Code No. 6712 / CBCS / N

FACULTY OF SCIENCE

M.Sc. II – Semester (CBCS) Examination, May / June 2017

Subject: Chemistry

Paper – III
Physical Chemistry

Time: 3 Hours **Max.Marks: 80**

Note: Answer all questions from Part – A and Part – B.
Each question carries 8 marks in Part-A and 12 marks in Part-B.

PART – A (4x8 = 32 Marks)
[Short Answer Type]

1 a) Explain Henry's law of vapour pressure.

b) Derive Gibbs – Duhem equation.

2 a) Write about Franck Condon principle.

b) Derive the quantum yield of fluorescence.

3 a) Explain about *n*, *l* and *m* quantum numbers.

b) State and explain variation theorem and prove it.

4 a) Explain photovoltaic effect.

b) Write about Meissner effect.

PART – B (4x12 = 48 Marks)
[Essay Answer Type]

5 a) What is fugacity and how is it determined?

b) Discuss about various thermodynamic properties of dilute solutions.

OR

c) Write about:

i) Vapour pressure lowering

ii) Boiling point elevation.

d) Explain the relationship between partition function and thermodynamic functions entropy and Gibbs free energy.

6 a) What is quantum yield? How quantum yield is determined experimentally.

b) Derive the kinetics of photo physical unimolecular reaction.

OR

c) What is quenching? Derive Stern-Volmer equation.

d) Explain electron transfer reactions with example.

7 a) Describe about radial distribution functions.

b) Explain about secular equations and secular determinant with a trial function $\Psi = a_1\phi_1 + a_2\phi_2$.

OR

c) Explain polar plots and boundary diagram.

d) Compare the MO and VB models of H_2 molecule.

8 a) Explain the band theory of solids.

b) What are superconductors? Explain BCS theory.

OR

c) Explain the preparation of 1-2-3 materials.

d) What is the principle involved in AFM.