LOGANATHA NARAYANASAMY GOVT. COLLEGE (Autonomous), PONNERI – 601 204

APRIL 2020 SEMESTER EXAMINATIONS

IV SEMESTER – M.Sc., CHEMISTRY

Paper Code : **17PEM4J** Title of the Paper : **Instrumental Methods In Inorganic Chemistry**

DATE **: 23.09.2020 FN** Time : **90 Minutes** Maximum Marks : **75 Marks**

PART – A

Answer any **FIVE** Questions from the following

1. What are the adsorbents used in column chromatography?
2. Write the advantages of thin layer chromatography.
3. Write the selection rule for IR spectroscopy.
4. Write basic requirement for Raman active.
5. Explain spin – spin coupling.
6. TMS is used as standard reference in NMR. Why?
7. Water is not a suitable solvent in ESR. Give reason.
8. Define hyperfine splitting.
9. What is recoil energy?
10. What is isomer shift?
11. What is R_f value?
12. What do you meant by Zeeman Effect?

PART – B

Answer any **THREE** Questions from the following

13. Write a note on HPLC.
14. State mutual exclusion principle. Explain it for carbon dioxide.
15. Explain chemical shift.
16. Write short notes on various transitions takes place in metal complexes.
17. Explain the principle of NQR spectroscopy.
18. Stokes lines are more intense than anti stokes lines. Explain.
19. Discuss quadrupole splitting.

PART – C

Answer any **TWO** Questions from the following

20. What is gas chromatography? Explain its principle in detail.
21. Discuss applications of IR spectroscopy of carbonyls.
22. Briefly explain the applications of ^{19}F- NMR spectra.
23. Explain ESR spectra of bis (salicylaldimine) copper (II) complex.
24. How Mossbauer spectra used in distinguishing Fe (II) and Fe (III) complexes.

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APRIL 2020 SEMESTER EXAMINATIONS

IV SEMESTER – M.Sc., CHEMISTRY

Paper Code : **17PEM4K** Title of the Paper : **Chemistry of Natural Products**

DATE **: 24.09.2020 FN** Time : **90 Minutes** Maximum Marks : **75 Marks**

PART – A

Answer any **FIVE** Questions from the following

1. What are alkaloids? Give any two examples.
2. Draw the structure of ephedrine and adrenaline.
3. State isoprene and special isoprene rule.
4. Name the terpenoids present in
   (i) Lemon, (ii) camphor, (iii) Jasmine, (iv) Sandalwood.
5. What are natural pigments? Give any two examples.
6. What are anthocyanins? Give any two examples.
7. What are called steroids? Give any two examples.
8. List out any two functions of bile acids.
9. Differentiate aromaticity from antiaromaticity.
10. Prove the aromaticity of azulene.
11. Draw the structure of camphane and camphene.
12. Mention the conditions of aromaticity.

PART – B

Answer any **THREE** Questions from the following

13. Discuss the structural elucidation of reserpine.
14. Discuss the general methods employed for the elucidating the structure of terpenoids.
15. What are flavones? Give two methods for the synthesis of flavone.
16. Describe in detail a total synthesis of testosterone.
17. Explain the different forms of annulenes.
18. Explain Hofmann exhaustive methylation method of elucidating the structure of alkaloid.
19. What is Diel's hydrocarbon? Explain its synthesis

PART – C

Answer any **TWO** Questions from the following

20. Describe essential steps in woodward's synthesis of quinine starting from 7-hydroxy-8-methyl isoquinoline.
21. Discuss the structural elucidation of squalene.
22. Explain the general methods of synthesizing porphyrins.
23. Establish the nature and the position of side chain in cholesterol
24. What is Huckel rule? Differentiate aromaticity from non-aromaticity. Explain the aromaticity of tropene and tropolene.

