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K19P 1080

Reg. No. :

Name :

III Semester M.Sc. Degree (CBSS-Reg./Sup./Imp.)

Examination, October - 2019

(2014 Admission. Onwards)

CHEMISTRY

CHE3C.09: ORGANIC CHEMISTRY-III

Time : 3 Hours

Max. Marks : 60

SECTION - A

Answer **all** questions in **one** word or **one** sentence. Each question carries **1** mark. **(8×1=8)**

1. Intramolecular H-bonded O-H absorbs at a (lower/higher) frequency in IR compared to normal O-H.
2. Give one example for an auxochromic group.
3. How many lines are seen in the ^{13}C NMR of DMSO?
4. An enolic OH proton will show a chemical shift close to _____ ppm.
5. Methyl bromide shows an intensity ratio of _____ for its M and M+2 peaks in its mass spectrum.
6. What reagent is used to convert styrene to its epoxide?
7. What is the value for the base peak in the mass spectrum of acetophenone?
8. What are the reagents used to convert pyrrole to pyrrole-2-carboxaldehyde?

SECTION - B

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

9. What is the value of absorbance for a solution which shows 50% transmittance?
10. Rationalize the difference in IR stretching frequency of the carbonyl group in an amide with that in an acid chloride.
11. What is meant by FTIR?

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12. Calculate the absorbance of a solution of concentration 2×10^{-4} M in a 1 cm cell, given the extinction co-efficient is $10,000 \text{ mol}^{-1} \text{ Lcm}^{-1}$.
13. A compound shows 5 aromatic protons in its ^1H NMR. In addition a two proton signal is observed at δ 4.2 ppm and an exchangeable proton is seen at δ 2.3 ppm. Identify the structure of the compound.
14. What is meant by noise decoupling?
15. At what chemical shift values will the signals of methyl benzoate appear in its ^{13}C NMR spectrum approximately?
16. What are meta-stable ions? What is its significance?
17. What are the major peaks observed in the EIMS of 2-heptanone?
18. Illustrate a method to synthesize 1,2,3-triazole.
19. What products are formed when the following are treated with methyl chloride and AlCl_3 : i) pyridine ii) quinoline and iii) thiophene?
20. Give the structures of i) azepine and ii) pyrazine.

SECTION-C

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

21. Calculate the ϵ value of a solution containing 1 mmol/dm^3 of a solute whose absorbance in a 1cm cell is 1.5. What is the value of the absorbance of a solution of double the concentration?
22. What difference would you expect in the IR spectra of i) methyl benzoate and phenyl acetate and ii) salicylaldehyde and 4-hydroxy benzaldehyde?
23. What is the reason for shielding of acetylenic protons and deshielding of vinylic protons in proton NMR spectra?
24. A compound $\text{C}_8\text{H}_7\text{N}$ shows a peak at 2210 cm^{-1} . In addition to the aromatic protons there is a two proton signal at δ 4.2 ppm in its ^1H NMR. Identify the structure of the compound.



25. Explain the principle behind CIMS technique.
26. Pyrrole is converted to 3-chloro-pyridine in presence of KOH/CHCl_3 . Illustrate the mechanism.

SECTION-D

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

27. a) i) Explain why butadiene shows red shift compared to ethylene
ii) How does solvent polarity affect the UV absorptions of 2-butene and benzophenone?
(OR)
- b) i) Arrange the following in the order of increasing IR stretching frequencies of carbonyl group: 2-furanone, cyclopent-2-enone and tropone.
ii) How are cis-alkenes differentiated from trans-alkenes using IR spectroscopy?
(OR)
28. a) A compound shows the following ^1H NMR values: δ 9.2 (1H, s), 7.3-7.8 (5H, m), 6.8 (1H, d), 6.6 (1H, d). Identify the compound. Explain the changes in the ^1H NMR if the compound is reduced.
(OR)
- b) Explain the $^1\text{H} - ^1\text{H}$ COSY of butyl bromide.
29. a) The mass spectrum of 1,2-dichloroethane shows a cluster. What is the intensity ratio of the peaks in the cluster?
(OR)
- b) What are the various analyzers used in mass spectroscopy?
30. a) Illustrate the i) Fischer indole synthesis and ii) Paal Knorr furan synthesis.
(OR)
- b) Illustrate the formation of the heterocyclic compound formed from heating of biphenyl azide.