



Shivari

II Semester M.Sc. Examination, June 2015  
(2010-2011 and Onwards) (NS)  
CHEMISTRY  
C - 203 : Physical Chemistry - II

Time : 3 Hours

Max. Marks : 80

**Instruction :** Answer question number 1 and any five of the remaining.

1. Answer any ten of the following : (10×2=20)
- a) What is chemical potential ? Explain.
  - b) Calculate the mole-fraction of two components present in a solution having 58.5 g of NaCl and 1000 g of water.
  - c) Distinguish the terms fugacity and activity.  $\frac{n_1}{n_1+n_2} = \frac{n_2}{n_1+n_2}$
  - d) What is ensemble averaging ? Explain.
  - e) What is the necessity of theories of heat capacity of solids ?
  - f) Explain the term microscopic reversibility.
  - g) What are the conceptual points of Debye Huckel Theory ?
  - h) Define concentration over potential.
    - i) What are the importance of exchange current density ?
    - j) What are the characteristics of hydrogen electrode ?
  - k) Distinguish between semiconductor and conventional electrodes.
    - l) The corrosion of a metal cannot take place in vacuum. Explain.
2. a) Explain the measurement of partial molar volume by any one method.  
 b) Distinguish between ideal and non-ideal solutions. (6+6=12)
3. a) Define the term activity. Explain the determination of activity coefficient from EMF measurements.  
 b) Explain canonical, grand canonical and microcanonical ensembles. (6+6=12)



4. a) Derive the expression for translational partition functions.  
b) What is Debye characteristic temperature ? Calculate the heat capacity of diamond at 1100 K,  $\theta_D = 1860$  K.  
c) What are the limitations of Einstein theory of heat capacity of solids ?

(6+4+2=12)

5. a) Explain Stern model for electrical double layer.  
b) Derive Lippmann equation.  
c) Write table equation and explain its significance.

(4+4+4=12) time : 3 Hr

6. a) Obtain the expression for Butler-Volmer equation.  
b) Describe the quantum aspects of charge transfer at electrode solution interface

(6+6=12) 1. Answ

7. Write a note on :

- i) Ilkovic equation.  
ii) Corrosion monitoring.  
iii) Effect of light at semiconductor-solution interface.

(4+4+4=12)

BMSCW

a) W

de

b) E

c) G

d) D

e) W

f) C

a

n

g) V

d

h) V

i) J

v

j) C

C

k) I

D



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