

M.Sc. (Final) Examination, August/September 2008
 Directorate of Correspondence Course
APPLIED CHEMISTRY
 DCC AC 2.01 : Advanced Inorganic Chemistry

Time : 3 Hours

Max. Marks : 75

- Note :* 1) Answer any **TEN** questions from Part A, **TWO** questions from Part B and **THREE** questions from Part C.
 2) Figures to **right** indicate marks.

PART – A

(2×10=20)

1. What are the important postulates of Valence Bond Theory ?
2. Define crystal field stabilization energy.
3. What is the difference between high-spin and low-spin complexes ? Give one example each.
4. Define spin selection rule and orbital selection rule.
5. What is spectrochemical series ?
6. Distinguish between the terms paramagnetism and diamagnetism.
7. What is meant by inert and labile complexes ?
8. Write the structure of Ziese's salt.
9. What hapticities are possible for C_6H_6 ? Give one example each.
10. What is trans-effect ?
11. Define homogeneous and heterogenous catalysis.
12. What constitutes a heme protein ? Name three of them.
13. Distinguish the functions of haemoglobin and myoglobin.
14. What does an enzyme do ?
15. What is meant by in vitro and in vivo nitrogen fixation ?

P.T.O.

PART - B

16. a) What are the salient features of Valence Bond Theory ? (4+4=8)
 b) Second and third row transition elements form M - M bonded compounds more than the first row. Give reasons.
17. a) Describe the classification of organometallic compounds based on the nature of M - C bond. (4+4=8)
 b) Discuss the functions of chlorophyll.
18. a) What are metallocenes ? Discuss the bonding nature in ferrocene. (4+4=8)
 b) Write a note on the inner-sphere and outer-sphere electron transfer reactions.

PART - C

19. a) Discuss briefly M.O. treatment of σ bonding in octahedral complexes. (5+4+4=13)
 b) Write briefly on metal complexes as drugs.
 c) Specify the role of K and Na in biological systems.
20. a) Describe the mechanism of hydrogenation of olefins using Wilkinson's catalyst. (5+4+4=13)
 b) What are non-heme proteins ? Explain how they act as electron carriers.
 c) Write a note on orgeel diagrams.
21. a) Describe splitting of d-orbitals in octahedral and square planar complexes. (5+4+4=13)
 b) Discuss the bonding in metal carbonyl complexes.
 c) Give an account of stereochemistry and oxygenation of haemoglobin.
22. a) What is the mechanism involved in water-gas shift reaction ? (5+4+4=13)
 b) Write a note on PS I and PS II photosynthetic systems.
 c) Give an account of spin-spin and spin-orbit coupling effects.
23. a) What is the catalytic species involved in Ziegler-Natta polymerisation process ? What significant role does it play in the process ? (5+4+4=13)
 b) Discuss the nature of bonding in metal-alkene complexes.
 c) Write a note on the classification of cytochromes.

M.Sc. (Final Year) Applied Chemistry Examination, August/September 2008
 Directorate of Correspondence Course
 2.02 : BIO-ORGANIC AND MEDICINAL CHEMISTRY

Time : 3 Hours

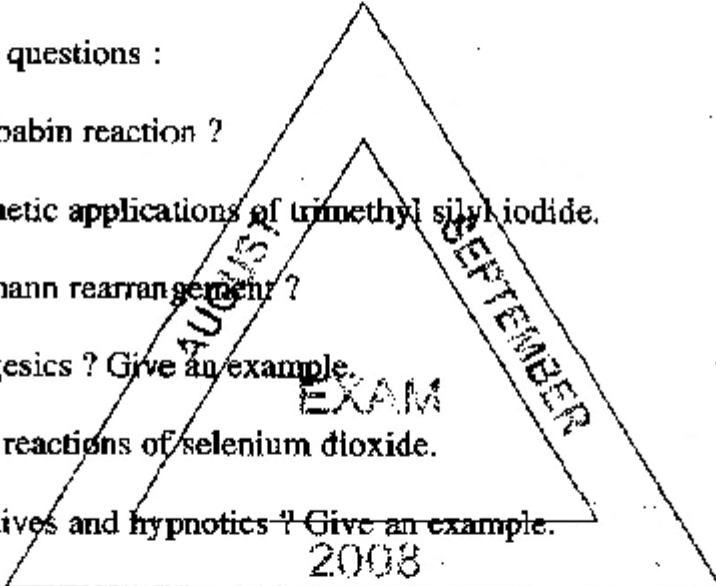
Max. Marks : 75

- Note :* 1) Answer any **TEN** questions from Part – A, **TWO** questions from Part – B and any **THREE** questions from Part C.
 2) Figures to the right indicate marks.

PART – A

Answer any **TEN** questions :

(2×10=20)

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1. What is chichibabin reaction ?
 2. Give two synthetic applications of trimethyl silyl iodide.
 3. What is Beckmann rearrangement ?
 4. What are analgesics ? Give an example.
 5. Write any two reactions of selenium dioxide.
 6. What are sedatives and hypnotics ? Give an example.
 7. Give two synthetic applications of Riemer-Tiemann reaction.
 8. Write the Woodward and Hoffmann rules for cycloaddition reactions.
 9. What are anticoagulants ?
 10. What is Curtius rearrangement ?
 11. Give one method of synthesis of sulfathiazole.
 12. What are pericyclic reactions ? How are they classified ?

P.T.O.



