PART – A (5 X 2 = 10 Marks)
Answer any **FIVE** Questions from the following

1. Name the raw materials of paints and detergents.

2. What is the significance of management?

3. Define ' Group Dynamics'.

4. List out the objectives of team building.

5. Mention the type of decision making.

6. Define ' Entrepreneurship'.

7. What is Budget?

PART – B (8 X 5 = 40 Marks)
Answer any **EIGHT** Questions from the following

8. What are the main objectives of quality control ?

9. Name the different levels of Management.

10. Differentiate Management and Administration.

11. Explain the method of planning in management.

12. Explain in brief the process of organization.

13. Define 'Leadership'. What are the basic leadership styles ?

14. Describe the process of decision making.

15. Write a note on Capital Budgeting.

16. Briefly describe the knowledge and skills required for the Entrepreneurship.

17. Define Management . What are the essentials of an effective management?

E - Mail Id for Uploading Answer Sheet
chemistrydepartment@lngovernmentcollege.com

LOGANATHA NARAYANASAMY GOVT. COLLEGE (Autonomous), PONNERI – 601 204
NOVEMBER 2020 SEMESTER EXAMINATIONS
III SEMESTER – M.Sc., CHEMISTRY

Paper Code : **17PEM3J**   Title of the Paper : **Advanced Coordination Chemistry**

DATE **: 23.12.2020 FN**   Time : **3 Hours**   Maximum Marks : **75 Marks**

PART – A (10 X 2 = 20 Marks)
Answer any **TEN** Questions from the following

1. What are Lanthanides shift reagents?
2. Write any four comparisons between Lanthanides and Actinides.
3. Write the selection rules in electronic transition of coordination complexes.
4. Calculate the magnetic moment of the complex ions $[Cr(H_2O)_6]^{2+}$ and $[Mn(H_2O)_6]^{2+}$
5. What is Anation reaction? Give example.
6. What are inert and labile complexes? Give examples.
7. What are Fluxional Organometallic molecules? Give examples.
8. Give examples of triple decker sandwich complexes.
9. What are electrochemical sensors?
10. Define spectral hole burning.
11. Why MnO_4^- ion is dark in color compare to $[Mn(H_2O)_6]^{2+}$ ion?
12. Write the Hydroformylation reaction.

PART – B (5 X 5 = 25 Marks)
Answer any **FIVE** Questions from the following

13. What is Lanthanide contraction? Discuss the consequences of lanthanide contraction.
14. Derive the ground state term symbol of d^{1-9} ions.
15. Explain the Jahn - teller effect with examples.
16. What is Trans effect? Explain the applications of Trans effect.
17. Write a note on Ziegler - Natta polymerization reaction.
18. What is thermogravimetric analysis? Explain thermogram of any two compounds.
19. Explain the Wacker process.

PART – C (3 X 10 = 30 Marks)
Answer any **THREE** Questions from the following

20. Discuss the method of extraction of Thorium and Uranium from its ore.
21. Explain the electronic spectra of $[Ti(H_2O)_6]^{3+}$ and $[V(H_2O)_6]^{3+}$ complex ions using orgel diagram.
22. What are electron transfer reactions? Explain the mechanism of outer electron transfer traction.
23. Discuss the aromatic character and chemical reaction of ferrocene.
24. Explain the instrumentation and applications of differential thermal analysis.

E - Mail Id for Uploading Answer Sheet
chemistrydepartment@lngovernmentcollege.com

LOGANATHA NARAYANASAMY GOVT. COLLEGE (Autonomous), PONNERI – 601 204
NOVEMBER 2020 SEMESTER EXAMINATIONS
III SEMESTER – M.Sc., CHEMISTRY

Paper Code : **17PEM3K**   Title of the Paper : **Heterocycles and Pericyclic Reactions**
DATE **: 26.12.2020 FN**   Time : **3 Hours**   Maximum Marks : **75 Marks**

PART – A (10 X 2 = 20 Marks)

