SHIVAJI COLLEGE, UNIVERSITY OF DELHI

DEPARTMENT OF _____CHEMISTRY_____

INTERNAL TEST (Academic Year 2023-24)

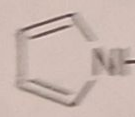
Name of the Course : BSc Programme with Physical Science
Semester : IV
Name of the Paper : Chemistry of carboxylic acid &their derivative Amines and Heterocycles
Faculty Name: Dr. Priti Kumari

Duration : 1 h **Maximum Marks: 8**
Date of Test : 22-04-2024

Q.1 Explain one method for the synthesis of Pyridine with mechanism. (2)

Q. 2 write the product: (0.5 x 4)

(a)  $\xrightarrow{NaNH_2 \text{ at } 100\ ^\circ C}$ P

(b)  $\xrightarrow{SO_3 \text{ in Pyridine}}$ P

(c)  $\xrightarrow{POCl_3,\ DMF}$ P

(d)  $\xrightarrow{H_2,\ Ni,\Delta}$ P

Q.3 (a) Explain why Pyridine is more basic than pyrrole? (1 x 4)

(b) Among all the three type of amine which is more basic?

(c) Explain one method to distinguish all the three type of Amine.

(d) Explain the electrophilic substitution reaction on thiophene with resonating structure.

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DEPARTMENT OF _____CHEMISTRY_____

INTERNAL TEST (Academic Year 2023-24)

Name of the Course : BSc Programme with Physical Science
Semester : IV

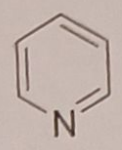
Name of the Paper : Chemistry of carboxylic acid &their derivative Amines and Heterocycles
Faculty Name: Dr. Priti Kumari

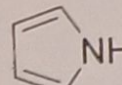
Duration : 1 h
Date of Test : 29-04-2024

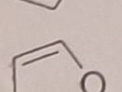
Maximum Marks: 8

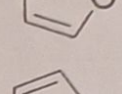
Q.1 Explain one method for the synthesis of Thiophene. (2)

Q. 2 write the product: **(0.5 x 4)**

(a)  $\xrightarrow{\text{Na in ethanol}}$ P

(b)  $\xrightarrow[\text{EtONa}]{CHCl_3}$ P

(c)  $\xrightarrow[CH_3COCl]{SnCl_4,}$ P

(d)  $\xrightarrow{H_2,\ Ni,\Delta}$ P

Q.3 (a) Among Pyridine and methylamine which is more basic, explain it.**(1 x 4)**

(b) What is carbylamine test and for what we use in laboratory.

(c) If Aniline is treated with $NaNO_2$ and HCl at ice bath what will be product. ?

(d) Explain the nucleophilic substitution reaction on Pyridine with resonating structure.

Priti Kumari

SHIVAJI COLLEGE, UNIVERSITY OF DELHI

DEPARTMENT OF CHEMISTRY

INTERNAL TEST (Academic Year 2023-24)

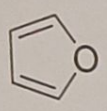
Name of the Course : BSc Programme with Physical Science
Semester : IV

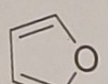
Name of the Paper : Chemistry of carboxylic acid & their derivative Amines and Heterocycles
Faculty Name: Dr. Priti Kumari

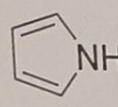
Duration : 1 h **Maximum Marks:** 8
Date of Test : 07-05-2024

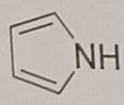
Q.1 Explain one method for the synthesis of Furan. **(2)**

Q. 2 write the product: **(0.5 x 4)**

(a)  $\xrightarrow{CO,\ HCl}$ P

(b)  $\xrightarrow[BF_3/Et_2O]{(CH_3CO)_2O,}$ P

(c)  $\xrightarrow{SO_2Cl_2}$ P

(d)  $\xrightarrow[CH_3COOH]{HNO_3}$ P

Q.3 Explain Nucleophilic substitution reaction on Pyridine? **(2)**

Q.4. Among pyridine and methylamine, which is more basic explain? **(2)**

SHIVAJI COLLEGE, UNIVERSITY OF DELHI

DEPARTMENT OF CHEMISTRY

INTERNAL TEST (Academic Year 2023-24)

Name of the Course : BSc Programme with Physical Science — Semester: VI

Name of the Paper : Organometallic, Bioinorganic chemistry, polynuclear hydrocarbon and UV, IR spectroscopy

