ACTIVITY CODE: 1903026021

B.Sc. 6th Semester (Honours) Examinations, October 2020

Subject: Chemistry

Course ID: 61411 **Course Code: UG/CHEM/601/C-13 (T13)**

Course Title: Inorganic Chemistry V

Full Marks: 12 **Time: 45 Minutes**

The figures in the margin indicate full marks
Candidates are required to give their answers in their own words as far as possible

1. Answer *any three* questions: 1×3 = 3

(a) Name a second-generation anti-cancer drug.
(b) State a biological use of manganese.
(c) Calculate the value x and y in the complex $[Fe(\eta^5\text{-}Cp)(CO)_x(NO)_y]$.
(d) Give an example of oxygen bonded carbonyl.
(e) Give an example of oxidative-addition reaction.
(f) How do $\Delta S^{\neq}$ values help in predicting the mechanism of a reaction?
(g) Arrange the ligands in order of their trans effect: Cl^-, Br^-, NH_3 and H_2O.
(h) Write the formula of the catalyst that is used for hydroformylation reaction.
(i) What is Wilkinson's catalyst?

2. Answer *any one* question: 5×1 = 5

(a) Write down the structure of the active site of haemoglobin. Explain the role of globin chain in haemoglobin oxygenation. 3+2 = 5
(b) (i) $Ni(CO)_4$ is common whereas $Pt(CO)_4$ is not so common – comment.
(ii) Square planar complexes prefer an associative mode of activation – explain. 2+3 = 5
(c) (i) Which of the following will have higher ν_{NO} stretching frequency: $[Fe(NO)(H_2O)_5]^{2+}$ and $[Fe(NO)(CN)_5]^2$?
(ii) Design two-step syntheses of cis- and trans-$[PtCl_2(NO_2)(NH_3)]^-$ from $[PtCl_4]^{2-}$. 2+3 = 5

3. Answer *any one* question: 4 × 1 = 4

(a) (i) Discuss the structure and bonding of Zeise's salt.
(ii) Give an example of electron transfer protein. 3+1 = 4
(b) (i)Name the diseases due to mercury and copper toxicity.
(ii) The position of ν_{CO} values can be used to discriminate terminal and bridging carbonyl complexes – Justify. 2+2 = 4
(c) (i) Explain the trans effect by π-bonding theory.
(ii) Nitration of ferrocene is not possible but acetylation of ferrocene is possible – comment. 2+2 = 4