Progressive Education Society's
Modern College of Arts, Science & Commerce Ganeshkhind, Pune – 16
(Autonomous)
End Semester Examination: MAR / APR 2025
Faculty: Science and Technology

Program: B.Sc **Semester:VI** **SET: A**
Program (Specific): B.Sc. Chemistry **Course Type:DSEC**
Class: T.Y.B.Sc **Max.Marks: 35**
Name of the Course:Physical Chemistry-III **Course Code: 24-CH-602**
Time: 2Hr **Paper: II**

Instructions to the candidate:

1) *There are 4 sections in the question paper. Write each section on a separate page.*
2) *All Sections are compulsory.*
3) *Figures to the right indicate full marks.*
4) *Draw a well labelled diagram wherever necessary.*

Q1) (5 Multiple Choice Question) **5**

a) Which of the following is a colligative property?
i. Change in free energy ii. Change in pressure iii. Osmotic Pressure iv. Heat of vapourization
b) A semipermeable membrane allows_____.
i. A solution to pass through it ii. Solute to pass through it
iii. Solvent to pass through it iv. Concentration effect
c) The autocatalysis model was derived by_____.
i. Jander ii.Prout and Tompkins iii. Avrami iv. Tammann
d) A vacant or partially filled and is called_____.
I. Conduction band ii.Valence band iii. Forbidden band iv. Empty band
e) The number of monomers in a polymer chain is known as:_____
i. Degree of polymerisation ii. Weight number molecular weight
iii. Weight average molecular weight iv. Addition polymerization

Q2) Define the following: (Attempt any 4/6) **4**

a) Semipermeable membrane
b) Lowering of vapour pressure
c) Rate of reaction in first order rate law.
d) Molecular solids.
e) Viscosity.
f) Weight fraction.

Q3) Short answer questions (Attempt any 4/6) **8**

a) Explain the graph of vapour pressure Vs temperature for lowering of vapour pressure for solvent and solution.
b) What is the degree of dissociation?
c) Explain the classification of solid-state reactions.
d) What are semiconductors?
e) Explain why particle size affects the rate of the reaction.
f) What are branched polymers?

Q4) Solve the following questions (Attempt any 4/6) **8**

a) Calculate molecular weight of the solute if 1.6 g of a non-volatile solute was dissolved in 25 g of a solvent. Given: Boiling point elevation is 0.4 ^{o}C and K_b is 1.15.
b) Draw the nature of the plot of thickness of product layer (x) with time.
c) Explain cohesive energy in metals.
d) What are different types of solids?
e) What are cross linked polymers?
f) Write a note on the boiling point of polymers.

Q5) Attempt any two of the following (2/4) **10**

a) When 0.5143 g anthracene was dissolved in 35 g chloroform, the boiling point was elevated by 0.323^{o}C. If K_b for chloroform is 3.9 calculate the molecular weight of anthracene.
b) Explain the kinetics of two solid reactants with examples.
c) Explain the role of Boron to obtain p-type semiconductor using MOT.
d) Give the classification of polymers on the basis of type of monomers and explain with suitable examples.