EASTERN UNIVERSITY, SRI LANKA

EXTERNAL DEGREE IN SCIENCE

THIRD EXAMINATION SECOND SEMESTER- 2008/2009

EXTCH 305 ORGANOMETALLIC CHEMISTRY AND NON-AQUEOUS SOLVENTS
(Proper and Repeat)

Answer all questions **Time allowed: ONE Hour**

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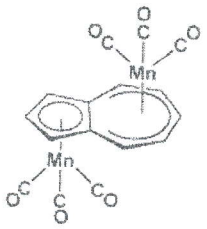
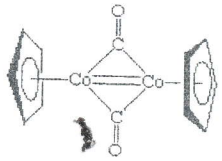
1. a) Indicate the ligands in the following organometallic compounds are monohapto, dihapto, trihapto, pentahapto or bridging ligands and indicate the number of electrons donated from each ligand to the metal center.

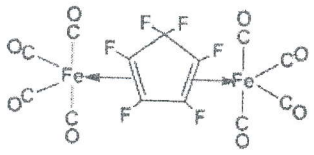
i)



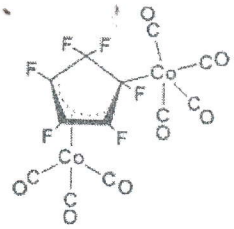
ii)



iii)



iv)



(20 marks)

b) Indicate whether the following organometallic compounds obey EAN rule or not (Atomic number: Cr = 24; Mn = 25; Fe = 26; Ni=28)

i) $Ni(CO)_4$ ii) $(h^5\text{-}C_5H_5)_2\ Cr$ iii) $Fe(CO)_5$ iv) $[Mn(CO)_6]^+$

(20 marks)

c) Explain the difference in the CO stretching frequencies of 2020, 1887 and 1786 cm^{-1} observed in IR spectra of $[Ni(CO)_4]$, $[Co(CO)_4]^-$ and $[Fe(CO)_4]^{2-}$ compounds respectively.

(30 marks)

Contd...

d) Draw the structure and explain the nature of bonding in $K[PtCl_3(C_2H_4)]$

(30 marks)

2. a) Explain why the CO stretching frequencies of $[Fe(NO)_2CO_2]$ is less than that of $[Fe(CO)_4]$.

(20 marks)

b) Explain the following observations.

i) $Na^+ (H_2NCONH)^-$ cannot be prepared in aqueous medium but can be prepared in liquid ammonia.

ii) Acetic acid acts as a differentiating solvent for strong acids.

c) Give an example to explain the following reactions: (30 marks)

i. Solvolysis reaction of CH_3COCl

ii. Ammonaion reaction of BF_3

iii. Precipitation reaction of $Ba(NO_3)_2$ and AgCl in liquid NH_3

(30 marks)

d) Explain the remarkable properties of dissolving Na metal in liquid ammonia.

(20 marks)

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