Answer any **TEN** Questions from the following

1. What is called torsional strain?

2. Name any four non - aromatic heterocycles.

3. How can you convert furan into 2 - acetyl furan?

4. How is azirine prepared from vinylazide?

5. Pyridine is more basic than pyrrole. Comment.

6. Why is phosphole non - aromatic?

7. Give the structure of sydnone.

8. How can you bring out the conversion of maleic dialdehyde into pyridazine?

9. What are called pericyclic reactions?

10. Give an example for (4 + 2) Diels - Alder Cycloaddition reaction.

11. What is chromone? Give its structure.

12. Give an example for the [3, 3] sigmatropic rearrangement of 1, 5 - dienes.

PART – B (5 X 5 = 25 Marks)

Answer any **FIVE** Questions from the following

13. Explain the influence of electronic structure and anomeric effect on the structure of heterocycles.

14. Give the preparation of a diazirine and oxetane.

15. Write note on :

    (i)   Preparation of coumarin by Perkin Reaction.

    (ii) Synthesis of azepine from aromatic amine.

16. Give any two electrophilic substitution reactions of pyrazole.

17. What are electrocyclic reactions? Give an example. Give its stereochemical features.

18. Applying Huckel's rule, explain the aromaticity of furan.

19. How are heterocycles classified based on number of hetero atoms and cycles? Give example for each.

20. Discuss various attractive interactions occurring in heterocyclic compounds.

21. How can you obtain pyrrole from acetylene? Explain its chemical properties?

22. Give the preparation and properties of quinoline.

23. Give any one synthetic method of the following :

       (i) Imidazole

       (ii) Oxazole

       (iii) Quinoxaline

       (iv) Pyrazine.

24. How do molecular orbitals and their nodes influence pericyclic reactions? Explain with an example.

E - Mail Id for Uploading Answer Sheet
chemistrydepartment@lngovernmentcollege.com

LOGANATHA NARAYANASAMY GOVT. COLLEGE (Autonomous), PONNERI – 601 204
NOVEMBER 2020 SEMESTER EXAMINATIONS
III SEMESTER – M.Sc., CHEMISTRY

Paper Code : **17PEM3L**   Title of the Paper : **Advanced Photo and Electro Chemistry**
DATE **: 29.12.2020 FN**   Time : **3 Hours**   Maximum Marks : **75 Marks**

PART – A (10 X 2 = 20 Marks)

Answer any **TEN** Questions from the following

1. What is electrical double layer?
2. Write Lippmann capillary equation.
3. What is concentration polarization and over potential?
4. Write the Ilkovic equation. What is its significance?
5. What are cells? How are they classified?
6. What is differential aeration corrosion?
7. What are radiative and non radiative processes?
8. What are excimers and exciplexes?
9. Define Quantum yield.
10. What are quantum dots?
11. Write the advantages and disadvantages of DME.
12. Write the stern volmer equation.

PART – B (5 X 5 = 25 Marks)

Answer any **FIVE** Questions from the following

13. Explain the Gouychapman and stern models of electrical double layers.
14. Discuss the principle of cyclic voltametry.
15. Explain the working of Lead acid batteries.
16. Explain the various photophysical processes using Jablanski diagram.
17. Write a note on photogalvanic cells.
18. Explain photoassisted reactions of electrolysis of water.
19. Explain the working of Lithium-MnO_2 cell.

PART – C (3 X 10 = 30 Marks)

Answer any **THREE** Questions from the following

20. Explain Debye-Hukel theory of strong electrolyte and Derive Debye-Hukel-Onsager equation.
21. Discuss the principle, theory and application of polarography.
22. Explain the different types of corrosions.
23. Discuss the principle and working of Flash and Laser Photolysis.
24. Explain the experimental determinations of Quantum yield of photochemical reactions.

