May-2025

BLDE (DEEMED TO BE UNIVERSITY)

Master of Science in Chemistry

[Time: 3 Hours] [Max. Marks: 80]

III SEMESTER

PAPER - I (Inorganic Chemistry III)

QP CODE: 7731

Your answer should be specific to the questions asked.
Write Question No. in left side of margin.

Long Question (Any – 3) **10 X 3= 30 Marks**

1. Set up MO energy level diagram of $[FeF_6]^{3-}$ involving metal ligand sigma bond. Explain its salient features.
2. Write a note on transferritin.
3. Discuss the structure and bonding in butadienes.
4. Discuss the structural features of hemerythrin (Hr) & hemocyanine (HC) & their role in oxygen transport.

Short Essays: (Any – 7) **5 X 7 = 35 Marks**

5. Give the mechanism of Monsanto synthesis of acetic acid.
6. Explain how the transition metal complexes interacts with DNA.
7. Explain the general features of blue copper proteins and their functions.
8. What is TS diagram? Explain by taking d6 octahedral both high spin and low spin complexes.
9. Write a short note on metal deficiency.
10. Write a note on Essential and trace elements.
11. Describe the structure and bonding of $[PtCl_3(\eta^2\text{-}C_2H_4)]$.
12. Discuss the electronic spectra of $[Ni(H_2O)_6]^{2+}$, $[Co(H_2O)_6]^{2+}$, $[FeCl_4]^{2-}$ & $[CoCl_4]^{2-}$.

Short Answers: (Any – 5) **3 X 5 = 15 Marks**

13. Predict d-d adsorption spectrum of $[Ti(H_2O)_6]^{3+}$.
14. What are Tanabe-Sugano(TS) diagram?
15. Write any two importance of Fe^{2+} ion in living organism.
16. Explain any two important metal deficiency of Mn^{2+} ion in living organism.
17. Define ferritin.
18. Explain any two functions of cytochromes.

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III SEMESTER

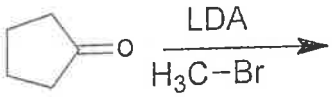
PAPER - II (Organic Chemistry III)

QP CODE: 7732

Your answer should be specific to the questions asked.
Write Question No. in left side of margin.

Long Question (Any – 3) **10 X 3= 30 Marks**

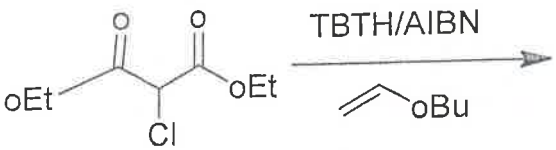
1. Assign the product with appropriate mechanism



2. Explain NorrishType-II by taking an example.
3. Discus Hoffman and Woodard rules for elctrocyclic (4n+2) pi electron system.
4. Give the synthesis and mode of action of the following
   I. Phenyl butazone.
   II. Chloroquin.

Short Essays: (Any – 7) **5 X 7 = 35 Marks**

5. Formulate the mechanism and application of Diels-Alder reaction.
6. Write a note on frontier orbitals of allyl systems.
7. Explain Paterno–Buchi reaction along with mechanism.
8. Discuss Photo-rearrangement of unsaturated ketones and cyclohexadienones.
9. Write a note on drug receptor interaction.
10. Give the synthesis and SAR study of sulphanilamide, sulphadiazine.
11. Discuss the mechanism for the 1,3-Dithiane with suitable example.
12. Assign the product with appropriate mechanism



Short Answers: (Any – 5) **3 X 5 = 15 Marks**

13. Give any two applications of Trimethylsilyl iodide.
14. Define the terms Intersystem crossing and phosphorescence.
15. Explain lumoketone rearrangement with suitable example.
16. Define the terms agonist and anti-agonist.
17. State cope rearrangement with suitable example.
18. What is meant by chemotherapy?

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III SEMESTER

PAPER - III (Physical Chemistry III)

QP CODE: 7733

Your answer should be specific to the questions asked.
Write Question No. in left side of margin.

Long Question (Any – 3) **10 X 3= 30 Marks**

1. Write the assumption of Langmuir adsorption isotherm and derive its equation.
2. Explain Hall effect in semiconductors.
3. Give an account on Bohr theory of hydrogen atom.
4. Explain Wolkenstein theory in catalysis.

Short Essays: (Any – 7) **5 X 7 = 35 Marks**

5. Write a brief note on applications magnetic susceptibility.
6. Discuss the Langevin's theory.
7. Write a note on Zeeman effect and Stark effect.
8. Discuss on space quantization.
9. Explain briefly the four modes of enzyme catalysis.
10. Explain kinetics of decomposition of hydrogen peroxide.
11. Discuss the BET isotherm for the determination of surface area and derive the equation.
12. Explain factors affecting the critical Micellar concentration of surfactants.

Short Answers: (Any – 5) **3 X 5 = 15 Marks**

13. Differentiate spark spectra and arc spectra.
14. What are normal and anomalous Zeeman effects?
15. Give brief note on Fermi level in semi-conductors.
16. Discuss intermediate stages in homogenous Catalysis.
17. Define adsorption indicators. Give an examples.
18. What is enzyme catalyzed reactions?