PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
MSc DEGREE EXAMINATION MAY 2019
(Second Semester)

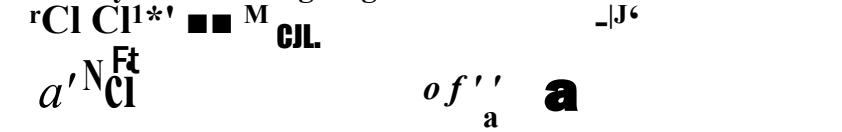
Branch-CHEMISTRY

INORGANIC CHEMISTRY - II

Time: Three Hours **Maximum: 75 Marks**

SECTION-A (10 Marks)
Answer ALL questions
ALL questions carry EQUAL marks (10 x 1 = 10)

1 **Identify the following Organometallic reaction.**



(i) Oxidative addition **(ii) Nucleophilic Reaction**
(iii) Elimination Reaction **(iv) Reduction**

9 **What is the other name of dative bond?**
(i) Ionic bond **(ii) Covalent bond**
(iii) Hydrogen bond **(iv) Co-ordinate covalent bond**

3 **Identify the process in which ethylene is converted into acetaldehyde in presence of 'Pd' catalyst.**
(i) wacker process **(ii) oxo process**
(iii) Reppe process **(iv) Reduction process**

4 **Which catalyst is widely used in the Olefin hydrogenation process?**
(i) Wilkinson's Catalyst **(ii) Ziegler-Natta Catalyst**
(iii) $[Rh(CO)_2I_2]'$ **(iv) $Co_2(CO)g$**

5 **Identify the correct formula for Bent-Sandwich structure.**
(i) $[(\eta^5\text{-}C_5H_5)_2M]$ **(ii) $[(\eta^5\text{-}C_5H_5)_2ML_\chi]$**
(iii) $[(\eta^5\text{-}C_5H_5)ML_5]$ **(iv) $K\eta^5\text{-}C_6H_5)_2M]$**

6 **What is the oxidation state of iron in ferrocene?**
(i) 0 **(ii) +1**
(iii) + 2 **(iv) +3**

7 **Identify the type of $C_2B_4H_8$ carboranes.**
(i) Closo **(ii) nido**
(iii) arachno **(iv) hypo**

8 **Find out the number of doubly bridging CO ligand in $Fe_2(CO)$<>.**
(i) 1 **(ii) 2**
(iii) 3 **(iv) 4**

9 **What is the difference in ionic radius between high spin Fe(II) and low spin Fe(II)?**
(i) 75pm **(ii) 92pm**
(iii) 85pm **(iv) 17pm**

10 **Which shows more intense absorption among the following?**
(i) Plastocyanin **(ii) Azurin**
(iii) Cyanin **(iv) $[Cu(NH_3)_6]^{2+}$**

Cont...

SECTION - B (25 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks (5 x 5 = 25)

1 1 a Illustrate the mechanism of insertion of CO to M-C bonds.

OR

b (i) State 18 electron rule. (2)

(ii) Analyse the stability of the following metal complexes using 18 electron rule: $V(CO)_6$, $Fe(CO)_5$, $Mn_2(CO)_{10}$ (3)

12 a Sketch the mechanism of hydrosilylation reaction.

OR

b Illustrate the mechanism of hydro carbonylation of olefins.

,13 a Explain briefly the structure of arene half sandwich complexes.

OR

b Discuss briefly the structure of cyclopentadienyl complexes.

14 a Explain briefly the photo substitution reaction with suitable example.

OR

b Discuss briefly the preparation and structure of 1,2-dicarba-closododecaborane.

15 a Discuss the role of Zn(II) in carboxypeptidase.

OR

b Determine the host-guest complexes of Clathrand.

SECTION -C (40 Marks!

Answer ALL questions

ALL questions carry EQUAL Marks (5 x 8 = 40)

16 a Classify the metal-carbon bond types and explain them.

OR

b Construct a synthesis of carbene complexes and explain their properties.

17 a Construct the catalytic loop for olefin hydrogenation.

OR

b Enumerate the Zeigler-Natta polymerisation of olefins.

18a Design the synthesis of allyl complexes and discuss their structure.

OR

b Design the synthesis of arene complexes and explain their structure.

19 a Criticize the application of IR spectroscopy in the study of metal carbonyls.

OR

b Compare photoreduction and photooxidation reactions with suitable examples.

20 a Evaluate the role ofVaska's iridium complexes.

OR

b Justify the Perutz cooperative mechanism of hemoglobin.

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