PG-CN–1026 MCHEN-11

P.G. DEGREE EXAMINATION — FEBRUARY 2023.

Chemistry

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 Chugaev reaction.

2. What is Wagner-Meerwin rearrangement? Explain.

3. Discuss the conditions for optical activity.

4. What is Jones reagent? Where is it used?

5. Discuss the aromaticity in heterocyclic compounds

6. Write briefly about elimination reactions

7. What are synthons and target molecules?

8. Illustrate the aromaticity of fullerenes.

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) Explain 1,2 and 1,4 additions with example

   (b) Write in detail about the Hofmann degradation.

10. Discuss about aromatic nucleophilic substitutions with examples.

11. Enumerate the conformations of Cyclohexane and Decalin systems

12. (a) Explain the reduction reaction using Ni based catalysts and using Wilkinson's catalyst.

(b) Write in detail about the synthetic applications of Grignard reagent in various industries.

13. Discuss the aromaticity in benzenoid and non-benzenoid systems with examples.

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PG-CN–1027 MCHEN-12

P.G. DEGREE EXAMINATION — FEBRUARY 2023.

Chemistry

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. List out any five important properties of ionic compounds.

2. Write a short note on spectrochemical series.

3. Explain about Crown ethers.

4. Give one example of an electron transfer reaction which occurs through inner sphere mechanism and also involves transfer of atoms or group.

5. Explain Lanthanide contraction.

6. Using MOT compare the bond energy, bond length of CN and CN^- species.

7. What is trans effect?

8. Enumerate the oxidation states of lanthanides.

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) Using VSEPR theory, draw the shape of PCl_5 and BrF_5

   (b) Explain Born-Haber Cycle

10. (a) Which of the following complexes have large crystal field splitting of d-orbitals in each pair

   (i) $[Co(H_2O)_6]^{2+}$ or $[Co(H_2O)_6]^{3+}$

   (ii) $[Co(CN)_6]^{3-}$ or $[Co(NH_3)_6]^{3+}$

   (b) Write a note on Nephelauxetic effect.

11. (a) How do you determine absolute configuration by ORD?

    (b) Discuss any one method for resolving optically active complex.

12. Discuss the complementary and the non-complementary two electron transfer reactions giving suitable example.

13. Give a comparative account of coordination chemistry of lanthanides and actinides.

PG-CN–1028 MCHEN-13

P.G. DEGREE EXAMINATION — FEBRUARY 2023.

Chemistry

First Year

PHYSICAL 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 Fugacity.

2. Assume that a particle of mass m is confined to a cubic box and its energy is 101 $h^1/8ma^2$. What is the degeneracy of this level?

3. Write the important concepts of Lindemann's theory.

4. Define the terms Phase, Component and Degree of freedom.

5. What is meant by ionic activity Coefficient?

6. List out the applications of phase rule.

7. What is Butler-Volmer equation and state its importance?

8. Define order of the reaction with two examples.

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) How chemical potential varies with temperature and pressure?

   (b) Explain reversible and irreversible processes.

10. Derive the expression for the linear momentum operator of a particle moving in the x-direction.

11. (a) Explain Transition State theory.

    (b) Derive Bronsted-Bjerrum equation.

12. Explain the classification of phase transitions.

13. State and explain Debye-Huckel theory for strong electrolyte.

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PG-CN–1030 MCHEN-15

P.G. DEGREE EXAMINATION — FEBRUARY 2023.

Chemistry

First Year

CHEMISTRY OF BIO–MOLECULES AND GREEN 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. Write a short note on secondary structure of DNA.

2. Discuss the difference between Vitamins and harmones. What are reproductory harmones?

3. What are analgesics and antipyretics? What is the difference between them?

4. What is Progestrone? State its significance

5. Explain about the concept of atom economy.

6. Discuss the occurrence and deficiency disease caused by Vitamin D and E.

7. State and explain Isoprene Rule.

8. Write short note on Urea and Superphosphate.

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 peptides

   (b) How are proteins classified? Explain the nomenclature of proteins with three examples.

10. (a) How are Carbohydrates classified? Explain with example.

    (b) Write short note on protoglands.

11. (a) Explain in detail about the chemicals derived from petroleum extraction.

    (b) What are pesticides? How are they classified? Explain about DDT and Gammexane.

12. Discuss the occurrence, isolation and synthesis of Morphine.

13. (a) Explain the role of phase transfer catalysts in Green chemistry.

    (b) Write in detail the Green chemical synthesis of paracetamol.

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PG-CN-1031 MCHEN-16

P.G. DEGREE EXAMINATION — FEBRUARY 2023.

Chemistry

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. Write short notes on elastomers and resins

2. Give a brief account on 1,2 polymerisation in 1,3 butadiene

3. How are polymers tested using thermal analysis?

4. Explain polydispersity index.

5. What are polymer composites? Explain.

6. List out the importance of glass transition temperature?

7. State coordination polymerization? State its significance?

8. Write a note on speciality polymers.

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 about chain polymerization and step growth polymerization.

   (b) Give a brief account on solution and suspension polymerization.

10. (a) Explain stereoregularity in polymers

    (b) Write the stereoisomerism in 1,1 disubstituted ethylene

11. (a) Discuss the relation between Tg and Tm.

    (b) Explain the crystal structure of polymers.

12. (a) Explain about Average molecular weight.

(b) How the molecular weight of a polymer is measured by light scattering method?

13. (a) Discuss the importance of natural polymers

(b) Briefly explain Biomedical polymers and its uses.

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