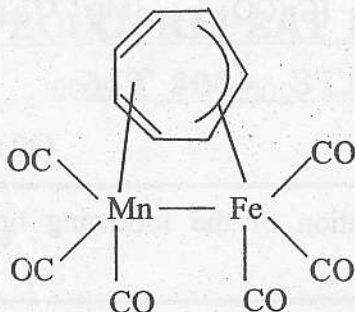


EASTERN UNIVERSITY SRI LANKA
THIRD EXAMINATION IN SCIENCE (SECOND SEMESTER)
SPECIAL REPEAT 2004/2005
CH 305 ORGANOMETALLIC CHEMISTRY & NON-AQUEOUS SOLVENTS

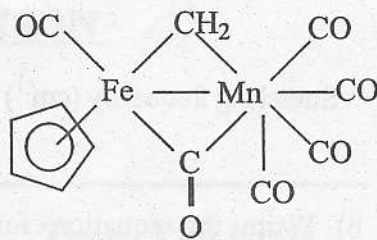
TIME: 01 HOUR

1) a) Indicate the monohapto, dihapto, trihapto, tetrahapto, pentahapto and bridging ligands present in the following compounds

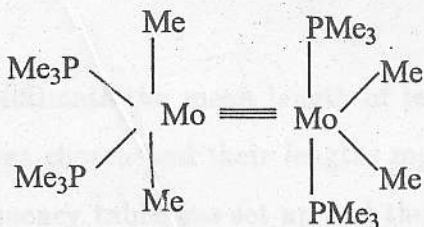
i)



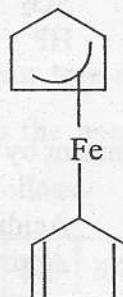
ii)



iii)



iv)



(30 marks)

b) What is meant by "Effective Atomic Number" (EAN) rule?

(20 marks)

c) Show that the organometallic compounds given below obey the EAN rule.



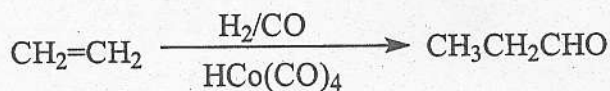
(25 marks)

(Atomic number Fe-26, Mn-25, V-23)



P.T.O

d) Give the mechanism and draw the structure of all the species involved in the catalytic cycle for the hydroformylation reaction shown below



(25 marks)

2) a) How would you account for the difference in the CO stretching frequencies observed in the IR spectra of the following chemical species.

	$[\text{V(CO)}_6]^-$	$[\text{Cr(CO)}_6]$	$[\text{Mn(CO)}_6]^+$
Stretching frequency (cm^{-1})	1860	2000	2090

(30 marks)

b) Write the equation for the self-ionization of the following non-aqueous solvents

- i) liq. NH_3
- ii) HCN
- iii) SO_2
- iv) HF

(20 marks)

c) What is meant by the following terms?

- i) Acidic solvents
- ii) Aprotic solvents

Briefly discuss each with one example.

(20 marks)

d) Give one reaction each to show that HF behaves as an acid and also as a base.

(15 marks)

e) Explain the following statement

“Acetic acid act as a differentiating solvent for strong acids”

(15 marks)