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Total No. of Pages : 02

Total No. of Questions : 09

M.Sc.(Chemistry) (2015 to 2017) (Sem.–1)

PHYSICAL CHEMISTRY

Subject Code : MSCH-104

Paper ID : [A2708]

Time : 3 Hrs. Max.Marks: 100

INSTRUCTIONS TO CANDIDATES :

1. Attempt FIVE questions in all selecting any ONE from each section.
2. All questions carry EQUAL marks.

SECTION-A

1. a) Derive thermodynamic equation of state. (10)

   b) State and explain third law of thermodynamics. How can this law be used for the determination of absolute entropies? (10)

2. a) Derive an expression for Maxwell-Boltzmann law of most probable distribution. (12)

   b) Define partition function. Derive the necessary expression for the vibrational partition function. (8)

SECTION-B

3. a) Describe in details the collision theory of reaction rates. What are its drawbacks? (10)

   b) Discuss flash photolysis method for the study of fast reaction kinetics. (10)

4. a) Give a brief account of the kinetics of opposing reactions. (10)

   b) Write short note on homogeneous catalysis. (10)

SECTION-C

5. a) Discuss the conductometric method of determination of the dissociation constants of weak electrolytes. (10)

   b) Explain the effect of high electric field on the conductance. (10)

6. Write short notes on the following :

a) Inter-ionic effects. (5)

b) Onsager conductance equation. (5)

c) Coulometry. (5)

d) Half wave potential. (5)

SECTION-D

7. a) What are intermolecular forces? Discuss their contribution to intermolecular potential. (10)

b) Differentiate between Newtonian and non-Newtonian flows. (5)

c) Explain natural and forced convections. (5)

8. a) Derive Bernoulli's equation for the pressure drop for the flow through pipes and channels. (12)

b) Give a brief account of flow measuring instruments. (8)

SECTION-E

9. Answer briefly : (10×2=20)

a) Explain free energy of mixing.

b) What are Bosons and Fermions? Give examples.

c) Explain collision frequency.

d) What is the principle of detailed balancing? Explain.

e) What are oscillatory reactions?

f) Explain ion association.

g) Define limiting and diffusion currents.

h) Explain dielectric polarization.

i) What is Fick's law of diffusion?

j) Differentiate between acidic, basic and neutral refractories.