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D-6333

M.Sc. (IIIrd Semester) Examination, 2020

CHEMISTRY

(Photochemistry and Pericyclic Reaction)

Time Allowed : Three Hours

Maximum Marks : 70

SECTION - A

Note : Attempt any ten questions. Each question carries one mark. **1×10=10**

Q. 1. Fill in the blanks type :

(1) The emission of light in chemical reaction at ordinary temperature is called _____.

(2) An electronically excited molecule can transfer its energy to a second species which then undergoes a photochemical process are called _____.

(3) Two catagories of pericyclic reactions are _____ and _____.

(4) Pericyclic reaction requires _____ and _____ to process the reaction.

(5) The Diels-Alder reaction is one example of a _____.

Multiple choice type :

(6) The reaction which are caused by heat and in absence of light is called :

(a) Photochemical reaction

(b) Dark reactions

(c) Reversible reaction

(d) Reversible photochemical reaction

(7) In photochemical reactions absorption of radiation take place :

(a) Ultraviolet and visible

(b) Radio

(c) Only visible

(d) Visible and X-rays

(8) The fact that the fluorescence wavelength is often much longer than the irradiation wavelength (Stokes shift) is a consequence of which phenomenon ?

(a) Low extinction coefficients (Lambert–Beer) law

(b) Verticle transitions (Kasha's rule)

(c) High ISC rates (El Sayed rule)

(d) The Franck-Condon principle

(9) Which regions of the light radiations lying between wavelength are chiefly concerned in bringing about photochemical reactions :

(a) 1000 Å and 2000 Å

(b) 1500 Å and 1000 Å

(c) 8000 Å and 2000 Å

(d) 14000 Å and 12000 Å

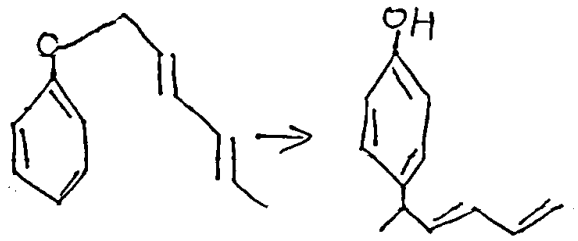
(10) The thermal cyclization of trans, trans 2, 4-hexadiene gives :

(a) Only trans-3, 4-dimethyl cyclobutene

(b) Only cis-3, 4-dimethyl-cyclobutene

(c) Both the above products in equal amount

(d) Cyclohexene

(11) 

The above reaction is example of :

(a) [5, 5] sigmatropic rearrangement

(b) [1, 5] sigmatropic rearrangement

(c) Claisen rearrangement

(d) Cope rearrangement

(12) In a Diels-Alder reaction, the most reactive diene amongst the following is :

(a) (4E)-1, 4-hexadiene

(b) (4z)-1, 4-hexadiene

(c) (2E, 4E)-2, 4-hexadiene

(d) (2z, 4z)-2, 4-hexadiene

SECTION - B

Note : Attempt any five questions. Each question carries 2 marks. **5×2=10**

Q. 2. Very short answer type (25-30 words) :

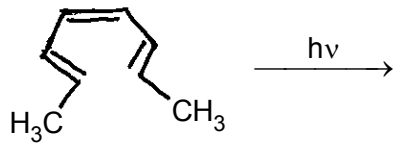
(1) What is quantum yield ?

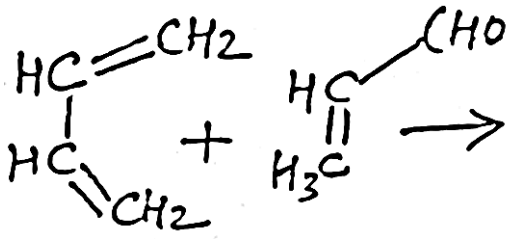
(2) What is fluorescence quenching ?

(3) What is cyclisation reaction ?

(4) Write ene reaction.

(5) Write photorearrangement of cyclopentanone.

(6) 

(7) 

SECTION - C

Note : Attempt any five questions. Each question carries 4 marks. **5×4=20**

Q. 3. (1) Explain flash photolysis.

(2) Write Stern-Volmer equation.

(3) Explain charge transfer spectra.

(4) Write Barton reaction ?

(5) Write mechanism of vision.

(6) Write rearrangement of 1, 4 and 1, 5 diene.

(7) Explain Frontier Molecular Orbital (FMO) theory.

SECTION - D

Note : Attempt any three questions. Each question carries 10 marks. **3×10=30**

Q. 4. Essay type (more than 500 words) :

(1) Explain energy dissipation by radiative and non radiative process.

OR

Describe rate of unimolecular photochemical reactions from singlet and triplet excited state.

(2) Explain photosensitization and energy transfer of photosensitization by giving suitable examples.

OR

Explain different types of γ–, β– and δ– hydrogen abstractions.

(3) Write process and mechanism of Norrish type-I and Norish type-II reactions.

(4) Explain electrophilic, radical substitution and photooxidation reactions.

OR

Explain photooxygenation and photoreduction reactions.