E - Mail Id for Uploading Answer Sheet
chemistrydepartment@lngovernmentcollege.com

PART – A (10 X 2 = 20 Marks)

Answer any **TEN** Questions from the following

1. What are called chromophores? Give examples.

2. Why is ethanol a good solvent for UV?

3. What are called overtones in IR spectroscopy?

4. The O - H stretching frequency is observed at higher frequency than the C - H stretching frequency. Why?

5. Why water is not a good solvent for IR spectroscopy?

6. What is a base peak in Mass spectroscopy?

7. State Nitrogen rule.

8. Define chemical shift.

9. Why C^{12}, O^{16}, O^{18}, S^{32} do not show NMR spectra?

10. Why is TMS used as a standard reference in NMR spectroscopy?

11. Which of the following molecules exhibit IR spectroscopy?

    a. NO   b. H_2 c. CO   d. O_2

12. What is C^{13} NMR spectroscopy?

PART – B (5 X 5 = 25 Marks)

Answer any **FIVE** Questions from the following

13. Define the terms :

    (a) Bathochromic shift

    (b) Hypsochromic shift

    (c) Hypochromic shift

    (d) Hyperchromic shift.

14. Write a note on Fermi resonance.

15. Discuss the various types of stretching and bending vibrations in IR spectroscopy.

16. Discuss the principle and applications of Mass spectrometry.

17. Write a note on Nuclear overhauser effect.

18. Explain the factors affecting chemical shift.

19. Determine the structure of the compound whose m/e values in the mass spectrum are 100, 85, 71, 57, 43 (base), 41, 29 and 27.

PART – C (3 X 10 = 30 Marks)

Answer any **THREE** Questions from the following

20. a) State Beer's law. (4)

    b) Explain and give examples of the types of electronic transitions which occur in organic compounds. (6)

21. a) How will you distinguish between intermolecular and intramolecular hydrogen bonding in IR spectroscopy? (6)

    b) Write a note on Vibrational coupling. (4)

22. Illustrate McLafferty rearrangement and Retro - Diels Alder fragmentation with examples.

23. a) Write a note on Spin - Spin coupling. (4)

    b) With examples explain the shielding and deshielding effects involved in NMR spectroscopy. (6)

24. A hydrocarbon containing 85.7% carbon and 14.3% Hydrogen is transparent above 210mµ in ultraviolet spectrum. In its IR, bands are formed at 3022 (m), 1676 (m) and at 965 cm^{-1} (s). Two signals appear in its NMR

        (i) 8.40τ doublet

        (ii) 4.45τ quartet in the integral area ratio as 3:1 respectively.

        Determine the structural formula of the compound.

E - Mail Id for Uploading Answer Sheet
chemistrydepartment@lngovernmentcollege.com

LOGANATHA NARAYANASAMY GOVT. COLLEGE (Autonomous), PONNERI – 601 204
NOVEMBER 2020 SEMESTER EXAMINATIONS
I SEMESTER – M.Sc., CHEMISTRY

Paper Code : **PEM1G**   Title of the Paper : **Organic Chemistry - I**
DATE **: 28.12.2020 FN**   Time : **3 Hours**   Maximum Marks : **75 Marks**

PART – A (10 X 2 = 20 Marks)

Answer any **TEN** Questions from the following

1. State Baldwin rules for ring closure.
2. State Hammond postulate.
3. Give mechanism of Curtius rearrangement.
4. Give the mechanism of Nebber rearrangement.
5. Explain Hammet and Taft equation.
6. Explain Keto - enol tautomerism.
7. Give an example of a reaction using Jonnes reagent.
8. Name the reagents for the following conversion :
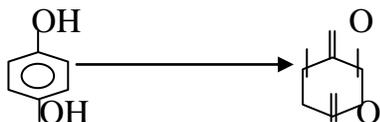
9. Define epimerization.
10. Give an example of compound containing chiral carbon.
11. Name two reactions involving formation of carbon electrophile.
12. Define mutarotation.

PART – B (5 X 5 = 25 Marks)

Answer any **FIVE** Questions from the following

13. Give the steps in determining the mechanism of the reaction. Explain any one method in detail.
14. Give the mechanism of pinacol – pinacolone rearrangement.
15. Give the mechanism of sulphonation reaction pertaining to aromatic electrophilic substitution reaction.
16. Write short notes on Wolf Kishner reduction.
17. Write short notes on asymmetric synthesis.
18. Explain the mechanism of Favorski rearrangement.
19. Write short notes on Birch reduction.

