

B.Sc. 6th Semester (Honours) Examination, 2021

CHEMISTRY

(Inorganic Chemistry V)

Paper : UG/CHEM/601/C-13

Course ID: 61411

Time: 1 Hour 15 Minutes

Full Marks: 25

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

1. Answer *any five* questions: 5×1=5

- (a) Complete: $(\text{Cp})_2\text{Fe} \xrightarrow{\text{HCHO, Me}_2\text{NH (Acetic acid)}} ?$
- (b) Which among Cl^- and I^- has a higher $^n\text{P}_t$ value?
- (c) How many double bonds are observed in porphyrin ligand?
- (d) Calculate the value of “n” in $(\eta^5\text{-Cp})\text{Co}(\text{CO})_n$.
- (e) Name a potent anticancer platinum complex. Write its formula.
- (f) Name a catalyst used in hydroformylation reaction.
- (g) Draw the active site structure of carbonic anhydrase B.
- (h) What is spectator ligand?

2. Answer *any two* questions: 2×5=10

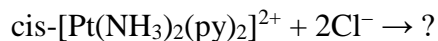
- (a) (i) Arrange the following in order of increasing C-O stretching frequency: $[\text{Ni}(\text{CO})_4]$, $[\text{Cr}(\text{CO})_6]$, $[\text{V}(\text{CO})_6]^-$.
- (ii) Show that each iron in $\text{Fe}_3(\text{CO})_{12}$ conforms to the 18-e rule.. 3+2=5
- (b) (i) Platinum compounds are generally used as targets for trial anti-cancer compounds but not palladium or nickel – comment.
- (ii) How can you prove the free rotations of cyclopentadiene rings with respect to one another? 3+2=5

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(c) (i) What is Ziegler Natta Catalyst?

(ii) Draw the catalytic cycle of hydroformylation reaction? 2+3=5

(d) (i) Predict the products of the following reaction and justify your answer:



(ii) A stable complex may be labile – comment. 3+2=5

3. Answer *any one* question: 1×10=10

(a) (i) Discuss the structure and bonding in Zeise's salt.

(ii) Define associative (A), dissociative (D) and interchange (I) paths in inorganic reaction mechanism.

(iii) Discuss briefly the structural features of hemocyanin and its role in oxygen transport.

3+3+4=10

(b) (i) What happens in PS-I and PS-II in photosynthesis.

(ii) What is trans effect? Explain the trans effect of the halogens on the basis of polarization theory.

(iii) Explain the catalytic cycle for the hydrogenation of terminal alkenes by Wilkinson's catalyst. 3+3+4=10
