

Indian Association for the Cultivation of Science

(Deemed to be University under de novo Category)

Master's/Integrated Master's-PhD Program/Integrated Bachelor's-Master's Program/PhD
Course

Mid-Semester Examination-Spring 2023

Subject: Structure, Spectroscopy and Kinetics

Full Marks: 25

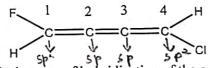
Subject Code(s): CHS 1201

Time Allotted: 2 h

Part I: Organic Chemistry [12.5 marks]

1. Consider the following molecule and answer the subsequent questions

[5x1/2]



Identify the state of hybridization of the carbon atoms (C1 to C4)

Find the maximum number of atoms lying in one plane

ii. Can this molecule show chirality?

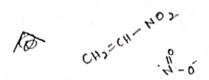
iv. Can this molecule show stereoisomerism?

Provide reasons for your answers to iii) and iv)

2 Identify the most basic compound amongst the following and give reasons for your answer. [2]

$$H_2N$$
 NH H_2N O H_3C NH NH_2 NH_2 NH_2 NH_2 NH_2

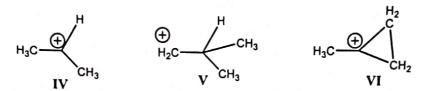
Draw the possible canonical forms for nitroethylene and identify the most stable structure(s) citing reasons.



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Which one amongst the following carbocations will have the highest hyperconjugative stabilization?

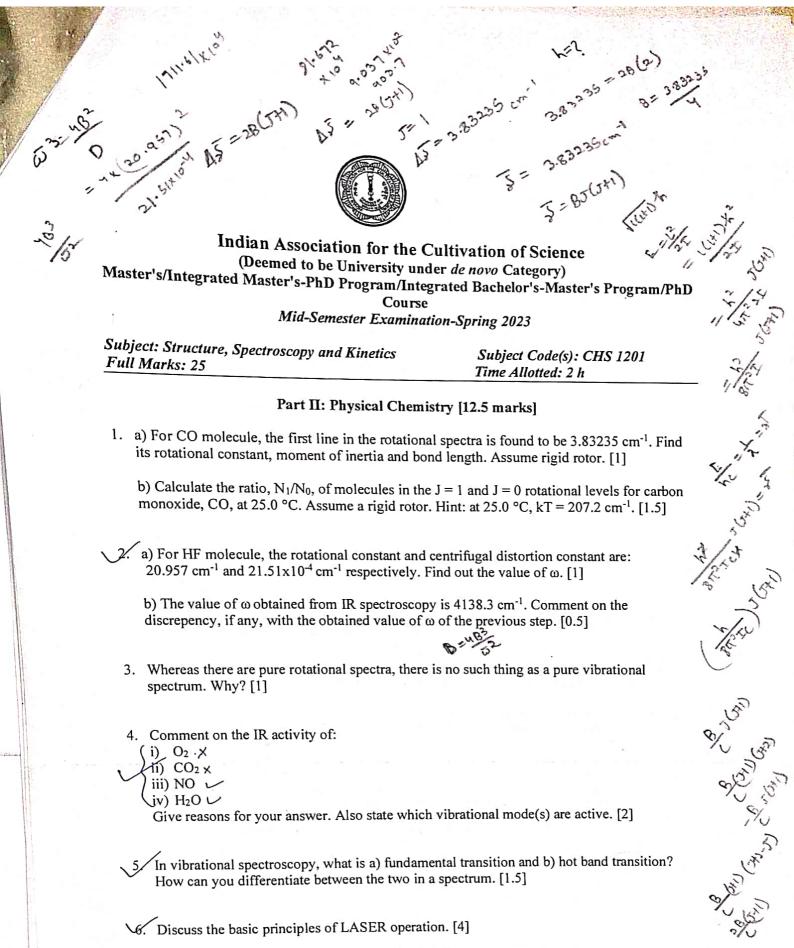
[2]



- 5. Answer the following questions:
- A. Explain the difference between asymmetric and dissymmetric molecules
- B. In terms of superimposability/non-superimposability with the mirror image, what is the minimum condition for chirality for a molecule?
- Find the number of sigma planes in the following structures:

Define a stereogenic center. Identify the stereogenic centres in the following molecules:

[4]



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