Seat No. _____

HJ-003-2014004

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

(W.E.F. 2019) Examination

April - 2023

C-401 : Chemistry

(Chemistry Theory) (New Course)

Faculty Code : 003

Subject Code : 2014004

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

Instructions :

(1) All 5 questions are compulsory.

(2) All 5 questions carry 14 marks each.

1 (a) Answer all the four questions in short : **4**

(1) Give an example for Sandwich type organometallic compound.

(2) Grignard reagent is an organo _____ compound.

(3) What are the macro nutrients ? Give examples.

(4) 'In hemoglobin, globin is a protein'. True or False.

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

(1) Give preparation of trimethyl aluminium and draw its structure.

(2) Explain role of chlorophyll in photosynthesis.

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

(1) Give the structure of eclipsed and staggered forms of ferrocene and discuss.

(2) Discuss the structure of porphyrin ring system.

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

(1) Discuss structure and bonding in Zeise salt.

(2) What are the toxic metals ? Discuss toxic effect of any two.

2 (a) Answer all four questions in short : **4**

(1) Noble gas occur naturally only in _____

(2) What are the clathrates of Noble gases ?

(3) Define active methylene compounds with examples.

(4) Give the structure of ethyl aceto acetate.

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

(1) Give the names and symbol of all six noble gases.

(2) Define tautomerism by example of aceto acetic ester.

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

(1) Discuss structure of XeF_2 and its properties.

(2) Give synthesis of Ethyl aceto acetate with mechanism.

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

(1) Write a note on applications of Noble gases.

(2) Prepare following compounds by using AAE as starting material :

(1) Crotonic acid

(2) Adipic Acid

(3) Acetonyl acetone

3 (a) Answer all four questions in short : **4**

(1) Give structure for diphenylketone.

(2) An oxime is obtained by reaction of aldehyde or ketone with _____.

(3) In common nomenclature system pentanoic acid is called _____.

(4) "Presence of an electron withdrawing group on the α-carbon of carboxylic acid will decrease the acidity." True or False.

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

(1) Give reduction of aldehyde and kenone by different reducing agents.

(2) Arrange Formic acid, Acetic acid and Propionic acid in increasing order of their acidity.

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

(1) Discuss addition reaction of $NaHSO_3$ with aldehyde and ketone.

(2) Explain why double value for molecular weight for acetic acid is found, when one determines it practically.

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

(1) Explain condensation reaction of aldehydes and ketones with ammonia derivatives.

(2) Discuss preparations of ester, amide, acid chloride and acid anhydride from carboxylic acid.

4 (a) Answer all four questions in short : **4**

(1) Hoffmann degradation is a reaction between _____ and sodium hypobromide.

(2) Give structure of Benzilic acid.

(3) The apparatus used to determine surface tension by drop weight method is called _____.

(4) Carbon dioxide has _____ structure and its dipole moment is _____.

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

(1) Give conversion : cyclohexanone $\rightarrow$ 6-Amino caproic acid

(2) Calculate parachor value for 

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

(1) Give principle, reaction and application for Wittig reaction.

(2) Discuss optical activity with example of lactic acid and tartaric acid.

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

(1) Write a note on Aldol condensation.

(2) Describe in detail determination of refractive index.

5 (a) Answer all four questions in short : **4**

(1) As per the thermodynamics

The Universe = _____ + _____

(2) Define Adiabatic Process.

(3) Define Isobaric Process.

(4) Define calorie with SI Unit.

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

(1) State the first law of thermodynamics – any two statements.

(2) State and explain Zeroth law of thermodynamics.

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

(1) Give differences between reversible and irreversible process.

(2) Describe open, close and isolated system,

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

(1) Explain Kirchoff's law.

(2) Discuss C_p and C_v, explain their relationship.