PART – C (3 X 10 = 30 Marks)

Answer any **THREE** Questions from the following

20. Draw the free energy profile for conversion of reactant into product and give the kinetic requirement of a reaction to occur.

21. Write short notes on :

       a) Hoffmann rearrangement   (6 Marks)

       b) Arndt - Eistert synthesis.   (4 Marks)

22. a) Explain SE2 mechanism of aromatic electrophillic substitution reaction.   (6 Marks)

   b) Write short notes on Stark enamine reaction.   (4 Marks)

23. a) Explain the mechanism of oxidation of glycol using lead tetra acetate.   (5 Marks)

   b) Write short notes on Willkinson's catalyst.   (5 Marks)

24. Write short notes on the following :

       a) Walden inversion   (3 Marks)

       b) Crams and Prelogs rule   (3 Marks)

       c) Memory effect.   (4 Marks)

E - Mail Id for Uploading Answer Sheet
chemistrydepartment@lngovernmentcollege.com

PART – A (10 X 2 = 20 Marks)
Answer any **TEN** Questions from the following

1. Explain the term Macroscopic and Microscopic properties?
2. Writ the equation of Maxwell - Boltzmann distribution law of velocities.
3. Note the Taft equation and mention its advantages.
4. Write a note on Flash Photolysis.
5. Mention the Solution of Schrodinger equation for H atom.
6. State Born - Oppenheimer approximation.
7. Write the Selection rule for Raman Spectra.
8. Calculate the fundamental modes of vibration for CH_4.
9. State Mutual exclusion principle.
10. What are parallel and perpendicular bands in FTIR?
11. Write any two differences between the reactions in a gas phase and in a solution.
12. What is meant by Zero point energy of Harmonic oscillator?

PART – B (5 X 5 = 25 Marks)
Answer any **FIVE** Questions from the following

13. Evaluate an electronic partition function (z_{el}) for a molecular State.
14. Discuss the stopped flow technique in determining kinetic Study of reactions in Solutions.
15. Explain the applications of Huckel molecular Orbital theory for butadiene.
16. Determination of representation of vibrational modes of H_2O.
17. Discuss the vibrational - rotational spectra of diatomic molecules and mention the selection rule.
18. Enumerate the heat capacities of monatomic Crystals by Einstein's model.
19. Explain the symmetry allowed transitions of Formaldehyde in electronic Spectra.

PART – C (3 X 10 = 30 Marks)
Answer any **THREE** Questions from the following

20. Derive a mathematical representation of Fermi - Dirac distribution Law for fermions.
21. Explain the effects of substitutents on the rate of the reaction using Hammett's equation. Mention its limitations.
22. Discuss indetail the applications of variation method to He atom.
23. Elucidate the symmetry of hybrid orbitals in BF_3.
24. Discuss the Quantum treatment on harmonic Oscillator.

E - Mail Id for Uploading Answer Sheet
chemistrydepartment@lngovernmentcollege.com