PART – B

13. a) Discuss the synthetic applications of tri-n-butyl tin hydride.
 b) Explain with mechanism the Pinacol-pinacolone rearrangement. (5+3)
14. a) Write a note on Sigmatropic Rearrangements.
 b) Explain the mechanism of Friedel-Craft's alkylation. (5+3)
15. a) Discuss the mechanism of action of barbiturates as sedative drugs.
 b) Explain one method of synthesis of pethidine. (5+3)

PART – C

16. a) Explain in detail the analysis of analgesics.
 b) Discuss the cycloaddition reactions of $4n$ and $4n+2$ systems.
 c) Explain the therapeutic uses and adverse effects of methadone and diclofenac. (5+4+4)
17. a) Discuss the synthetic applications of Gilman reagent.
 b) Describe the Birch reduction with mechanism.
 c) Explain the therapeutic uses and adverse effects of adrenergic drugs. (5+4+4)
18. a) Write a note on synthetic applications of Osmium tetroxide.
 b) Discuss the mechanism of benzilic acid rearrangement.
 c) Discuss the synthesis of chloroquine. (5+4+4)
19. a) Write a note on common methods of assay.
 b) Explain the mechanism of action of dicumarol as anticoagulants.
 c) Discuss the synthetic applications of 1, 3 – dithiane. (5+4+4)
20. a) Discuss the mechanism of Wagner-Meerwein rearrangement.
 b) Describe the therapeutic uses of ibuprofen and diazepam.
 c) Write the mechanism of Clemmenson reduction. (5+4+4)

M.Sc. Final Year Applied Chemistry Examination, August/September 2008
 Directorate of Correspondence Course
 AC 2. 03 : Polymer Chemistry and Technology

Time : 3 Hours

Max. Marks : 75

- Note : 1) Answer any TEN subdivisions from Part A, any TWO full questions from Part B and any THREE full questions from Part C.
 2) Marks are indicated at the right side.*

PART – A

Answer any TEN questions :

(10×2=20)

1. a) Define oligomer and monomer.
- b) State differences between thermoplastic and thermoset with suitable examples.
- c) What are inhibitors and initiators ?
- d) What is radical polymerization ?
- e) Make the differences between the syndiotactic and atactic polymers.
- f) Why does anionic polymerization results to a living polymer ?
- g) What is copolymerization ? And give an example.
- h) What is ASTM ?
- i) Name the different average molecular weights associated with polymers.
- j) What are the units of flexural, impact and tear resistance in SI units ?
- k) What is Zeigler-Natta catalyst ?
- l) Define the theta solvent and theta temperature with regard to polymer dissolution.
- m) What is condensation polymer ? Give an example.
- n) What are the fillers ? What is their effect on the mechanical strength of polymers ?
- o) Define melt flow index and write the significance of it in polymer processing.

PART – B

Answer any TWO questions :

(2×8=16)

2. a) Write a note on :
 - i) Plasticizers
 - ii) Biomedical polymers.
- b) Discuss briefly the viscosity of dilute polymer solutions.

(2+2+4=8)

P.T.O.



3. a) i) Explain how flame retardants can be imparted to PVC cable compounds.
 ii) Draw a schematic diagram of GPC. Discuss in detail the principle and working of GPC.
- b) Discuss the polydispersity. (2+4+2=8)
4. a) Discuss injection and blow moulding techniques.
 b) What is the emulsion polymerization ?
 c) Explain ultracentrifugation. (4+2+2=8)

PART - C

Answer any **THREE** questions : (3×13=39)

5. a) Give the concept and significance of poly dispersitivity and molecular weight distribution with regard to polymers.
 b) What are polymers ? Explain different types and degree of polymerization.
 c) Discuss the different types of polymer degradation. (4+5+4=13)
6. a) Explain the importance of polymer reactions.
 b) Discuss various factors in brief which affect the glass transition temperature of polymers. Describe any one method to experimentally determine T_g of a polymer. (7+6=13)
7. a) Write a note on fiber spinning techniques.
 b) What is Zeigler-Natta catalyst and how it is useful in polymerization process ? (7+6=13)
8. a) Give an account of Flory-Huggins theory of polymer solution.
 b) Write a note on :
 i) End group analysis
 ii) Calendaring technique
 iii) Theta solvent. (7+2+2+2=13)

M.Sc. (Final Year) Applied Chemistry Examination, August/September 2008
Directorate of Correspondence Course
Paper – 2.04 : SELECTED TOPICS IN INDUSTRIAL CHEMISTRY

Time : 3 Hours

Max. Marks : 75

PART – A

Answer any TEN of the following :

(10×2=20)

1. a) Define :
 - a) Quality control
 - b) Quality assurance
- b) What are the components of Standard Operation Procedure ?
- c) Write a note on validation.
- d) Write briefly on ISO-9000 family of standards.
- e) Write any two reduction process.
- f) Explain sulphonation process.
- g) State Ficks law of diffusion.
- h) What is GMP ?
- i) What are the pollution prevention techniques ?
- j) What is the importance of in-process control ?
- k) Convert 10 ft^3 to kg/m^3 .
- l) Explain the importance of unit operations in industry. Explain annealing process.

PART – B

Answer any FIVE of the following :

(5×4=20)

2. What are the advantages of ISO-9000 ?
3. What are the general requirements in quality management system ?
4. What are the responsibilities of quality control department ?

P.T.O.



5. Write short note on type of sampling.
6. Distinguish between unit operation and unit process.
7. Describe the cost aspects of quality decisions.
8. What are the different products produced from the crude oil ?

PART - C

Answer any **FIVE** of the following :

(7×5=35)

9. Explain the eight management system principles in QMS.
10. Write a note on hydrogenation of oils.
11. With a neat diagram explain the manufacture of cement.
12. With a neat diagram explain any one type of heat exchanger used in the industries.
13. What are the different types of distillation ?
14. With a neat diagram explain the production of nitrobenzene.
15. Explain the importance of quality management and standards used in the industries.

