

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 2018
(First Semester)

Branch-CHEMISTRY

PHYSICALCHEMISTRY -1

Time : Three Hours

Maximum : 75 Marks

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 15 = 75)

- 1 a State and explain chemical potential. (5)
- b Derive Gibbs Duhem equation. (5)
- c Explain the variation chemical potential with T. (5)
- OR
- d Define and explain fugacity. (5)
- e Describe the variation of fugacity with p. (5)
- f Give the differences between fugacity and activity. (5)
- 2 a State and explain Lechatlier - Braun principle. Describe its application to Haber process. (8)
- b Derive the equilibrium constant for equilibrium involving ideal and real gases. (7)
- OR
- c Derive Van't Hoff equation. Give its significance. (5)
- d Give any two statements of third law of thermodynamics. (5)
- e Obtain the equilibrium constant for heterogeneous equilibrium with an example. (5)
- 3 a Discuss how the following are determined using EMF measurements : (5)
 - (i) Equilibrium constant (5)
 - (ii) Dissociation constant (5)
 - (iii) Solubility product (5)
- OR
- b State and explain Debye - Huckel limiting law. (5)
- c Explain the following : (5)
 - (i) Wien effect (5)
 - (ii) Debye - Falkenhagen effect (5)
- 4 a Sketch and explain the current potential curve for electrolysis. (5)
- b Define over voltage and give the factors affecting it. (5)
- c Explain Stern theory of electrical double layer. (5)
- OR
- d Derive the zeta potential of electro osmosis. (5)
- e Derive and explain the following : (4)
 - (i) Tafel equation (4)
 - (ii) Butler - Volmer equation (6)
- 5 a Define and derive Gibbs phase rule. (7)
- b Draw and explain the phase diagram of Cu and Zn system. (81)
- OR
- c State and explain simple eutectic system with a suitable example. (5)
- d Distinguish between congruent and incongruent systems. (5)
- e Sketch and explain briefly the iron-carbon system. (5)