

B.Sc. Semester - 6 (CBCS) Examination

March/April-2023 (NEW COURSE)

Organic Chemistry and Spectroscopy (Core (New))

Time: 2:30 Hours

Marks: 70

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

Q.1(A) Answer the following question. (04)

Explain:- In five membered heterocyclic compounds, electrophile(E^+) attack at C_2 -position not C_3 -position.

Q.1(B) Answer the following questions. (Any Two) (10)

1. Prove the following observation table for ring closing electro cyclic reaction of 1,3-butadiene and 1,3,5-hexatriene by FMO – theory

	Δ	Hv
4n	Conrotation	Disrotation
4n + 2	Disrotation	Conrotation

2. Discuss factors effecting on frequency of carbonyl group in IR – spectroscopy
3. Give the Hantzsch pyridine synthesis with full mechanism.

Q.2(A) Answer the following question. (04)

Deduce the structure from the following data

M.F :- $C_9H_{12}O$

I.R :- 3050, 2950, 1470, 1100, 835 cm^{-1}

Signal	δ_{ppm}	No of proton	Multiplicity
(a)	1.18	3 H	Triplet
(b)	2.72	2 H	Quartet
(c)	3.81	3 H	Singlet
(d)	7.13	2 H	Doublet
(e)	6.86	2 H	Doublet

Q.2(B) Answer the following questions. (Any Two) (10)

1. Give the synthesis of citral
2. Give the Oxidation and Reduction reactions for naphthalene.
3. Give the synthesis of RDX and musk Ambrette (one method for each)

Q.3(A) Answer the following question. (04)

Give the Interconversion for D (-) Arabinose to D (+) Mannnose

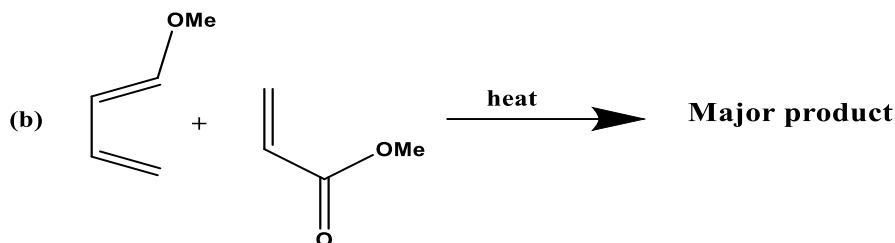
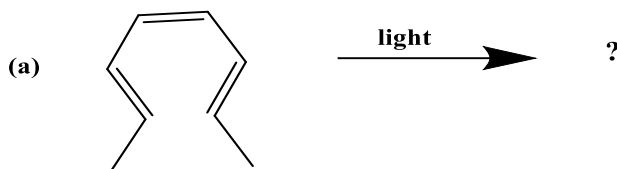
Q.3(B) Answer the following questions. (Any Two) (10)

1. Give the synthesis and use of (i) Baygon (ii) carbendazole
2. Explain:- Absorption and intensity shift in U.V. spectroscopy with solvent effect.
3. Determine the size of ring in glucose by methylation method

Q.4(A) Answer the following question.

(04)

Complete the following reaction?



Q.4(B) Answer the following questions. (Any Two)

(10)

1. Deduce the structure from following data
M.Wt = 114 gm/mol, C=52.63 %, H = 5.30 %
IR:- 2965, 1825, 1785, 1465 cm^{-1}
NMR : (i) 2H – quintet, $\delta_{\text{ppm}} = 1.93$
(ii) 4H – triplet, $\delta_{\text{ppm}} = 2.21$
2. Give the synthesis of α -terpineol
3. Explain the fundamental modes in IR spectroscopy.

Q.5(A) Answer the following question.

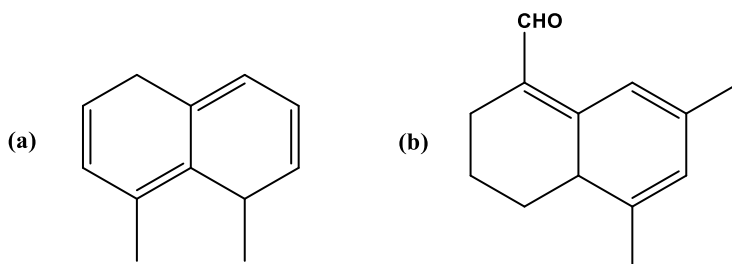
(04)

Give the synthesis of biphenyl and naphthalene. (two methods for each)

Q.5(B) Answer the following questions. (Any Two)

(10)

1. Calculate λ_{max} for following given structures



2. Prove the cyclic structure of D (+) glucose by methylation-oxidation method.
3. An organic compound has M.F : $\text{C}_{10}\text{H}_{18}$ gives only one nmr signal at 1.24 δ_{ppm} as singlet and 2165 cm^{-1} frequency in IR, then write the structural formula and IUPAC name of compound.

Spectroscopic data

U.V.:- Base Value of Homo annular diene: 253nm,
Hetero annular diene: 215nm,
Enone with Z=OH : 195nm,
Enone with Z=H : 210nm,

IR:

Alkyne C-H str	3350-3300 cm^{-1}
Aromatic C-H str	3100-3000 cm^{-1}
Alkane C-H str	3000-2900 cm^{-1}
Nitrile C-N str	2300-2200 cm^{-1}
Alkyne $\text{C}\equiv\text{C}$ str	2190-2100 cm^{-1}
Carbonyl C=O str	1800-1680 cm^{-1}
Alkane C-H bend	1470-1420 cm^{-1}
Ester C-O-C str	1300-1000 cm^{-1}

NMR:

Alkane C-H	0.9 – 2.5 δ_{ppm}
Alkyne C-H	2.5 – 3.9 δ_{ppm}
Alkene C-H	5.5 – 6.5 δ_{ppm}
Aromatic C-H	6.5 – 8.5 δ_{ppm}
Phenolic O-H	4.4 – 8.8 δ_{ppm}
Aldehydic C-H	8.0 – 10.0 δ_{ppm}
Acidic O-H	10.0 – 12.5 δ_{ppm}