Seat No. _____

HJ-003-1014004

B. Sc. (Sem.-IV) (CBCS)

(W.E.F. 2016) Examination

April - 2023

C-401 : Chemistry Theory

(Old Course)

Faculty Code : 003

Subject Code : 1014004

Time : $2\frac{1}{2}$ Hours / Total Marks : **70**

Instructions :

(1) This question paper contains five questions.

(2) All are compulsory.

(3) Figures to the right indicate full marks.

1 (a) Answer the following questions : **4**

(i) Define : Organometallic compounds.

(ii) Ferrocene has _____ type structure.

(iii) Give structure of porphyrin.

(iv) In Hemoglobin iron has ____ oxidation state.

(b) Answer any one : **2**

(1) Give preparation method of organoaluminium compounds.

(2) How lead poisoning is cured ?

(c) Answer any one : **3**

(1) Short note on "Zeise salt".

(2) Explain myoglobin.

(d) Answer any one : **5**

(1) Explain the structure of trimethyl aluminium (dimer).

(2) Describe the structure and role of chlorophyll.

2 (a) Answer the following questions : **4**

(1) Explain : Clathrates.

(2) Complete the reaction :

$$Kr + F_2 \xrightarrow{\gamma\text{-radiation}} \_\_\_\_\_.$$

(3) Give the structure of malonic ester.

(4) Give name : $CH_3–CO–CH_2–CH_2–COOH$

(b) Answer any one : **2**

(1) Provide the electronic configuration of Helium and Radon.

(2) Define : Tautomer.

(c) Answer any one : **3**

(1) What are the applications of Krypton and Xenon ?

(2) Provide keto and end structure of ethyl aceto acetate.

(d) Answer any one : **5**

(1) Explain uses of noble gases.

(2) Explain different reactions of ethyl acetoacetate.

3 (a) Answer the following questions : **4**

(1) Give IUPAC name of acetone.

(2) Write structure of acetyl chloride.

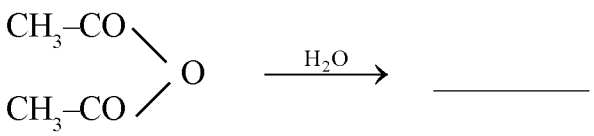
(3) Write structure of benzaldehyde.

(4) Write structure of benzamide.

(b) Answer any one : **2**

(1) Give oxidation reaction of primary and secondary alcohols.

(2) Complete the reaction and give name of products



(c) Answer any one : **3**

(1) Explain condensation reaction of acetaldehyde with ammonia derivatives.

(2) Explain HVZ reaction.

(d) Answer any one : **5**

(1) Explain addition reaction of aldehyde and ketone with alcohol.

(2) Explain hydrolysis of esters by $B_{AC}2$ mechanism.

4 (a) Answer the following questions : **4**

(1) Give structure of Wittig reagent.

(2) Give structure of Benzillic acid.

(3) Define Molar volume.

(4) Give the name of method to determine surface tension.

(b) Answer any one : **2**

(1) Explain principle of Hofmann degradation reaction.

(2) Write short note on Parachor.

(c) Answer any one : **3**

(1) Give mechanism of Perkin reaction.

(2) Parachor of ethane and propane are 110.5 and 150.8 respectively. Calculate parachor of Hexane.

(d) Answer any one : **5**

(1) Explain Aldol condensation reaction with principle, mechanism and application.

(2) Define refractive index and give details on Abbe refractomer.

5 (a) Answer the following questions : **4**

(1) Define : Open system.

(2) Define Specific heat with equation.

(3) Define : Extensive properties.

(4) Give name of the process in which pressure remains constant.

(b) Answer any one : **2**

(1) State the first law of thermodynamics obtain the mathematical expression.

(2) Derive the relationship :

$$\Delta H = \Delta U + \Delta nRT$$

(c) Answer any one : **3**

(1) Write note on applications and limitations of thermodynamics.

(2) Distinguish between Reversible and Irreversible process.

(d) Answer any one : **5**

(1) Explain C_p and C_v; state their relation.

(2) Describe different types of thermodynamics processes.
