



MCR-003-001507 Seat No. _____

B. Sc. (Sem. V) (CBCS) Examination

May / June - 2018

C - 503 : Chemistry

(Physical & Analytical Chemistry)

Faculty Code : 003

Subject Code : 001507

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- Instructions :** (1) This paper contains three questions. All questions are compulsory.
(2) Question No. 1 carries 20 marks.
(3) Question No. 2 & 3 carry 25 marks each.

1 Answer the following questions : **20**

- (1) Which terms are equal to zero in Isothermal Expansion in Carnot cycle?
- (2) Write the equation of Gibbs Helmholtz equation.
- (3) Which radiation is used to determine the crystal structure?
- (4) Entropy is a measure of _____ and _____.
- (5) For solid liquid equilibrium, Clausius Clayperon equation is written as _____
- (6) Work function and free energy function are defined by the equation $A =$ _____ $G =$ _____
- (7) If Phase is equal to one in three Component system then Degree of Freedom is equal to _____
- (8) Define Phase and write Phase rule equation.
- (9) Rock salt has a _____ cubic lattice.
- (10) Write Bragg's equation.
- (11) The mathematical form of Lamberts law is _____
- (12) KMnO_4 is _____ indicator.
- (13) Define Absolute error.

- (14) Define Solubility.
- (15) 2 litres of solution contains 100 gm NaOH, determine its molarity.
- (16) Define Molar Absorptivity.
- (17) Define Transmittance.
- (18) Mechanical loss of material in various steps of analysis is an example of _____ type error.
- (19) Which indicator is used in the titration of FAS against $K_2Cr_2O_7$?
- (20) State Beer's Law.

2 (A) Answer Any **Three** of the following : **6**

- (1) Write any two statements of 2nd law of thermodynamics.
- (2) Explain the effect of pressure on melting point of ice.
- (3) Explain with the help of diagram Binodal curve and Plait point
- (4) Calculate Miller Indices from the intercepts 3a, 2b, 1c.
- (5) Define Liquid Crystal.
- (6) At the melting point of a substance 840 J/mole heat is required at that time change of entropy is 1.2 J/mole/K. Calculate the melting point of the substance.

(B) Answer Any **Three** of the following : **9**

- (1) Derive Gibbs Helmholtz equation.
- (2) Prove that decrease in work function is equal to maximum work obtained.
- (3) Carnot engine works between 0°C and 100°C temp. If 453.6 kcal heat is given to the engine calculate useful work.
- (4) What is the difference between Smectic and Nematic Liquid Crystal?
- (5) Explain three pair partially miscible liquid with neat diagram.
- (6) Define the types of Cubic Lattice.

- (C) Answer Any **Two** of the following : 10
- (1) Derive Clausius Clayperon equation.
 - (2) Derive the equation : $e = W/q_2 = [T_2 - T_1]/T_2$
 - (3) Explain one pair partially miscible liquid with neat diagram.
 - (4) Explain Law of mass action based on Chemical potential.
 - (5) What is crystal? Explain Laws of Crystallography.

- 3 (A) Answer Any **Three** of the following : 6
- (1) Explain separation of Cu^{+2} and Cd^{+2} ions.
 - (2) Define :
 - (a) End point and
 - (b) Equivalent point.
 - (3) Write a short note on Standard deviation.
 - (4) What is primary standard? Explain with suitable examples.
 - (5) Explain the preparation of standard sodium thiosulphate solution.
 - (6) Write a short note on common ion effect.

- (B) Answer Any **Three** of the following : 9
- (1) Explain principle of neutralization indicator.
 - (2) Describe any three methods for elimination of errors.
 - (3) Explain iodimetry titration.
 - (4) Write the advantages and disadvantages of starch indicator.
 - (5) Explain separation of Cl^- , Br^- and I^- .
 - (6) Explain Lambert-Beer's law.

(C) Answer Any **Two** of the following :

10

- (1) Explain spectrophotometer estimation of
 - (a) Lacking of absorption by reactant and product
 - (b) Lacking of absorbance by reactant and reagents.
- (2) Explain the separation of PO_4^{-3} , AsO_3^{-3} and AsO_4^{-3} in detail by qualitative analysis.
- (3) Explain titration curve for polyprotic acid and strong base.
- (4) Explain student T test and Q test.
- (5) What is precipitation titration? Explain Fajan's adsorption method.