PART – A (10 X 2 = 20 Marks)
Answer any **TEN** Questions from the following

1. What is torsional strain in heterocyclic compounds? Give example.
2. Choose the aromatic heterocyclic compounds and justify their aromaticity.
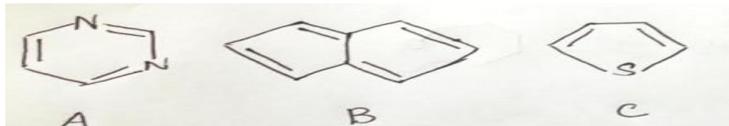
3. Write one preparation method each of pyrrole and oxaziridine.
4. Predict the product.
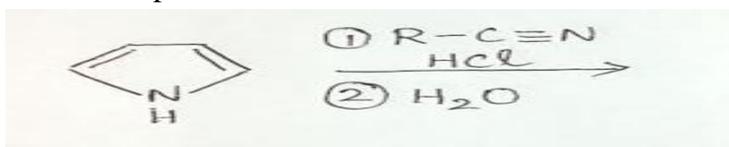
5. Mention any two methods of preparation of a 2 - pyrone.
6. Give the mechanism of the reaction :
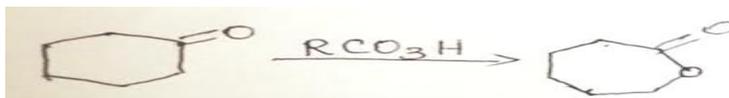
7. What is the product for mannich reaction of 2, 4 - dimethyl quinazoline.
8. Complete the reaction :
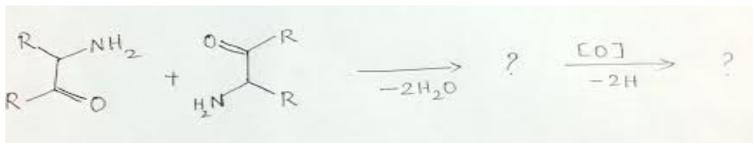
9. State Woodward - Hoffmann rules.
10. Give an example of 4 + 2 cycloaddition.
11. Writ one method of synthesis of each of an oxazole and a thiozole.
12. Illustrate pyramidal inversion in heterocyclic compound.

PART – B (5 X 5 = 25 Marks)
Answer any **FIVE** Questions from the following

13. Discuss the stereochemistry of six membered saturated heterocyclic compound adding light on the anomeric effect.
14. Give one method each of the preparation of thietane, isobenzofuran and mechanisms involved.
15. Predict the products :
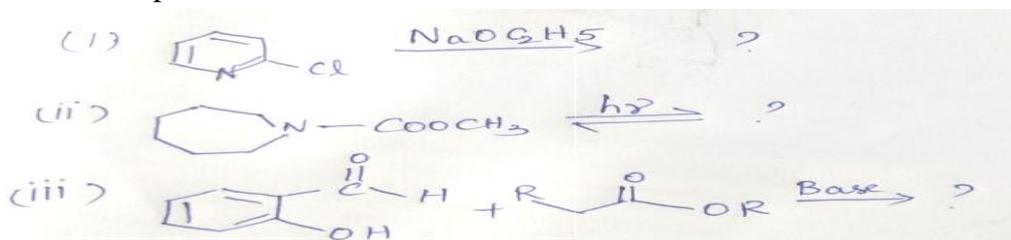
16. Propose a mechanism for the following reactions :
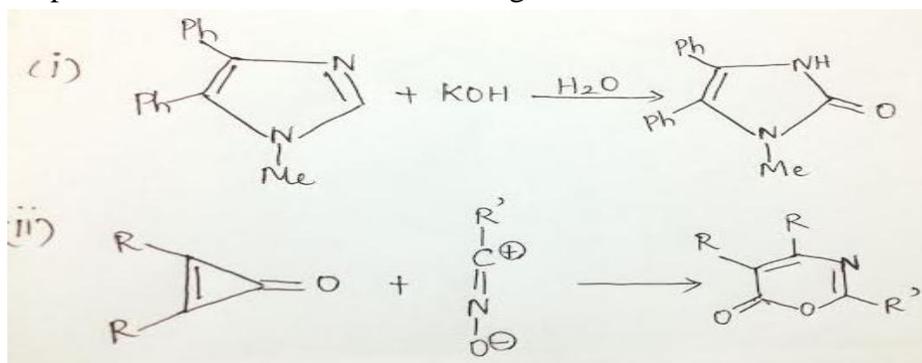
17. Illustrate (2 + 2) cycloaddition with examples and add light on chelotropic reactions.
18. Discuss on the electrophilic substitution reactions of pyrrole and thiophene with mechanisms.
19. Construct a molecular orbital diagram of ethylene.

