

L-3/2111

13/06/N

Paper: 333

Title of the Paper: Fundamentals and Atmospheric Photochemistry

Time Allowed: 3 Hours

Maximum Marks: 55

Note:- Attempt five questions, selecting two questions each from each A and B and entire Section C is compulsory.

SECTION-A

1. a) Describe photosensitized reactions of simple alkanes and alkenes.
b) Describe spin conservation Rule. Give its application for energy transfer. (4,4)
2. a) How luminescence is applied to optical bleaching of textiles and papers?
c) Explain different kinds of spectra with examples. (4,4)
3. a) Describe photosensitized incorporation of molecular oxygen into organic compounds.
b) Explain mechanism of energy transfer by considering donor (D) and acceptor (A) system. (4,4)
4. a) How photoreactions and thermally initiated reactions are distinguished?
b) Describe in detail the photophysical process of HI. (4,4)

SECTION-B

5. a) Discuss the Spectrum of Oxygen along with reactions.
b) Discuss the mechanism of Ozone Hole. (4,4.5)
6. a) What are the differences between Photochemical Smog and London Smog?
b) What is a Pollutant? Discuss different ways to explain concentration of Pollutant? (4,4.5)
7. a) Discuss different Zones in the atmosphere with respect to Diffusion.
b) What is particulate Matter? Briefly explain. (6,2.5)
8. a) What is NO_x ? Explain its monitoring in the atmosphere.
b) Explain PAN in the atmosphere. (4,4.5)

SECTION-C

9. a) State second Law of Photochemistry?
b) What is ozone Hole?
c) Write a short note on sensitized fluorescence.

- d) Briefly explain ferrioxalate actinometer,
- e) How you can define structure of atmosphere in terms of temperature?
- f) Comment upon intersystem crossing.
- g) Calculate the energy in joules per quantum of $\lambda = 3000 \text{ \AA}$.
- h) What are the important sources of SO_2 and H_2S .
- i) What is the primary oxidising agent in the troposphere?
- j) State and explain the law of photochemical equivalence?
- k) How are oxides of nitrogen monitored in the atmosphere?

11 x2 = 22

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