

**2022/TDC(CBCS)/EVEN/SEM/
CHMHCC-602T/345**

TDC (CBCS) Even Semester Exam., 2022

CHEMISTRY

(Honours)

(6th Semester)

Course No. : CHMHCC-602T

(Organic Chemistry)

Full Marks : 50

Pass Marks : 20

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

SECTION—A

Answer any *ten* questions : 2×10=20

1. Define chromophore and auxochrome with example. 1+1=2
2. α,β -unsaturated esters absorb at lower wave number as compared to its saturated counterpart. Explain.

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(Turn Over)

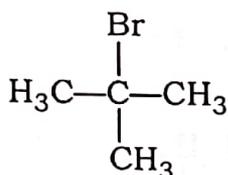


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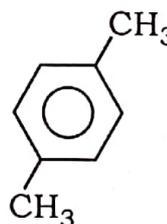
3. How will you distinguish between the following pair by IR spectroscopy?

Phenyl acetate and Methyl benzoate

4. How many $^1\text{H-NMR}$ signals are expected for the following compounds? 1+1=2



and



5. What do you understand by the term 'spin-spin coupling'?
6. What are equivalent and non-equivalent protons?
7. What is invert sugar?
8. What happens when glucose react with conc. HNO_3 ?
9. Define epimers and anomers.
10. Draw the structure of phenolphthalein and state its application.
11. What is vat dye? Give one example.

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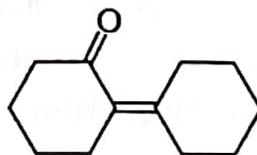
12. Give the name and structure of one triphenylmethane dye.
13. What do you mean by atactic and syndiotactic polymers?
14. What is biodegradable polymers? Give example.
15. How is Nylon-6 synthesized from ϵ -caprolactum?

SECTION—B

Answer any *five* questions :

6×5=30

16. (a) Explain the various types of electronic transitions possible in formaldehyde and sketch the spectrum indicating the transitions. 3
- (b) Polar solvents usually shift the $\pi - \pi^*$ transitions to longer wavelength and $n - \pi^*$ transitions to shorter wavelength. Explain. 2
- (c) Calculate λ_{\max} for the compound

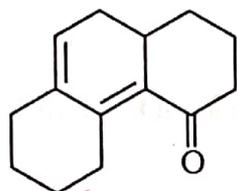


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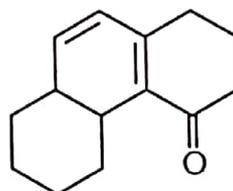
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17. (a) How can you distinguish between inter- and intra-molecular H-bonding in any compound by IR spectroscopy? 2
- (b) Discuss the effect of ring size on carbonyl absorption ($\nu_{C=O}$) in case of cycloketones. 2
- (c) An unknown structure is believed to have either structure A or B. Its UV-spectrum shows λ_{max} at 320 nm (ethanol). What could be its likely structure? 2



(A)



(B)

18. (a) Explain why the aromatic protons are more deshielded than ethylenic protons although both the types of protons are attached to sp^2 -hybridized carbons. 2
- (b) How will you distinguish between *cis*- and *trans*-isomers with the help of NMR spectroscopy? 2
- (c) The observed chemical shift of a proton is 324 Hz from TMS and the operating frequency of the machine is 60 MHz. Calculate the chemical shift in ppm. 2

19. (a) Describe the probable value of the chemical shift, relative intensities and splitting pattern taking TMS as the standard reference. Also sketch the PMR spectra of the compound
- $$\text{CH}_3-\text{CH}_2-\text{CHO} \quad 4$$
- (b) Explain with an example the effect of H-bonding on the magnitude of chemical shift. 2
20. (a) Why does glucose show mutarotation? 2
- (b) How will you distinguish between glucose and sucrose (cane sugar)? 2
- (c) Describe the conversion of aldopentose to aldohexose. 2
21. (a) Fructose gives positive Tollens' test. Explain. 2
- (b) How will you convert D(+)-glucose to D(-)-fructose and vice-versa? 2+2=4
22. (a) How are dyes classified on the basis of chemical constitution? 2
- (b) Give a method of preparation and application of methyl orange. 4

23. (a) Discuss the modern theories of colour and chemical constitution. 3
- (b) Give a method of preparation of crystal violet. 3
24. (a) Discuss condensation polymerization with a suitable example. 4
- (b) Write a short note on 'phenol-formaldehyde resin'. 2
25. (a) What do you mean by number average molecular weight and weight average molecular weight? $1\frac{1}{2}+1\frac{1}{2}=3$
- (b) Write the steps involved in the mechanism of cationic addition polymerization. 3
