UG-C-2310 **BCHE–31X**

U.G. DEGREE EXAMINATION – DECEMBER, 2023.

Chemistry

Third Year

INORGANIC CHEMISTRY

Time : 3 hours Maximum marks : 70

PART A — ($3 \times 3 = 9$ marks)

Answer any THREE questions out of Five questions in 100 words

All questions carry equal marks.

1. Draw the rutile structure and discuss the coordinates.

2. Write EAN rule.

3. What are Isobars?

4. Explain buffer action.

5. Write 18 electron rule.

PART B — ($3 \times 7 = 21$ marks)

Answer any THREE questions out of Five questions in 200 words.

All questions carry equal marks.

6. Explain about superconductors and semiconductors.

7. Explain about optical and geometrical isomerism of octahedral complexes.

8. Explain about composition of nucleus and nuclear forces.

9. Explain preparation, properties and applications of solvent liquid ammonia.

10. Explain preparation and applications of organo lithium compounds.

PART C — ($4 \times 10 = 40$ marks)

Answer any FOUR questions out of Seven questions in 500 words.

All questions carry equal marks.

11. Derive Bragg's equation and write its applications.

12. Explain about valence bond theory and crystal field theory.

13. Explain about nuclear fission and fusion reactions and their applications.

14. Explain Arrhenius, Brosted-Lowry theory of acid base reactions.

15. Explain mechanisms and application of Wilkinson's and Ziegler-Natta Catalysts.

16. Derive Henderson equation and write its applications.

17. Explain in detail about nuclear hazards and waste disposal methods.

———————

UG-C-2311 **BCHE-32X**

U.G. DEGREE EXAMINATION – DECEMBER, 2023.

Chemistry

Third Year

ORGANIC CHEMISTRY

Time : 3 hours Maximum marks : 70

PART A — ($3 \times 3 = 9$ marks)

Answer any THREE questions out of Five questions in 100 words

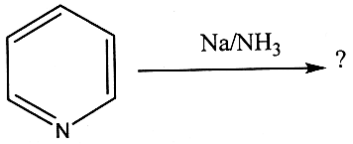
All questions carry equal marks

1. Pyridine is more basic compared to pyrrole. Explain.

2. What are stereoisomers?

3. Define the term stereo selectivity and specificity.

4. Complete the following reaction:



5. Define the term shielding and deshielding effects in NMR.

PART B — ($3 \times 7 = 21$ marks)

Answer any THREE questions out of Five questions in 200 words

All questions carry equal marks

6. Give Skraup synthesis for quinoline.

7. Draw the Fischer projections for all possible stereoisomers of $C_6H_5CH(NH_2)COOH$.

8. Discuss the relative stability of conformers on the basis of:

   (a) steric effect

   (b) dipole-dipole interaction and

   (c) Hydrogen bonding

9. Write a note on Knoevenagel condensations.

10. Define term chemical shift and describe the factors which influence it.

PART C — (4 × 10 = 40 marks)

Answer any FOUR questions out of Seven questions in 500 words

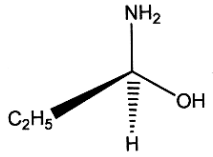
All questions carry equal marks.

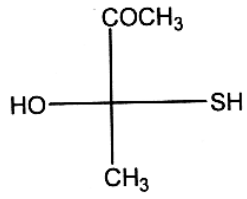
11. Explain the following:

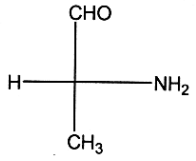
(a) Retro synthetic analysis.

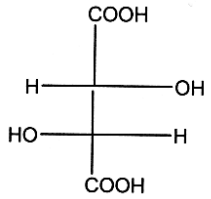
(b) Primary, secondary and tertiary structure of proteins.

12. Assign the R and S configuration to the following:

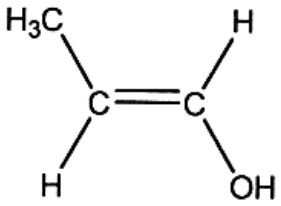
(a) 

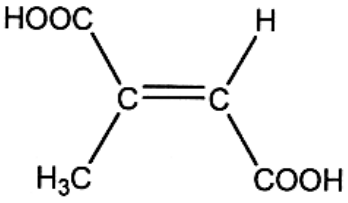
(b) 

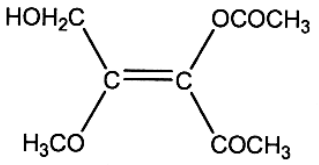
(c) 

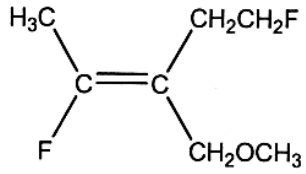
(d) 

13. Designate E'&'Z' to the following compounds:

(a) 

(b) 

(c) 

(d) 

14. Explain the following with mechanism:

    (a) Wagner-Meerwein rearrangement

    (b) Schmidt rearrangement

15. Write the applications of:

    (a) UV and IR spectroscopy

    (b) NMR in identification of pure ethanol from impure one.

16. Discuss the following:

(a) aromaticity in furan, pyrrole, thiophene.

(b) functional group interconversion.

17. An organic compound with molecular mass 120 absorbs in UV at 268nm ε_{max} 480. In IR absorption bands at

(a) 3067-2907 cm^{-1}

(b) 1608 cm^{-1} (m) and 1473 cm^{-1} (m).

The NMR spectrum shows absorptions as

(i) 6.79 $\delta(s)$ and

(ii) 2.26 $\delta(s)$.

Find the structure of compound.

———————