

Roll No. :

Total No. of Questions : 11]

[Total No. of Printed Pages : 3

BPG-1092

M.Sc. (Previous) Examination, 2021

CHEMISTRY

Paper-III

CH-403

(Physical Chemistry)

Time : 1½ Hours]

[Maximum Marks : 75

Section-A

(Marks : 2 × 10 = 20)

Note :- Answer all *ten* questions (Answer limit **50** words). Each question carries **2** marks.

Section-B

(Marks : 5 × 5 = 25)

Note :- Answer all *five* questions. Each question has internal choice. (Answer limit **200** words). Each question carries **5** marks.

Section-C

(Marks : 10 × 3 = 30)

Note :- Answer any *three* questions out of five. (Answer limit **500** words). Each question carries **10** marks.

Section-A

2 each

1. Attempt all questions. Answer should not exceed **50** words in each question.

(i) Define normalisation and orthogonality.

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- (ii) What is Hermitian Operator ?
- (iii) What is Ionic Strength ?
- (iv) What is second order phases transition ?
- (v) Write short note on Flash Photolysis.
- (vi) Why reactions of the higher orders are rare ?
- (vii) Write short note on surface films on liquids.
- (viii) What is reverse micelles ?
- (ix) Define exchange current density.
- (x) Write explanatory note on Butler-Volmer equation.

Section-B

5 each

Attempt all questions. Answer should not exceed **200** words in each question.

2. Show that the 1s and 2s orbitals of hydrogen atom are orthogonal to each other.

Or

Write a note on extended Huckel theory.

3. Apply phase rule to a three component system.

Or

Explain the molecular basis of residual entropy.

4. What are Polymer Solutions ? How do they differ from colloidal solutions ?

Or

Discuss the kinetics of Polymerisation.

5. Define relaxation time. Describe its measurement.

Or

Derive Michaelis-Menten equation.

6. Discuss the electrocapillary curves.

Or

Discuss the diffusion overpotential.

Section–C

10 each

Attempt any *three* question out of five. Answer should not exceed **500** words in each question.

7. Discuss the application of variation theorem to helium atom.
8. Define Fugacity. Discuss the methods used to determine its value.
9. Discuss the dynamics of barrierless chemical reactions in solutions.
10. What is CMC ? What are the factors affecting the CMC of surfactants ?
11. What is Corrosion ? Discuss the various factors which influence corrosion.