PB-164

M.Sc. Chemistry (1st Semester)
Examination, Dec., 2018

Paper - III

Physical Chemistry - I

Time : Three Hours] [*Maximum Marks* : 80
[*Minimum Pass Marks* : 29

Note : Answer from **both** the Sections as directed. The figures in the right-hand margin indicate marks.

SECTION-A

1. Write the answer of the following questions : 1×10

(*a*) What is the difference between classical mechanics and quantum mechanics.

(*b*) Define the spin antisymmetry.

(*c*) Write the term symbol $^3F_2$ by spin multiplicity or spectroscopic state.

(*d*) Draw energy diagram of kinetics of enzymatic reaction.

(*e*) Write the full from of RRKM.

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(*f*) Discuss the various chain structure of polymers.

(*g*) Explain the probable density of postulates of quantum mechanics.

(*h*) What is the equation of Laplacian operator in cartesian coordinates ?

(*i*) What is conjugated system by molecular orbital theory ?

(*j*) Describe the irreverse and reverse micelles.

2. Answer the following questions : 2×5

(*a*) Explain the perturbation theory in first order degenerates.

(*b*) What is Slater-Condon parameters ?

(*c*) Explain the dynamic of barrier less chemical rean in solution with examples.

(*d*) Describe the electrokinetic phenomenon of surface film.

(*e*) Give the mechanism of polymerization.

SECTION-B

Answer **all** questions : 12×5

3. (*a*) Explain the harmonic oscillator in hydrogen atom in a box.

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(*b*) Discuss the eigen function for angular momentum.

OR

(*a*) Give the importance, introduction of postulate of quantum mechanics.

(*b*) What is linear variation principle ?

4. Write short notes on the following :

(*a*) Russell-Saunders Term

(*b*) Bond order and charge density calculations

OR

Explain in brief the term separation energy for d^n configurations.

5. Discuss activated complex theory and steady state kinetics.

OR

Answer the following :

(*a*) Pyrolysis of CH_3CHO

(*b*) Hydrogen-Chlorine rean

6. Describe the Gibbs absorption isotherm and Calvin equation.

OR

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(*a*) Discuss the factors affecting the CMC of surfactant.

(*b*) Thermodynamics of micellization phase separation.

7. Give some important methods for the determination of molecular mass.

OR

Write short notes on the following :

(*a*) Fire resistant

(*b*) Kinetic of polymerization

(*c*) Types of polymers

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