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DB-003-001507 Seat No. _____

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

March – 2022

C-503 : Chemistry

(Physical & Analytical Chemistry)

Faculty Code : 003

Subject Code : 001507

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

Instruction : All questions are compulsory.

SECTION - A

1 Answer the following questions : **20**

(1) Define Heat of Sublimation.

(2) Define Spontaneous process. Give example.

(3) Write Gibbs free energy equation, which type of function it is ?

(4) Give Van't Hoff Isochore equation with two limits of T and k.

(5) What will be the effect of pressure on melting point of Paraffin wax?

(6) Define unit cell.

(7) Name 3 types of Bravai's lattices.

(8) What is Mesomorphic state?

(9) Define degree of Freedom.

(10) Who gave Phase rule?

(11) Define term Accuracy?

(12) Give formula for Standard deviation for less number of observations.

(13) Define Common ion effect.

(14) How I^- and Br^- could be separated?

(15) What is the color of the precipitates of CdS?

(16) What is the wave length region of Photo chemical reaction?
(17) Give mathematical form of Lambert's law.
(18) Define Molar Absorptivity.
(19) What is equivalent weight?
(20) Name the indicator used in Fajan's method.

SECTION - B

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

(1) Define (i) Spontaneous Process (ii) Cyclic Process
(2) Define (i) Tie lines and (ii) Binodal curves.
(3) Define (i) Interfacial angle (ii) Crystal.
(4) Give physical significance of Gibbs Free Energy.
(5) How many atoms are there in BCC and FCC Lattice ?
(6) Give the mathematical form Braggs Equation.

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

(1) What is Entropy? Prove that it is state function.
(2) Derive Gibbs Helmholtz Equation.
(3) What is the Liquid Crystal and give its different types.
(4) What is Phase Rule and define each of the terms related.
(5) Give few points on application of Ternary Liquid Phase Diagram.
(6) What is intercept law of Miller and calculate value for d_{110} plane.

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

(1) Derive Van't Hoff Isotherm Equation.
(2) Explain the Carnot cycle to prove efficiency of Engine is always less than 1.
(3) Explain Laws of Crystallography.
(4) Explain 3 pairs of partially miscible liquids with diagram.
(5) Explain the method for determining the crystal structure.

SECTION - C

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

(1) Define (i) Relative (ii) Absolute Error

(2) Define Grothus Drapers Law

(3) Define Indicator and give its types.

(4) What is difference between Equivalent Point and End Point.

(5) If 125 gm. $NaOH$ is dissolved in 2 Lit. of water calculate Molarity

(6) Define Methodic Error and Personal Error.

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

(1) Explain difference between Accuracy and Precision

(2) Explain Separation of $PO_4^{-3}, AsO_4^{-3}, AsO_3^{-3}$

(3) Give factors responsible for Deviation from Lambert Beer's Law.

(4) Define Primary Standard and its characteristics.

(5) Explain Internal and External Redox Indicator. Give Example.

(6) Differentiate Deviation, Mean Deviation and Relative Mean Deviation.

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

(1) Explain Q Test, and Student T Test.

(2) How could (1) $S^{-2}, SO_3^{-2}, SO_4^{-2}$ *and* $S^{-2}, SO_3^{-2}, CO_3^{-2}$ could be detected in presence of each other?

(3) Explain different types of Spectrophotometric estimation with graph.

(4) Explain Titrimetric curve for Strong Base against Polyprotic Acid.

(5) (A) Concentration of a compound is $0.0002M$, Cell is of 1 cm and $\lambda \max = 2.35nm.$ If Transmission of Solution is 20% then find Molar Absorptivity $\in$ of Solution.

(B) Density of 60%W/W H_3PO_4 solution is $1.426\ gms./ml.$ If $500ml$ solution is prepared from above said $100ml$ of solution then, calculate the Molarity of diluted solution.
