PG-AN-138 MCHEN–11

P.G. DEGREE EXAMINATION –
JULY, 2022.

Chemistry

(From CY – 2020 onwards)

First Year

ORGANIC CHEMISTRY — I

Time : 3 hours Maximum marks : 70

PART A — ($5 \times 5 = 25$ marks)

Answer any FIVE questions out of Eight questions in 300 words.

All questions carry equal marks

1. Explain hydroboration reaction with mechanism.

2. Write a short note on non-classical carbocation.

3. Explain Enantiomers and Diastereomers with example.

4. Briefly explain about the concept of Reterosynthesis and its salient features.

5. Is Cyclooctatetraene and cyclopropenyl cation aromatic? Justify your answer.

6. Explain Cope elimination with example.

7. Briefly explain about diazocoupling reaction.

8. Explain the industrial importance of Wilkinson's catalyst.

PART B — ($3 \times 15 = 45$ marks)

Answer any THREE questions out of Five questions in 1000 words.

All questions carry equal marks.

9. (a) Discuss the stereochemical factors influencing addition reactions.

   (b) Explain Benzoin and Knoevenagel reactions.

10. (a) Explain Sandmeyer and Chichibabin reaction with mechanism.

    (b) Discuss about Hammett-Taft equation.

11. (a) Explain the molecular chirality in biphenyls.

    (b) Explain Fisher projection structures and D,L configuration with examples.

12. (a) Explain oxidizing action of PCC and DMP with suitable examples.

(b) Write a brief note on organolithium reagent.

13. (a) Explain how aromatic compounds are identified using NMR technique

(b) Explain antiaromatic systems with examples

———————

PG–AN-139 MCHEN–12

P.G. DEGREE EXAMINATION —
JULY 2022.

Chemistry

(From CY – 2020 Onwards)

First Year

INORGANIC CHEMISTRY – I

Time : 3 hours Maximum marks : 70

PART A — (5 × 5 = 25 marks)

Answer any FIVE questions out of Eight Questions in 300 words.

All questions carry equal marks.

1. Explain the symmetry of molecular orbitals.

2. Calculate the CFSE and spin only magnetic moment for the following configurations of octahedral complex: d5 (in weak as well as strong field ligand)

3. Briefly write about asymmetric synthesis.

4. Explain complementary reaction.

5. List out the important characteristics of actinides.

6. Explain Born-Lande equation for calculation of lattice energy.

7. Give examples of oxidation-reduction reactions occurring through the transfer of atom or groups of atoms.

8. Explain the magnetic properties of lanthanide complexes.

PART B — $(3 \times 15 = 45$ marks)

Answer any THREE questions out of Five Questions in 1000 words.

All questions carry equal marks.

9. (a) What do you understand by partial ionic character of covalent bond? How is it calculated?

   (b) Draw and explain the structure of $XeOF_4$

10. (a) Discuss the salient features of ligand field theory.

    (b) Write a note of Jahn-Teller distortion.

11. (a) Explain linkage isomerism and the factors affecting it.

(b) Discuss with an example about Geometrical isomerism in octahedral complexes.

12. (a) Discuss the outer sphere mechanism of electron transfer reactions.

(b) Explain thermodynamic stability of coordination complexes.

13. Discuss the factors influencing the formation of lanthanide complexes.

———————

PG-AN-140 MCHEN13

P.G. DEGREE EXAMINATION – JULY, 2022.

Chemistry

(From CY – 2020 onwards)

First Year

PHYSICAL CHEMISTRY – I

Time : 3 hours Maximum marks : 70

PART A — (5 × 5 = 25 marks)

Answer any FIVE questions out of Eight questions in 300 words.

All questions catty equal marks.

1. Explain the thermodynamics of Liquid-Liquid solutions.

2. Given that ψ and φ are two non-orthogonal but normalized Eigen functions of an operator, find the normalization constant of an Eigen function that is a combination of the two.

3. Discuss the rate law and how temperature influences reaction rate.

4. State and explain the terms triple point and metastable triple point.

5. What is activity coefficient? Explain.

6. Write note on fugacity.

7. What is the effect of pressure on the transition temperature of Rhomic Sulphur?

8. Briefly explain activated complex theory.

PART B — (3 × 15 = 45 marks)

Answer any THREE questions out of Five questions in 1000 words.

All questions carry equal marks.

9. (a) Derive Gibbs-Duhem equation.

   (b) Explain Entropy.

10. (a) Briefly explain about photoelectric effect.

    (b) Discuss on Debroglie's hypothesis.

11. (a) Write the salient features of collision theory.

    (b) Explain Kinetic isotope effect.

