



Reg. No. : .....

Name : .....

**Combined First and Second Semester B.Tech. Degree  
Examination, April 2015  
(2008 Scheme)  
08-103 : ENGINEERING CHEMISTRY  
(CMNPHEARUFBS)**

Time : 3 Hours

Max. Marks : 100

## PART – A

Answer **all** questions. **Each** question carries 4 marks.

1. Derive Nernst equation for single electrode.
2. What is anodising ? How is it employed ?
3. Explain briefly about the properties and applications of nano-tubes and nano-wires.
4. Calculate the electrode potential developed on a zinc rod dipped in a solution of  $ZnSO_4$  at  $27^\circ C$ . Given the standard reduction potential of zinc is  $-0.76 V$ .
5. What is meant by chemical shift and spin-spin splitting ?
6. Write down the chemical reactions involved in Li-ion cell.
7. Calculate the hardness of water containing 7.3 mg of  $Mg(HCO_3)_2$  and 4.8 mg of  $Ca(HCO_3)_2$  per litre.
8. What is electrodialysis ? How is it employed in desalination process ?
9. Distinguish between HCV and LCV of a fuel.
10. What is meant by extreme pressure lubrication ? Name the important additives used.





## PART – B

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

**Module – I**

11. What is a concentration cell ? Explain the working of a typical concentration cell. Mention the important applications.
12. Explain the following :
  - i) Differential aeration corrosion
  - ii) Galvanic corrosion
  - iii) Stress corrosion.
13. Discuss the different factors which influence the rate of electro chemical corrosion.

**Module – II**

14. Explain the demineralization process of water treatment. List the important advantages over the chemical method of softening.
15. What is HPLC ? Explain the principle, instrumentation and applications of HPLC.
16. Write explanatory notes on :
  - a) Green House effect
  - b) CFCs and Ozone depletion.

**Module – III**

17. Mention the important ingredients of Portland cement with their functions. Describe the method of manufacturing Portland cement.
  18. Explain the following :
    - a) Vulcanization of Rubber
    - b) Free radical polymerization.
  19. Write notes on :
    - a) i) Solid lubricants
    - ii) Cloud and pour point
    - iii) Flash and fire point.
    - b) Conducting organic materials.
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