FD-608

M.Sc. 3rd Semester
Examination, Dec.-Jan., 2021-22

CHEMISTRY

Paper - I

Resonance Spectroscopy,
Photochemistry and Organocatalysis

Time : Three Hours] [*Maximum Marks* : 80
[*Minimum Pass Marks* : 16

Note : Answer **all** questions. The figures in the right-hand margin indicate marks.

Unit-I

1. (*a*) Explain the principle of ESR spectroscopy. Describe spin polarization of atoms and metal ions. 12

(*b*) Discuss application of ESR spectroscopy to transition metal complexes. 8

OR

Write notes on the following :

(*a*) Quadrupole moment 7

(*b*) Electric field gradient 7

(*c*) Coupling constant 6

Unit-II

2. (*a*) How would you determine dipole moment by photoelectron spectroscopy ? 10

(*b*) Discuss basic principle of photoacoustic spectroscopy. 10

OR

(*a*) What is Auger Effect ? Describe KLL Auger process and list out the applications of AES. 10

(*b*) Discuss chemical and surface applications of photoacoustic spectroscopy. 10

Unit-III

3. Write notes on the following : 5×4

(*a*) Stern-Volmer equation

(*b*) Photo-Fries reaction of anilides

(*c*) Photodegradation of polymer

(*d*) Quantum yield

OR

(*a*) Discuss the effect of light intensity on rate of reaction. 6

(*b*) Write a note on photo-chemical formation of smog. 7

(*c*) Describe a method for determination of rate constant of a reaction. 7

Unit-IV

4. (*a*) Describe various types of organometallic reactions. 10

(*b*) Write brief notes on the following : 5×2

(*i*) Alkene polymerization

(*ii*) Oxidative elimination

OR

(*a*) Discuss Wacker oxidation of alkenes. 10

(*b*) Write notes on the following : 5×2

(*i*) Asymmetric oxidation

(*ii*) Nature of heterogenons catalysis

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