

Reg. No. :

Name :

III Semester M.Sc. Degree (CBSS – Reg./Supple./Imp.)
Examination, October 2023
(2020 Admission Onwards)
CHEMISTRY
CHE 3C 09 : Organic Chemistry III

Time : 3 Hours

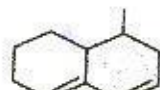
Max. Marks : 60

SECTION – A

Answer **all** questions in **one** word or **one** sentence. Each question carries **one** mark.

(8×1=8)

1. Calculate the
- λ_{\max}
- value of the organic compound.



2. Define Beer-Lambert's law.

3. What is coupling constant ?

4. How many
- ^1H
- NMR signals would you expect in the following organic compound ?



5. How will you identify chlorine atom present in an organic compound by using mass spectra ?

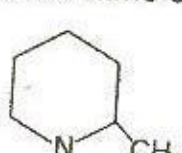
6. What is nitrogen rule ?

P.T.O.

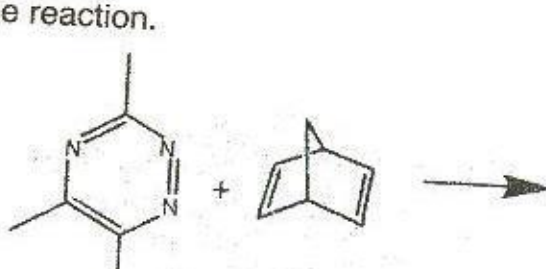
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7. Write the IUPAC name of the following organic compound.



8. Complete the reaction.



SECTION – B

Answer **any eight** questions. Answer may be **two** or **three** sentences. Each question carries **two** marks.

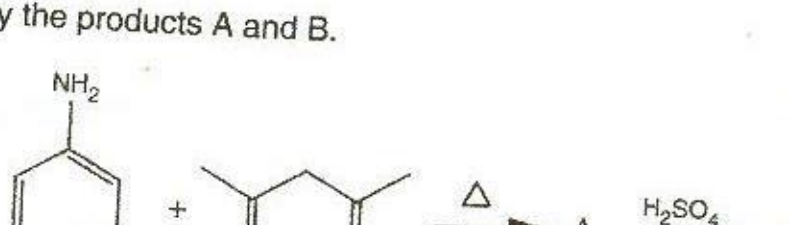
(8×2=16)

- How will you distinguish cis-but-2-ene and trans-but-2-ene using IR spectroscopy ?
- How the polarity of the solvent shifts the wavelength of $n \rightarrow \pi^*$ electronic transition ?
- The intensity of $n \rightarrow \pi^*$ electronic transitions are usually very low. Give reason.
- Water is not commonly used as a solvent in IR spectroscopy. Give reason.
- Intensities of ^{13}C NMR peaks are lower than that of ^1H NMR. Give reason.
- Hydroxylic peak of acidified ethanol usually give a single peak. Why ?
- What is McLafferty rearrangement ? Explain.
- Write the fragmentation pattern and identify the base peak of cyclohexene.
- Explain the metastable ion present in mass spectrum.

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18. Identify the products A and B.



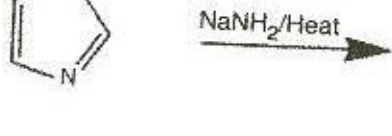
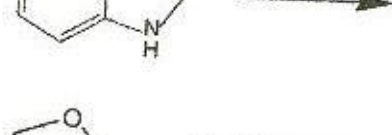
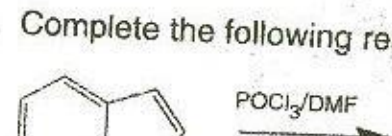
- Write a short note on oxetane.
- Explain the cycloaddition reactions of azepines.

SECTION – C

Answer **any four** questions. Short paragraph questions. Each question carries **three** marks.

(4×3=12)

- An organic compound has molecular formula $\text{C}_3\text{H}_6\text{O}$ is IR (KBr) : 2995, 2918, 1715, 1422, 1360 and 1213 cm^{-1} . Assign the structure.
- Account the electronic transitions in enes and enones.
- Explain anisotropic effect with suitable examples.
- Write a short note on :
i) GC-MS ii) HPLC-MS
- What are coumarins ? Write any one synthetic method to prepare coumarin.
- Complete the following reactions.



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SECTION – D

Answer **any four** questions. Essay type questions. Each question carries **six** marks.

(4×6=24)

- A) Explain the factors affecting vibrational frequencies. What are the applications of IR spectroscopy ?
OR
B) Explain FTIR and its instrumentation.
- A) Briefly discuss the following :
i) Double resonance
ii) NOE
iii) DEPT.
OR
B) Explain the spin-spin interaction in NMR spectroscopy.
- A) Assign the structure of the organic compound $\text{C}_8\text{H}_8\text{O}$ shows the following spectral data
Two base peaks at $m/z = 119$ and 91
IR (KBr) : 2825, 2717, 1700 cm^{-1}
 ^1H NMR : δ 2.4 (3H, s), δ 7.1 – 7.9 (4H, a pair of doublets $J=8$ Hz) and δ 10.0 (1H, S)
OR
B) Describe the EI, CA, FAB and electro spray ion sources in the mass spectroscopy.
- A) Explain the preparation and properties of indole and quinoline.
OR
B) Explain the preparation and properties of pyrans and pyrimidines.