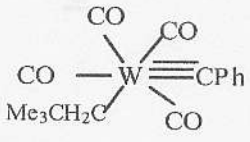
EASTERN UNIVERSITY, SRI LANKA
THIRD EXAMINATION IN SCIENCE – 2003/2004
SECOND SEMESTER
(June/July-2005)
CH 305 ORGANOMETALLIC AND NON-AQUEOUS SOLVENTS

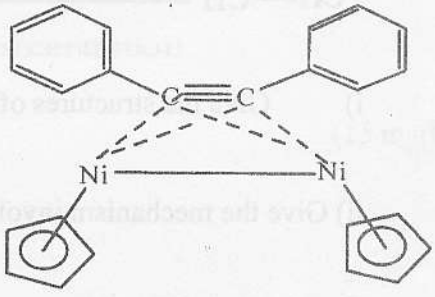
Answer all questions **Time: One hour**

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

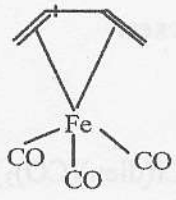
i)



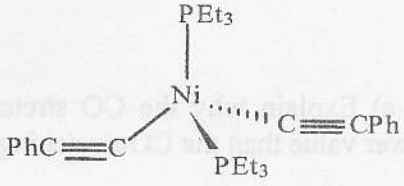
i)



ii)

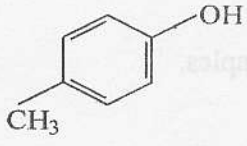


iv)

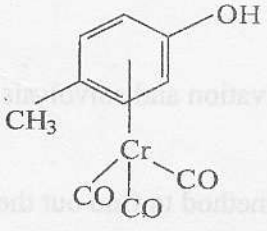


(20 marks)

b) pKa value of **A** is 11.25 where as that of **B** is 7.35. Explain this observation.



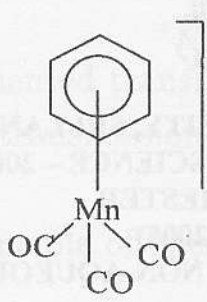
A

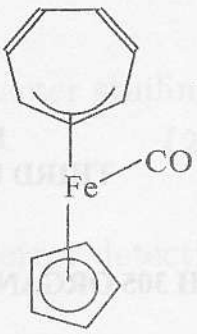


B

(15 marks)

c) Give the systematic names of the following organometallic compounds.

i) 

ii) 

(15 marks)

d)

$$CH{\equiv}CH \xrightarrow{H_2Fe(CO)_4} \underline{A} \xrightarrow{HCo(CO)_3} \underline{B}$$

i) Give the structures of **A** and **B**.

(10 marks)

ii) Give the mechanism involved in the conversion of **A** to **B**.

(20 marks)

e) Explain the bonding in transition metal π-allyl complexes.

(20 marks)

2) a) Explain why the CO stretching frequency in $[Cr(dien)(CO)_3]$ complex shows a lower value than the CO stretching frequency in $Cr(CO)_6$.

(20 marks)

b) Using ^1H NMR spectroscopy, explain how you would differentiate σ-bonded and π-bonded cyclopentadienyl ligand.

(15 marks)

c) Explain solvation and solvolysis with examples.

(15 marks)

d) Propose a method to find out the pK value of HCl in water.

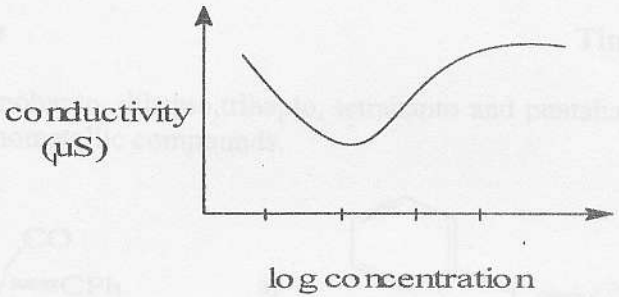
(15 marks)

e) What type of chemical bonding involved in the following solvation process?

i) Dissolution of naphthalene in benzene.
ii) Dissolution of AgCl in NH_3.
iii) Dissolution of $BaCl_2$ in water
iv) Dissolution of sugar molecules in water.

(20 marks)

f) Variation of the conductivity of a solution containing Na in liq. NH_3 is given below. Explain the graph.



(15 marks)