Registration No : | | | | | | | | | | |

Total Number of Page : 01 **M.Sc.**

16MCYC201

2nd Semester Back Examination 2017-18
INORGANIC CHEMISTRY-II
BRANCH : M.Sc.(AC)
Time : 3 Hours
Max Marks : 70
Q.CODE : C605

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.
Answer all parts of a question at a place.

Q1 **Answer the following questions :** **(2 x 10)**

a) What is the ground state term symbol of Ti^{+2} ion?
b) Define organometallic compounds and the term "metal" in it.
c) Why $Mn(CO)_5$ is unstable and it dimerizes to $Mn_2(CO)_{10}$?
d) Write the nomenclature of $B(CH_3)_3$ and $Fe(\eta^5\text{-}C_5H_5)_2$.
e) What is 18-electron rule?
f) Calculate the number of valence electrons of the following complexes. $RhCl(PPh_3)_3$ and $[PtCl_4]^{2-}$.
g) Give examples of (i) Diamagnetic, (ii) Paramagnetic, (iii) Ferromagnetic and (iv) Antiforromagnetic compounds.
h) Calculate spin only magnetic moment (μ_s) of Ti^{2+}.
i) Which among the following d^n (n = 1, 2, 3, 4, 5, 6) complexes in the weak octahedral field are (i) expected and (ii) not expected to have orbital contribution in the observed magnetic moment?
j) Plot the magnetic susceptibility vs temperature for paramagnetic, ferromagnetic and antiferromagnetic materials.

Q2 **a)** Discuss the term antiferromagnetism and its types? **(5)**
b) Calculate the magnetic moment (μ_{L+S}) of V^{+3} ion. **(5)**

Q3 **a)** Distinguish between singlet and triplet carbene. **(5)**
b) Draw the bonding features of the Fischer carbene complex. **(5)**

Q4 Discuss the bonding features of Zeise's salt, $K[PtCl_3(C_2H_4)]$ **(10)**

Write short notes on :

Q5 **a)** Fischer-Tropsch synthesis **(5)**
b) Agostic alkyls **(5)**

Q6 **a)** Discuss the steps and draw the mechanism of hydrogenation reaction of olefin. **(5)**
b) Draw the reaction mechanism of ethylene (C_2H_4) polymerization reaction on $TiCl_4/AlEt_3$ **(5)**

Q7 Discuss ^1H NMR spectral feature of the fluxional molecule $(\eta^1\text{-}C_5H_5)_2Ti(\eta^5\text{-}C_5H_5)_2$ on temperature variation. **(10)**

Q8 Diagrammatically show the different bonding modes of (i) buta-1,3-diene and (ii) η^3–allyl with transition metal. **(5 + 5)**