



MAL-003-001507

Seat No. _____

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

October / November – 2016

Chemistry : Paper - C - 503

(Physical & Analytical Chemistry) (New Course)

Faculty Code : 003

Subject Code : 001507

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

[Total Marks : 70

- Instructions :**
- (1) All the questions are compulsory.
 - (2) Question no. 1 carries 20 marks. All other carries 25 marks each.
 - (3) Symbols have their usual meaning.
 - (4) Right side indicates marks.

1 Answer the following questions in short : 20

- (1) Explain cyclic process.
- (2) What is amorphous solid ?
- (3) Which type of membrane is used in Vant-Hoff equilibrium box ?
- (4) Name the intermediate state between solid and liquid.
- (5) Define : Unit cell
- (6) Which thermodynamics function represents net OR useful work ?
- (7) Write Kelvin-Plank statement.
- (8) What is Binodal curve ?
- (9) What is spontaneous change ?
- (10) For three component system and one phase what will be degree of freedom ?
- (11) What is sparingly soluble salt ?
- (12) Define : Standard deviation
- (13) Explain Grothus-Draper's law.
- (14) How many grams of NaOH is required to prepare 0.2 molar 5 Lit. aqueous solution ?
- (15) What is useful pH range of methyl orange ?
- (16) Define : Solubility.

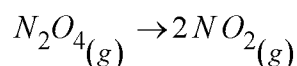
- (17) Why Mohr's method is not used in acidic medium ?
 (18) Name any two redox indicators.
 (19) Which substance is used to remove I^- from the mixture of Cl^- , Br^- and I^- ?
 (20) Define : Precision

2 (a) Answer any three questions : 6

- (1) Discuss Bravais lattice.
- (2) Explain effect of pressure on the melting point of paraffin wax.
- (3) Give the limitations of first law of thermodynamics.
- (4) Define :
 - (a) Quintuple point
 - (b) Tie Lines
- (5) Calculate work efficiency of heat engine during work between $150^\circ C$ and $50^\circ C$.
- (6) Calculate Miller indices from the intercept of crystal $2a$, $-3b$, $-3c$.

(b) Answer any three questions : 9

- (1) Describe physical significance of entropy in short.
- (2) Write a short note on liquid crystal.
- (3) Prove that the decrease in work function is equal to maximum work.
- (4) Explain phase rule with its terms.
- (5) Derive $\Delta S = C_p \ln \frac{T_2}{T_1} + R \ln \frac{P_1}{P_2}$.
- (6) At 300 Kelvin temp and 1 atm pressure N_2O_4 decomposes by 20%. Calculate change in free energy and equilibrium constant for the reaction.



(c) Answer any two questions : 10

- (1) Prove : $\eta = \frac{W_{\max}}{Q_2} = \frac{Q_2 - Q_1}{Q_2} = \frac{T_2 - T_1}{T_2}$.
- (2) Draw and explain phase diagram of two pair of partially miscible liquid mixture.
- (3) Derive Clausius-Clapeyron equation and its integration form.

- (4) Explain the internal structure of NaCl by X-ray diffraction method.
- (5) 2.8 litre O₂ and 19.6 litre H₂ mixed at STP at mixing calculate the entropy change.
- 3 (a) Answer any three questions : 6
- (1) Explain Absolute and Relative error.
 - (2) Explain in short "Common ion effect".
 - (3) How many grams of KMnO₄ is required to prepare 500 ml 0.5 M KMnO₄ solution (M.W. KMnO₄ = 158)
 - (4) Define :
 - (a) Absorbance
 - (b) Transmittance.
 - (5) State the difference between iodimetry and iodometry titration.
 - (6) Explain primary standard.
- (b) Answer any three questions : 9
- (1) Write short note on Q-Test.
 - (2) Derive equation of Lambert's and Beer's law.
 - (3) Explain principle of Neutralization Indicator.
 - (4) State the disadvantages of starch as an indicator.
 - (5) Calculate molarity of 2 litre solution containing 100 gm NaOH.
 - (6) Explain roll of KCN in the separation of Cu⁺² and Cd⁺².
- (c) Answer any two questions : 10
- (1) Explain neutralization titration of strong acid and strong base with diagram.
 - (2) Describe the methods for elimination of error.
 - (3) Explain Mohr's method for the titration of NaCl → AgNO₃.
 - (4) Write note on spectrophotometric estimation.
 - (5) Explain separation of PO₄⁻³; ASO₄⁻³ and ASO₄⁻³ ions in detail in qualitative analysis.