

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2018
(First Semester)

Branch - **CHEMISTRY**

PHYSICAL CHEMISTRY !

Time : Three Hours

Maximum : 75 Marks

Answer **ALL** questions

ALL questions carry **EQUAL** marks (5 x 15 = 75)

- 1 a Define mean activity coefficient of electrolyte. Illustrate its determination by emf method. (5)
- b Describe the dependence of fugacity on pressure and temperature. (5)
- c State and explain Duhem Margules equation. Give its significance. (5)
- OR
- d What is meant by chemical potential? Give its physical significances. (5)
- e State and explain Gibbs Duhem' equation. (5)
- f Describe the variation of chemical potential with temperature and pressure. (5)
- 2 a Give an example for heterogeneous equilibrium and obtain its equilibrium constant. (5)
- b Apply Le Chatlier - Brawn principle to Haber process. (5)
- c State and explain the third law of thermodynamics. (5)
- OR
- d Derive Van T Hoff equation. (5)
- e Deduce the equilibrium constant for equilibrium involving ideal gases. (5)
- f The equilibrium constant of a reaction doubles on raising the temperature from 25°C to 35° C. Determine the ΔH^0 for the reaction. (5)
- 3 a Give and explain Debye - Huckel - Onsager equation and its experimental verification. (6)
- b Derive and explain the thickness of ionic atmosphere. Give its significance. (9)
- OR
- c Deduce Debye - Huckel limiting law. Give its application. (5)
- d How is solubility product determined by emf measurement method? (5)
- e What are reference electrodes? Illustrate with a suitable example. (5)

- 4 a Sketch and explain electrolytic current-potential curves. (5)
- b Define over potential, mention the factors influencing over voltage. (5)
- c Derive the zeta potential for electro-osmosis. (5)
- OR
- d Derive and explain the Butler - Volmer and Tafel equations. (10)
- e Define and explain membrane potential. (5)
- 5 a Apply phase rule to Cu and Zn two component system. (5)
- b State and explain simple eutectic system with a suitable example. (5)
- c Give and explain Gibb's phase rule. (5)
- OR
- d What are congruent and incongruent melting systems? Explain with examples. (6)
- e Illustrate the application of phase rule to a three component system of a liquid and two solids. (9)

Z-Z-Z

END