K23P 1376

Reg. No. : .....

Name : .....

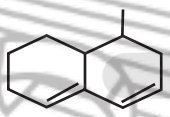
III Semester M.Sc. Degree (CBSS – Reg./Supple./Imp.)
Examination, October 2023
(2020 Admission Onwards)
CHEMISTRY
CHE 3C 09 : Organic Chemistry III

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)**

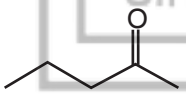
1. Calculate the λ_{max} value of the organic compound.



2. Define Beer-Lambert's law.

3. What is coupling constant ?

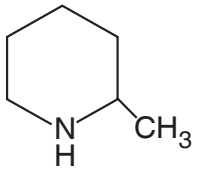
4. How many ^1H NMR signals would you expect in the following organic compound ?



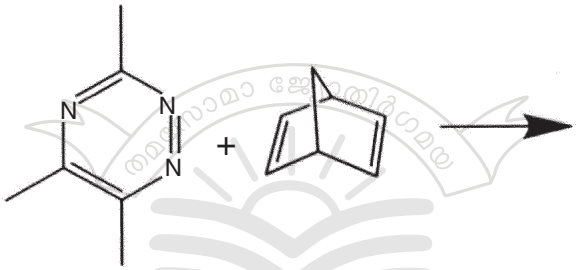
5. How will you identify chlorine atom present in an organic compound by using mass spectra ?

6. What is nitrogen rule ?

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



8. Complete the reaction.

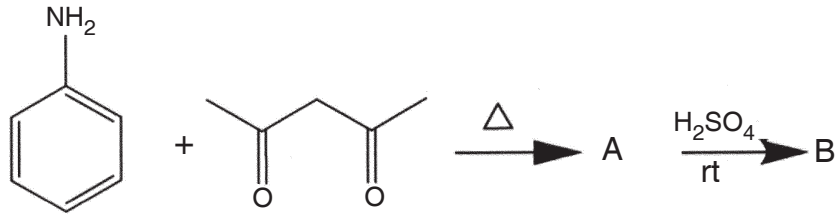


SECTION – B

Answer **any eight** questions. Answer may be **two** or **three** sentences. **Each** question carries **two** marks. **(8×2=16)**

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

18. Identify the products A and B.



19. Write a short note on oxetane.

20. Explain the cycloaddition reactions of azepines.

SECTION – C

Answer **any four** questions. Short paragraph questions. **Each** question carries **three** marks. **(4×3=12)**

21. An organic compound has molecular formula C_3H_6O is IR (KBr) : 2995, 2918, 1715, 1422, 1360 and 1213 cm^{-1}. Assign the structure.

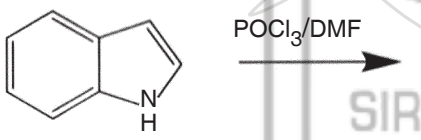
22. Account the electronic transitions in enes and enones.

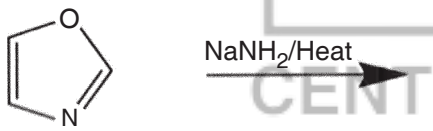
23. Explain anisotropic effect with suitable examples.

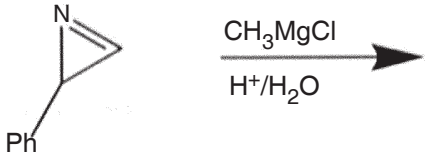
24. Write a short note on :
    i) GC-MS ii) HPLC -MS

25. What are coumarins ? Write any one synthetic method to prepare coumarin.

26. Complete the following reactions.







SECTION – D

Answer **any four** questions. Essay type questions. **Each** question carries **six** marks. **(4×6=24)**

27. A) Explain the factors affecting vibrational frequencies. What are the applications of IR spectroscopy ?

OR

B) Explain FTIR and its instrumentation.

28. A) Briefly discuss the following :

i) Double resonance

ii) NOE

iii) DEPT.

OR

B) Explain the spin-spin interaction in NMR spectroscopy.

29. A) Assign the structure of the organic compound C_8H_8O 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.

30. A) Explain the preparation and properties of indole and quinoline.

OR

B) Explain the preparation and properties of pyrans and pyrimidines.