

B.Sc. Semester - 5 (CBCS) Examination

December - 2020 (Old Course)

ORGANIC CHEMISTRY AND SPECTROSCOPY(CORE)

Time: 1:30 Hours

Marks: 42

Instructions:

1. Figures to the right indicate marks.
 2. There are five questions in the question paper.
 3. Answer any three of the following questions.
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Q. 1 (A) Answer the following question.**(4)**

- (1) Give reactions which prove the presence of 5-OH and a carbonyl group as CHO in glucose.

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

- (1) Discuss determination of pyranose ring structure of glucose using Periodic acid method.
- (2) Give Kiliani step up and Ruff's degradation reactions for monosaccharides.
- (3) Discuss reaction of glucose and fructose with phenylhydrazine.

Q. 2 (A) Answer the following question.**(4)**

- (1) What is point group? Construct multiplication table for a molecule with C_{2h} point group.

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

- (1) What is symmetry element? Explain axis of symmetry in detail.
- (2) Taking the example of PCl_5 Prove that $C_n^n = E$ always, but $S_n^{2n} = E$ when n is odd.
- (3) Compare various planes of symmetry.

Q. 3 (A) Answer the following question.**(4)**

- (1) Give synthesis and uses of saccharine.

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

- (1) Discuss briefly classification of drugs based on various methods with examples.
- (2) Discuss relative basicity of pyrrole, pyridine and aliphatic amines.
- (3) Discuss electrophilic substitution reactions of Furan.

Q. 4 (A) Answer the following questions.**(4)**

- (1) Assign IR frequencies for different vibrations in $C_6H_5-CH_2-NH_2$ from the following 3100-3040, 1600, 1500, 1460, 3250, 3500 cm^{-1}
- (2) Explain overtone in IR.

Q. 4 (B) Answer the following questions. (Any two)**(10)**

- (1) Discuss applications of IR Spectroscopy for H bond identification.
- (2) Discuss Curtius rearrangement with mechanism.
- (3) a. Explain finger print region in IR spectroscopy.
b. Organic compound with formula C_7H_5OCl gives following IR bands. Deduce the constitution of the molecule. 3065, 1774 and 1730 cm^{-1} .

Q. 5 (A) Answer the following question.**(4)**

(1) Explain Von Braun method for the degradation of cyclic amines

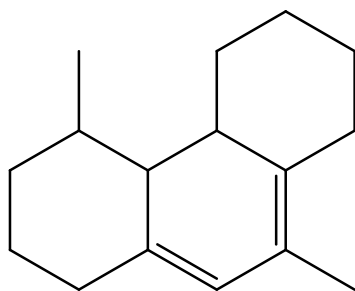
Q. 5 (B) Answer the following questions. (Any two)**(10)**

(1) Prove that Nicotine is β -Pyridyl- α -Pyrrolidine alkaloid.

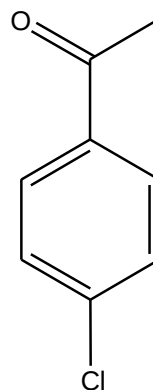
(2) Discuss types of electronic transitions involved in UV spectroscopy.

(3) Calculate $\lambda_{\max}$ for the following

(a)



(b)

**Spectral data**

3100-3040 C-H str
1600 C=C str in Aromatic
1500 C=C str in Aromatic
1460 C=C str in Aromatic
3250-3500 N-H str

1675 C=O str
3300 cm-1 C-H str

3065 C-H str
1774 C=O str (raised due to Cl)
1730 cm-1. Fermi resonance band (C=O str and overtone of 872 cm-1 band)

 $\lambda_{\max}$ (in nm)

Parent Ring residue R-CO-X	246
heteroannular diene	215
Homoannular diene	253
R=Cl subst at o-position	0
Cl subst at m-position	0
Cl subst at p-position	10
Extra conjugated double bond	30
Cis form if extra conjugated double bond	39
Exocyclic double bond	5
Exocyclic double bond	5
Ring residue	5
Substitution Ring residue	5
Substitution CH ₃	5