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APRIL 2020 SEMESTER EXAMINATIONS

IV SEMESTER – M.Sc., CHEMISTRY

Paper Code : **17PEM4L** Title of the Paper : **Chemistry of Macromolecules**

DATE **: 25.09.2020 FN** Time : **90 Minutes** Maximum Marks : **75 Marks**

PART – A

Answer any **FIVE** Questions from the following

1. What are called water soluble polymers? Give examples.
2. Mention any two applications for fire retardant polymers and give two examples for it.
3. Differentiate homogenous and heterogenous phases in polymerization.
4. Define the term living polymerization.
5. What is meant by weight-average molecular weight of a polymer?
6. What do you mean by crystallinity of polymer?
7. Name any two stabilizers used in polymer degradation.
8. Define biodegradation of a polymer.
9. Expand the terms RAFT and ATRP.
10. What are called dendrimers?
11. What are called copolymers?
12. Give any one reaction for metathesis polymerization.

PART – B

Answer any **THREE** Questions from the following

13. Give a method of preparation of acrylamide and polyisothiocyanates.
14. Explain the mechanism of anionic ring opening polymerization with suitable example.
15. Define glass transition temperature. Explain the factors affecting it.
16. Write a note on oxidative degradation of polymers.
17. Write a note on atom transfer radical polymerization.
18. Explain any two methods of moulding of polymers with a neat diagram.
19. Describe the role of antioxidants in polymer degradation.

PART – C

Answer any **TWO** Questions from the following

20. Write a note on polymer additives.
21. Discuss the mechanism of free radical polymerization by giving suitable example.
22. Explain the molecular weight determination of polymers using ultracentrifuge method.
23. What do you mean by polymer degradation? Describe the types of polymer degradation.
24. Write a note on

    (i) Group transfer polymerization (ii) Dendrimers.

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APRIL 2020 SEMESTER EXAMINATIONS

IV SEMESTER – M.Sc., CHEMISTRY

Paper Code : **PEM4A** Title of the paper : **Instrumental Methods in Inorganic Chemistry**

DATE **: 23.09.2020 FN** Time : **90 Minutes** Maximum Marks : **75 Marks**

PART – A

Answer any **FIVE** Questions from the following

1. What do you mean by metathesis?
2. What is hydroformylation? Give an example.
3. What is C_{60}? Give any two applications of it.
4. Mention any two applications of carbon nanotubes.
5. State the selection rule for compounds to give rise to Raman spectrum.
6. What is zero field splitting?
7. Mention the factors affecting 'g value'.
8. What is Doppler Effect?
9. Draw the thermo gram of Calcium oxalate monohydrate.
10. Define the term 'Rf value'
11. What is Raman effect?
12. Define the term 'isomer shift'.

PART – B

Answer any **THREE** Questions from the following

13. What is Wilkinson's catalyst? Explain how is it used in the hydrogenation of an alkene?
14. What are nano materials? Explain their classification with an example for each.
15. What is hyperfine splitting? List the factors affecting it.
16. a) In the Sn (IV) halide series, only SnF_4 exhibits quadrupolar splitting in Sn^{119} Mossbauer spectrum - Why?

    b) Explain why the Mossbauer spectrum of K_4 [Fe (CN) $_6$] consists of a single line while that of $FeSO_4.7H_2O$ is a doublet.
17. a) How will you measure the column efficiency in HPLC?

    b) In what way TLC is superior to other chromatographic techniques?

18. Write the catalytic cycle for the production of acetaldehyde from ethylene by using Wacker's process.
19. Explain the principle of NQR spectroscopy in detail.

PART – C

Answer any **TWO** Questions from the following

20. a) Explain the mechanism of Ziegler - Natta polymerization with an example. (7 Marks)
    b) Mention the role of Al $(C_2H_5)_3$ in this mechanism. (3 Marks)
21. How are the nano materials synthesized by the following methods?
    a) Microwave irradiation method
    b) Reverse Micelle synthesis.
22. Discuss the principle, instrumentation and applications of Raman spectroscopy.
23. What is effective field gradient? How is the covalent nature of a bond investigated with NQR?
24. a) Enumerate the differences between TGA and DTA.
    b) List the various basic parts of gas chromatograph with their functions.