12. Explain three component system and method of plotting with suitable example.

13. Derive Butler-Volmer equation and discuss its importance.

———————

PG-AN-141 MCHEN-14

P.G. DEGREE EXAMINATION – JULY, 2022.

Chemistry

[From CY–2020 onwards]

First Year

ANALYTICAL AND ENVIRONMENTAL CHEMISTRY

Time : 3 hours Maximum marks : 70

PART A — (5 × 5 = 25 marks)

Answer any FIVE questions out of Eight Questions in 300 words

All questions carry equal marks

1. Compare ^{1}H NMR and ^{13}C NMR techniques.

2. What is the IR frequency for ammonia and water molecules? Is it affected by Coordination? Explain

3. Explain the principle underlying Mass spectrometry.

4. Explain Cyclic Voltammetry.

5. What is Acid rain? Discuss the causes and effects.

6. What are the effects of nuclear radiations and how do we minimize it?

7. How is intramolecular hydrogen bonding detected in IR? Explain with example.

8. Explain $\sigma \rightarrow \sigma^*$ and $\pi \rightarrow \pi^*$ electron excitations.

PART B — ($3 \times 15 = 45$ marks)

Answer any THREE questions out of Five Questions in 1000 words.

All questions carry equal marks.

9. Discuss the principle and instrumentation of proton NMR spectroscopy.

10. (a) Discuss about monochromators used in IR spectroscopy.

    (b) Write short notes on Fermi resonance

11. (a) Explain Woodward-Fieser rule.

    (b) Write short note on metastable ion and isotopic ion.

12. (a) Explain different types of electrodes with example.

(b) List the applications of DTA.

13. Discuss elaborately on Water pollution, its control and treatment methods.

———————

PG-AN-142 MCHEN–15

P.G. DEGREE EXAMINATION – JULY, 2022.

Chemistry

(From CY – 2020 Onwards)

First Year

CHEMISTRY OF BIOMOLECULES AND GREEN CHEMISTRY

Time : 3 hours Maximum marks : 70

PART A — (5 × 5 = 25 marks)

Answer any FIVE questions out of Eight questions in 300 words.

All questions carry equal marks.

1. Explain N- terminal analysis.

2. Write the structure, occurrence and deficiency due to Vitamin A.

3. List out the applications of antibiotics

4. Write about biosynthesis of Nicotine.

5. State the importance of Phase transfer catalysts.

6. How is the structure of α-Carotene determined?

7. List the principles of Green Chemistry.

8. Discuss the application of Chloromycetin and Streptomycin.

PART B — ($3 \times 15 = 45$ marks)

Answer any THREE questions out of Five Questions in 1000 words.

All questions carry equal marks.

9. (a) Discuss the structure of DNA.

   (b) What are Co-enzymes? Write a note on enzyme action.

10. (a) Explain the preparation and properties of Glucose.

    (b) Explain the importance of harmones giving suitable examples.

11. (a) Write a note on Synthetic Gasoline.

    (b) What are inorganic pesticides. Explain with any two examples.

12. Discuss the synthesis and stereochemistry of Cholesterol.

13. (a) List out the applications of Green Chemistry.

(b) Briefly explain microwave and ultrasound assisted Green synthesis.

———————

PG-AN-143 MCHEN-16

P.G. DEGREE EXAMINATION — JULY 2022.

Chemistry

(From CY – 2020 onwards)

First Year

POLYMER CHEMISTRY

Time : 3 hours Maximum marks : 70

PART A — ($5 \times 5 = 25$ marks)

Answer any FIVE questions out of Eight Questions in 300 words.

All questions carry equal marks.

1. Explain cross linked polymer with an example.

2. Write short notes on tacticity of polymers with examples.

3. What are crystalline polymer? Explain its morphology.

4. What is Number Average Molecular weight?

5. Give a brief account on silicone polymers.

6. How molecular weight of polymer is measured using end group analysis?

7. What are electroluminescent polymers? Give example.

8. What is step growth polymerization? Explain with example.

PART B — $(3 \times 15 = 45$ marks)

Answer any THREE questions out of Five Questions in 1000 words.

All questions carry equal marks.

9. (a) Differentiate thermoplastic and thermosetting polymers.

   (b) Discuss about emulsion and bulk polymerization technique.

10. (a) Explain Ziegler Natta polymerization and its significance.

    (b) Write briefly about stereoisomerism in 1,2 disubstituted ethylene.

11. (a) Discuss the effect of entropy and heat of fusion on crystalline melting point.

    (b) Explain Glass transition temperature and factors influencing it.

12. How do you test and analyze polymers by

    (a) Thermal analysis

    (b) XRD

    (c) Spectroscopic method

13. Give a detailed account on

    (a) Fire retardant polymers

    (b) Bio polymers

    (c) Polymer nanocomposites

———————