PART – C (3 X 10 = 30 Marks)
Answer any **THREE** Questions from the following

20. Explain the terms in heterocyclic atoms :
    a) Hydrogen bonding (4)   b) Electrophilic interaction (3)   c) Bridged heterocycles (3).
21. a) Give the synthesis method and mechanism of formation of isoindole and carbazole.
    b) Propose a reaction mechanism.
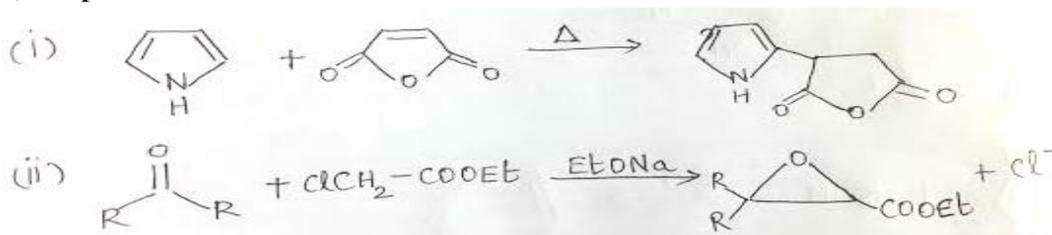
22. Illustrate the electrophilic substitution reaction mechanisms :
    a) Quinoline (4)   b) Pyridine (3)   c) Acridine (3)
23. a) Explain the synthesis method and mechanism of pyrazole and pyridazine.   (6)
    b) Write a note on triazine and sydnones.   (4)

24. a) Predict the product and propose a mechanism :   (3+3)
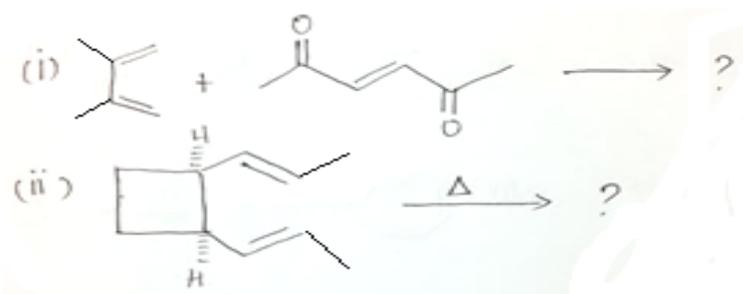
    b) Explain oxy cope rearrangement with examples.   (4)

E - Mail Id for Uploading Answer Sheet
chemistrydepartment@lngovernmentcollege.com

LOGANATHA NARAYANASAMY GOVT. COLLEGE (Autonomous), PONNERI – 601 204
NOVEMBER 2020 SEMESTER EXAMINATIONS
III SEMESTER – M.Sc., CHEMISTRY

Paper Code : **PEM3H**   Title of the Paper : **Advanced Photo and Electro Chemistry**
DATE **: 29.12.2020 FN**   Time : **3 Hours**   Maximum Marks : **75 Marks**

PART – A (10 X 2 = 20 Marks)

Answer any **TEN** Questions from the following

1. What is meant by diffusion potential?
2. Writ the significant of electro capillarity maxima.
3. Define the term Polarization.
4. Mention the applications of cyclic voltametry.
5. Differentiate primary cells from secondary cells.
6. State Pilling – Bedworth rule.
7. Write a note on chemiluminescence and give an example.
8. Distinguish eximer from exciplexes.
9. What is meant by quantum efficiency?
10. What are photogalvanic cells? Give examples.
11. Electrolessplating is superior to Electroplating. Justify.
12. What is photoperoxidattion reaction? Give example.

PART – B (5 X 5 = 25 Marks)

Answer any **FIVE** Questions from the following

13. Discuss in detail the Helmholtz – Perrin model and mention its limitations.
14. Explain the Instrumentation and applications of polarography.
15. Explain the construction, working and applications of Ni - Cd cell.
16. Derive Stern – Volmer equation for quenching of heavy molecules in solution.
17. What is chemical actinometry? Explain in detail about any two chemical actinometer.
18. Draw the Pourbaix diagram and explain its significance.
19. Explain the role of flash photolysis in photo chemical kinetics.

PART – C (3 X 10 = 30 Marks)

Answer any **THREE** Questions from the following

20. Derive Debye – Huckel – Onsager equation and mention its limitations.
21. Explain the significance of equilibrium exchange current density and symmetry factor.
22. (i) Explain the factors which are influencing the rate of corrosion.
    (ii) Discuss the Cathodic protection methods to control corrosion.
23. Describe various photo physical path ways with the help of Jeblanski diagram.
24. Writ in detail about photo sensitized photolysis of water.

