Combined First and Second Semester B.Tech. Degree
Examination, January 2019
(2008 Scheme)
08-103 : ENGINEERING CHEMISTRY
(CMNPHEF ARUFBS)

Time : 3 Hours  Max. Marks : 100

PART – A

Answer all questions from Part A. Each question carries 4 marks.

1. Calculate the emf of the following cell Ni, Ni²⁺ (0.1M) //Pb²⁺ (1M), Pb (E°Ni = -0.24 v and E°Pb = -0.13 v).

2. What is the principle of conductometric titration? Explain the titration in the case of a strong acid and a strong base.

3. What is cathodic protection? Explain.

4. What is a secondary cell? Explain the reaction that occurs during charging and discharging of pb-acid battery.

5. What is caustic embrittlement? What are the disadvantages of caustic embrittlement.

6. Discuss briefly about Green House effect.

7. Explain the principle and applications of HPLC.

8. Write a note on Ziegler-Natta polymerisation.

9. Explain briefly the following:
   1) Cloud and pour point
   2) Aniline point.


P.T.O.
PART – B

Answer two questions from each Module. Each question carries 10 marks.

Module – I

11. What is Helmholtz electrical double layer? Derive Nernst equation for a single electrode. Calculate the electrode potential of copper electrode placed in a 0.015 M copper sulphate solution \( E^\circ_{Cu} = +0.34 \) v.

12. a) Explain the ingredients and their functions in paint.
    b) Write a note on corrosion inhibitors.

13. Explain the following methods of synthesis of nanomaterials:
   i) Laser ablation method
   ii) Sputtering method
   iii) Chemical reduction method.

Module – II

14. Describe the various steps for the purification of water for drinking purposes.

15. Explain the principle of nmr spectroscopy. Write short note on:
   i) Chemical shift
   ii) Spin-spin coupling.

16. Discuss the sources and control of air pollution.

Module – III

17. What is calorific value of a fuel? Explain how calorific value of solid fuel is determined.

18. a) Explain the various methods used for the fabrication of plastics.
    b) Give the preparation and uses of (a) Butyl rubber and (b) PET.

19. Explain:
   i) Mechanism of setting and hardening of cement.
   ii) Write a note on (a) Solid lubricant and (b) Liquid lubricant.