BCH-003-001507 Seat No. _____

B. Sc. (Sem. V) (W.E.F. 2012) Examination

August - 2021

C-503 - Chemistry

(Physical Chemistry & Analytical Chemistry)

(Old Course)

Faculty Code : 003

Subject Code : 001507

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (1) All questions are compulsory.
(2) Q. 1 carries 20 marks.
(3) Q. 2 and 3 carries 25 marks each.

1 Answer the following questions : **20**

(1) Give the statement of Clausus for second law of thermodynamic.

(2) What is cyclic process ?

(3) Entropy is measure of ____ and _____.

(4) Work function and free energy functions are defined by equation A = _____, G = _____

(5) Define free energy.

(6) Give the full form of SCL and FCCL.

(7) NaCl has which type of cubic lattice ?

(8) What is tie line ?

(9) Define critical point.

(10) A mixture of two miscible liquids constitutes a system having the number of phase equal to _____.

(11) What is relative error ?

(12) Define Mean deviation.

(13) Define soluble salt.

(14) What is pH ?

(15) What is molar absorptivity ?

(16) Define Transmittance.

(17) Write Lambert's law.

(18) What is indicator ?

(19) Give any one name of self indicator.

(20) Which indicator is used in Fajan's method for the titration of $AgNO_3$ –> NaCl.

2 (a) Answer any three of the following : **6**

(1) Give the difference between reversible process and a spontaneous process.

(2) Explain the effect of pressure on melting point of ice.

(3) Explain : degree of freedom.

(4) Define : Isotropic and anisotropic.

(5) When does a solution deviate from Lambert-Beer law ?

(6) For the preparation of 15% V/V aqueous solution of alcohol; in how many ml of H_2O are required for 25 ml alcohol is to be dissolved.

(b) Answer any three of the following : **9**

(1) Derive Gibb's - Helmholtz equation.

(2) Prove that $-\Delta G = W_{net}$.

(3) Calculate the work efficiency of heat engine working between 127°C and 27°C. The net work done by engine is 500 joule. find out absorbed heat in calorie.

(4) Give the difference between crystalline solid and amorphous solid.

(5) Explain three pair partially miscible liquid with diagram.

(6) Explain the types of cubic lattice with figures.

(c) Answer any two of the following : **10**

(1) Explain Carnot's cycle with its operation in detail.

(2) Derive van't Holf Isochore equation.

(3) Explain one pair partially miscible liquid with phase diagram.

(4) Explain the structure of NaCl (Rock Salt) by X-ray diffraction method.

(5) Derive Helmholtz equation for change at constant volume in reference of work function. (Relation of A with T &V)

3 (a) Answer any three of the following : **6**

(1) Explain the standard deviation.

(2) Explain separation of Cu^{+2} and Cd^{+2} by any method.

(3) Give the difference between end point and equivalence point.

(4) Give the merits and demerits of starch indicator.

(5) What is primary standard ? Explain with example.

(6) Give the types of volumetric analysis.

(b) Answer any three of the following. **9**

(1) Give the method for minimization of errors. Explain it any three.

(2) Explain iodometry titration.

(3) What is indicator ? Explain the principle of Ostwald's law based on indicator.

(4) Explain separation of CI^{-}, Br^{-} and I^{-}.

(5) Explain Lambert-Beer's law.

(6) Explain internal redox indicator with an example.

(c) Answer any two of the following : **10**

(1) Explain spectrophotometric estimation of

(a) Lacking of absorption by reactant and product

(b) Lacking of absorption by reaction product.

(2) Explain separation of CO_3^{-2}, SO_3^{-2} and S^{-2} present in a mixture.

(3) Explain titration curve for polyprotic acid and strong base.

(4) Explain Q-test and T-test with example.

(5) Explain Fajan's method with diagram.