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APRIL 2020 SEMESTER EXAMINATIONS

IV SEMESTER – M.Sc., CHEMISTRY

Paper Code : **PEM4B** Title of the Paper : **Chemistry of Natural Products**

DATE **: 24.09.2020 FN** Time : **90 Minutes** Maximum Marks : **75 Marks**

PART – A

Answer any **FIVE** Questions from the following

1. Define alkaloid. Give two examples.
2. How will you account for the nature of nitrogen atom in cocaine?
3. What is isoprene rule and special isoprene rule?
4. What are the products obtained on oxidation of Farnesol?
5. Give the properties of anthocyanin.
6. Give the structure of porphyrin.
7. What is Diels hydrocarbon?
8. Differentiate steroids from harmones.
9. Define annelation.
10. Define homo aromatic compound. Give one example.
11. Write the structure of isoborneol.
12. Give the molecular formula of progesterone.

PART – B

Answer any **THREE** Questions from the following

13. Write short notes on Hoffmann's exhaustive methylation method.
14. How is the constitution of borneal elucidated?
15. How will you account for the structure of flavones?
16. How will you account for the following in cholesterol?
    a) Presence of OH group.
    b) Presence of double bond and its position.
17. Explain anti-aromaticity and non-aromaticity.
18. Explain the steps involved in structural elucidation of Quinine.
19. Give the functions of thyroxine.

PART – C

Answer any **TWO** Questions from the following

20. Elucidate the structure of cocaine.
21. Give the general methods of determining the structure of camphene.
22. Discuss the general methods for the elucidation of the structure of flavonols.
23. How will you isolate testosterone? Give its physiological actions and its structure.
24. Explain the theories of aromaticity.

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APRIL 2020 SEMESTER EXAMINATIONS

IV SEMESTER – M.Sc., CHEMISTRY

Paper Code : **PEM4C** Title of the Paper : **Chemistry of Corrosion and Macromolecules**

DATE **: 25.09.2020 FN** Time : **90 Minutes** Maximum Marks : **75 Marks**

PART – A

Answer any **FIVE** Questions from the following

1. What is corrosion? What are various types of corrosion?
2. What is a galvanic cell and how does it differ from electrolytic cell?
3. Give the structure of polyacrylamide and polyisothiocyanate.
4. What are fillers? Give any two examples for organic fillers.
5. What is Mayo equation? What is its use?
6. What are living polymers? Why are they so called?
7. Define glass transition temperature.
8. Differentiate copolymers and homopolymer with a suitable example.
9. What are antioxidants? Give any one example.
10. Melting point of teflon is high why?
11. List any two stabilizers that are used for PVC.
12. What is meant by biodegradation?

PART – B

Answer any **THREE** Questions from the following

13. Explain the mechanish of corrosion of iron by means of oxygen absorption.
14. Write a note on water dispersible polymers.
15. What is meant by telomerisation? Explain the chain transfer mechanism of polymerization of bromotrifluoro ethylene.
16. Explain how the various factors affecting the glass transition temperature.
17. What are photostabilisers? Explain the mechanism of photodegradation.
18. Explain the role of following in causing or suppressing corrosion:
    (i) Concentration cell (ii) Sacrificial anode
19. With a schematic diagram of film-casting equipment explain the process of film casting.

PART – C

Answer any **TWO** Questions from the following

20. Discuss the electrochemical theory of corrosion. What are the various factors which effect the rate of corrosion? Explain cathodic protection.

21. (a) What are plasticizers? How are they classified? Write any five properties of plasticizers.
    (b) Write short note on "organic colourants".
22. Discuss the kinetics and mechanism of anionic polymerization.
23. Discuss the molecular weight determination of polymers by any one experimental method.
24. (a) Explain the factors affecting the C-C bond stability and thermal stability in a polymer with examples.
    (b) How does PVC undergo degradation? Explain with mechanism.

