ?
3. Derive the Nernst Equation for the Calomel Electrode.
4. Find the EMF of the cell $Mg|Mg^{2+}_{(0.001M)}||Cu^{2+}_{(0.0001M)}|Cu$

   $E^0_{Mg^{2+}/Mg} = -2.37\,V; E^0 Cu^{2+}/Cu = 0.34\,V$ and write the cell reaction.
5. Give the classification of nano materials.
6. 100 mL of a sample water has hardness equivalent to 12.5 mL of 0.08 N $MgSO_4$. What is the hardness of water (M.wt. of $MgSO_4$ = 120) ?
7. Explain caustic embrittlement in boilers.
8. What is break point chlorination ? What are its advantages ?
9. Give the functions of lime, silica, alumina and gypsum in cement.
10. What is meant by porosity of a refractory material ?

PART – B

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

Module – I

11. a) Explain Injection moulding and blow moulding.

    b) Give the principle, instrumentation and applications of TGA.

OR

12. a) Write notes on biodegradable plastics, PHBA and PLA.

    b) Explain chemical shift and discuss the H-NMR spectrum of $CH_3 - O - CH_2 - CN$.

Module – II

13. a) Explain the working of a Glass Electrode. How will you determine the pH of a solution using it ?

    b) Write notes on fuel cells and solar cells.

OR

14. a) Discuss any two corrosion control methods.

    b) Explain Electrochemical corrosion and give the mechanism of rusting of Iron under different environmental conditions.

Module – III

15. a) 100 mL of sample water required 20 mL of 0.01M, EDTA. After boiling, 100 mL of sample water required 10 mL of 0.01MEDTA. Calculate each type of hardness.

    b) Discuss the reasons for boiler corrosion.

OR

16. a) Explain any two methods of Sewage Treatment.

    b) Discuss any two methods of solid waste disposal.

Module – IV

17. a) Explain the setting and hardening of cement.

    b) Discuss the various characteristics of Pigments.

OR

18. a) Explain the manufacture and properties of silica and Carborundum refractories.

    b) Write notes on Proximate analysis and petrol knocking.
