KJ-454

M.Sc. (Chemistry)

3rd Semester Examination, June, 2020

Resonance Spectroscopy, Photochemistry

Time : Three Hours] [*Maximum Marks* : 80

Note : Answer **all** questions. All parts of a question should be answered at one place. Be precise and to the point in your answers. The figures in the right-hand margin indicate marks.

Unit-I

1. (*a*) Discuss the nature of electric field gradient in nuclear quadrupole resonance. 10

(*b*) Discuss the application of NQR. 10

OR

(*a*) Explain the principle of ESR spectroscopy. Discuss the hyperfine splitting in transition metal complexes. 10

(*b*) What is the significance of g-tensor ? Give its value in the following systems : 10

(*i*) Free electron

(*ii*) Organic radicals

Unit-II

2. (*a*) Explain Auger effect, discuss its principle and applications. 10

(*b*) Write short notes on the following : 10

(*i*) Photo-ionization process

(*ii*) Photoelectron spectra of NaN_3 and HBr.

OR

(*a*) Give the principle and applications of photoacoustic spectroscopy. 10

(*b*) Which type of sources are used and how can you minimize saturation effect in PAS ? 10

Unit-III

3. Write notes on the following : 5×4

(*a*) Photo-Fries reaction of anilides

(*b*) Barton reaction

(*c*) Photochemical formation of smog

(*d*) Phtodegradation of polymers

OR

(*a*) What is quantum yield ? Explain the method of determination of quantum yield by actinometer. 10

(*b*) Explain the physical and chemical pathways of mode of dissipation of energy. 10

Unit-IV

4. (*a*) Explain the Paterno-Buchi reaction. 10

(*b*) Explain intermolecular photochemical reaction in olifins. 10

OR

(*a*) Discuss the photochemical cyclization with examples. 10

(*b*) What are the major products of the photochemical determination of methyl neopentyl ketone ? 10

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