

**D. K. M. COLLEGE FOR WOMEN (AUTONOMOUS), VELLORE-1****SEMESTER EXAMINATIONS****NOVEMBER – 2017****15CPCH1C****PHYSICAL CHEMISTRY – I****Time : 3 Hours****Max. Marks : 75****SECTION – A ( 5 x 6 = 30 )****Answer ALL the questions.**

1. (a) Explain the term chemical potential and state its importance in thermodynamics. (6)  
(Or)  
(b) Explain how the fugacity value varies with respect to temperature. (6)
2. (a) i) What are ideal solution? (3)  
ii) Explain – Activity coefficient. (3)  
(Or)  
(b) Determine the activity and activity co - efficient using Gibbs - Dhuem equation. (6)
3. (a) Write note on the effect of temperature on reaction rates. (6)  
(Or)  
(b) Write short note on Molecular beam method in relevant to molecular reaction dynamics. (6)
4. (a) What is Flash photolysis? Explain its applications in the study of fast reactions. (6)  
(Or)  
(b) Explain Intra and Inter molecular energy transfer in photo chemical reaction. (6)
5. (a) Derive the character table for  $C_{3v}$  Point group. (6)  
(Or)  
(b) Discuss the Great Orthogonality theorem and its consequences. (6)

**SECTION – B ( 3 x 15 = 45 )****Answer any THREE of the following questions.**

6. a) Define Partial Molar volume and Partial Molar heat content. (5)  
b) Explain the variation of Chemical potential with temperature and pressure. (10)
7. a) The activity of 2.5 mole of a substance changes from 0.05 to 0.35. What would be the change in its free energy at 27° C. (5)  
b) Determine the activity co - efficient for electrolytes by emf and vapor pressure methods. (10)

8. a) Derive Bronsted catalysis law. (6)  
b) Describe in detail about the effect of ionic strength on reactions in solutions. (3)  
c) Derive the Eyring equation. (6)
9. Explain the following  
a) Symmetry elements and symmetry operations. (5)  
b) Reducible and irreducible representation. (10)
10. a) What are the symmetry selection rules for Infrared and Raman spectra? (5)  
b) Deduce the symmetry of normal modes of vibration of H<sub>2</sub>O molecule. (10)

\*\*\*\*\*