E - Mail Id for Uploading Answer Sheet
chemistrydepartment@lngovernmentcollege.com

PART – A (10 X 2 = 20 Marks)
Answer any **TEN** Questions from the following

1. What is Reductive Elimination?
2. Write the advantages of Wilkinson's catalyst.
3. What are Nanomaterials?
4. Give the classification of Nanomaterials.
5. Write the basic principle of Raman spectroscopy.
6. Define – hyperfine splitting.
7. What is quadrupole moment.
8. Define – Isomer shift.
9. Write any four applications of DSC.
10. Give the basic principle of TLC.
11. Define – Carbon nanotubes.
12. Write the basic principle of Mossbauer spectroscopy.

PART – B (5 X 5 = 25 Marks)
Answer any **FIVE** Questions from the following

13. Discuss the mechanism of Wacker' process.
14. Explain the synthesis of nanomaterial by Hydrothermal method.
15. Give the qualitative and quantitative applications of Raman spectroscopy.
16. Write note on Nuclear orientations and quadrupole transitions of NQR.
17. Explain the Instrumentation and application of TGA.
18. Explain the mechanism of hydrogenation of olefins using Wilkinson's catalyst.
19. Explain the Isomer shift and quadrupole splitting in Iron complexes using Mossbauer spectra.

PART – C (3 X 10 = 30 Marks)
Answer any **THREE** Questions from the following

20. Explain the mechanism and importance of Ziegler – Natta catalysis.
21. Describe the Microwave irradiation method to synthesis of nanomaterials.
22. Explain the basic principle and experimental techniques of ESR.
23. Explain the sources, calibration and experiment techniques of Mossbauer spectroscopy
24. Describe the principle, Instrumentation and applications of HPLC.

E - Mail Id for Uploading Answer Sheet
chemistrydepartment@lngovernmentcollege.com

PART – A (10 X 2 = 20 Marks)
Answer any **TEN** Questions from the following

1. What are alkaloids? Mention their properties.
2. How does the size of the heterocyclic ring of an alkaloid is determined?
3. Give the source, structure and use of ephedrine?
4. Explain isoprene rule and special isoprene rule with example.
5. Prove that isoborneol is a secondary alcohol.
6. How many double bonds are present in squalene? How will you prove this number?
7. List the properties and functions of anthocyanine.
8. What are flavonol? What happens when methylated flavonol is fused with KOH?
9. What is Diel's hydrocarbon? Give its structure.
10. What are hormones? List the biological importance of thyroxin.
11. List the properties of aromatic and non - aromatic compounds.
12. What are tropolone and azulene? Justify their aromatic nature.

PART – B (5 X 5 = 25 Marks)
Answer any **FIVE** Questions from the following

13. Elucidate the structure of quinine.
14. Write a detailed account on the general methods of structural elucidation of alkaloids.
15. Write a detailed account on the general methods of structural elucidation of terpenes.
16. Write a detailed account on the structural determination of phytol.
17. Write a note on the isolation, properties and structural determination of flavone.
18. Write a note on the isolation, constitution and functions of bile acid.
19. Discuss the theories of aromaticity with suitable examples.

PART – C (3 X 10 = 30 Marks)
Answer any **THREE** Questions from the following

20. i) Elucidate the structure of morphine.   ii) Write one synthesis of cinchonine.
21. i) Elucidate the structure of farnesol.   ii) Write one synthesis of squalene.
22. Write a detailed account on the structure and biological importance of porphyrin.
23. i) Write a detailed note on the constitution and functions of progesterone.
    ii) Explain the biosynthesis of cholesterol.
24. i) With suitable examples explain anti aromaticity and non - aromaticity.
    ii) Justify the aromatic nature of tropone and annulenes.

E - Mail Id for Uploading Answer Sheet
chemistrydepartment@lngovernmentcollege.com