Faculty Name : Dr. Priti Kumari , Mr. Deepesh Singh

Duration: 1 h — Maximum Marks: **10**

Date of Test: 18/04/2024

Q 1: Using 18 electron rule as a guide Determine the no. of Metal-metal bonds in **(1x 2)**

(a) $Mn_2(CO)_2$

(b) $Fe_3(CO)_{12}$

Q 2: Predict the no. of CO ligand in **(1x2)**

(a) $Co_4(CO)x$

(b) $Fe_2(CO)x$

Q. 3: What is the heptacity of ligand in Ferrocene **(0.5)**

Draw the structure of

(i) Ferrocene in eclipsed and staggered form **(0.5)**

(ii) Zeise' salt **(1)**

Q 4: Why CO is referred to as a π acid ligand **(1)**

Q 5: Draw the structure of following **(1x 3)**

(a) $Fe_2(CO)_9$ (b) $Co_2(CO)_8$ (c)$Fe_3(CO)_{12}$

Priti Kumari

Faculty Signature:

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INTERNAL TEST (Academic Year 2023-24)

Name of the Course : BSc Programme with Physical Science

Semester: VI

Name of the Paper : Organometallic, Bioinorganic chemistry, polynuclear hydrocarbon and UV, IR spectroscopy

Faculty Name : Dr. Priti Kumari , Mr. Deepesh Singh

Duration: 1 h

Maximum Marks: 10

Date of Test: 25/04/2024

Q 1: Explain why $Ni(CO)_4$ is a monomer but the analogous cobalt compound is dimer? (2)

Q 2: What do you mean by heptacity of ligands? Explain, Give example of ligands with the heptacity of 3, 4 and 5. (2)

Q 3: What is synergic effect explain using the molecular orbital diagram with CO ligand as an example? (2)

Q.4: Is Ferrocene aromatic? Explain with reason. Write down the electrophilic substitution reaction on ferrocene with example of alkylation and acylation. (2)

Q.5 Calculate the metal metal bond in $Co_4(CO)_{12}$ and draw the structure.(2)

Priti Kumari

SHIVAJI COLLEGE, UNIVERSITY OF DELHI

DEPARTMENT OF CHEMISTRY

INTERNAL TEST (Academic Year 2023-24)

Name of the Course : BSc Programme with Physical Science

Semester: VI

Name of the Paper : Organometallic, Bioinorganic chemistry, polynuclear hydrocarbon and UV, IR spectroscopy

Faculty Name : Dr. Priti Kumari , Mr. Deepesh Singh

Duration: 1 h

Maximum Marks: **10**

Date of Test: 29/04/2024

Q 1: Explain the difference in the bonding of CO from that of C_2H_4 in their metal complexes. **(2)**

Q2: Draw the structure of the following metal carbonyls **(0.5 x 4= 2)**

(a) $Ir_4(CO)_{12}$ (b) $Os_3(CO)_{12}$ (c) $Os_2(CO)_9$ (d) $Co_2(CO)_8$

Q 3: Name the first metal olefin complex isolated. Discuss its preparation and properties **(2)**

Q.4: Discuss the laboratory preparation of ferrocene and gives its reaction involving

(i) akylation (ii) lithylation (iii)Mannich condensation (iv) acetylation **(2)**

Q.5 What is EAN rule explain with example? **(2)**

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DEPARTMENT OF CHEMISTRY

INTERNAL TEST (Academic Year 2023-24)

Name of the Course : BSc Programme with Physical Science Semester: VI

Name of the Paper : Organometallic, Bioinorganic chemistry, polynuclear hydrocarbon and UV, IR spectroscopy

Faculty Name : Dr. Priti Kumari, Mr. Deepesh Singh

Duration: 1 h Maximum Marks: **10**

Date of Test: 07/05/2024

Q 1: How are $Os_2(CO)_9$, $Os_3(CO)_{12}$, $Fe_2(CO)_9$ and $Fe_3(CO)_{12}$ structurally represented ? **(2)**

Q2: Write short notes on **(2x2 =4)**

(a) Bonding in linear metal carbonyl

(b) EAN Rule

Q 3: What is Ferrocene? How it is prepared? Describe a few important properties of Ferrocene. How is bonding explained in Ferrocene? **(4)**