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APRIL 2020 SEMESTER EXAMINATIONS

IV SEMESTER – M.Sc., CHEMISTRY

Paper Code : **PEM4F** Title of the paper : **Instrumental Methods in Inorganic Chemistry**

DATE **: 23.09.2020 FN** Time : **90 Minutes** Maximum Marks : **75 Marks**

PART – A

Answer any **FIVE** Questions from the following

1. What do you mean by metathesis?
2. What is hydroformylation? Give an example.
3. What is C_{60}? Give any two applications of it.
4. Mention any two applications of carbon nanotubes.
5. State the selection rule for compounds to give rise to Raman spectrum.
6. What is zero field splitting?
7. Mention the factors affecting 'g value'.
8. What is Doppler Effect?
9. Draw the thermo gram of Calcium oxalate monohydrate.
10. Define the term 'Rf value'
11. What is Raman effect?
12. Define the term 'isomer shift'.

PART – B

Answer any **THREE** Questions from the following

13. What is Wilkinson's catalyst? Explain how is it used in the hydrogenation of an alkene?
14. What are nano materials? Explain their classification with an example for each.
15. What is hyperfine splitting? List the factors affecting it.
16. a) In the Sn (IV) halide series, only SnF_4 exhibits quadrupolar splitting in Sn^{119} Mossbauer spectrum - Why?

    b) Explain why the Mossbauer spectrum of K_4 [Fe (CN) $_6$] consists of a single line while that of $FeSO_4.7H_2O$ is a doublet.
17. a) How will you measure the column efficiency in HPLC?

    b) In what way TLC is superior to other chromatographic techniques?

18. Write the catalytic cycle for the production of acetaldehyde from ethylene by using Wacker's process.
19. Explain the principle of NQR spectroscopy in detail.

PART – C

Answer any **TWO** Questions from the following

20. a) Explain the mechanism of Ziegler - Natta polymerization with an example. (7 Marks)
    b) Mention the role of Al $(C_2H_5)_3$ in this mechanism. (3 Marks)
21. How are the nano materials synthesized by the following methods?
    a) Microwave irradiation method
    b) Reverse Micelle synthesis.
22. Discuss the principle, instrumentation and applications of Raman spectroscopy.
23. What is effective field gradient? How is the covalent nature of a bond investigated with NQR?
24. a) Enumerate the differences between TGA and DTA.
    b) List the various basic parts of gas chromatograph with their functions.

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APRIL 2020 SEMESTER EXAMINATIONS

IV SEMESTER – M.Sc., CHEMISTRY

Paper Code : **PEM4G** Title of the Paper : **Chemistry of Natural Products**

DATE **: 24.09.2020 FN** Time : **90 Minutes** Maximum Marks : **75 Marks**

PART – A

Answer any **FIVE** Questions from the following

1. Define alkaloid. Give two examples.
2. How will you account for the nature of nitrogen atom in cocaine?
3. What is isoprene rule and special isoprene rule?
4. What are the products obtained on oxidation of Farnesol?
5. Give the properties of anthocyanin.
6. Give the structure of porphyrin.
7. What is Diels hydrocarbon?
8. Differentiate steroids from harmones.
9. Define annelation.
10. Define homo aromatic compound. Give one example.
11. Write the structure of isoborneol.
12. Give the molecular formula of progesterone.

PART – B

Answer any **THREE** Questions from the following

13. Write short notes on Hoffmann's exhaustive methylation method.
14. How is the constitution of borneal elucidated?
15. How will you account for the structure of flavones?
16. How will you account for the following in cholesterol?
    a) Presence of OH group.
    b) Presence of double bond and its position.
17. Explain anti-aromaticity and non-aromaticity.
18. Explain the steps involved in structural elucidation of Quinine.
19. Give the functions of thyroxine.

PART – C

Answer any **TWO** Questions from the following

20. Elucidate the structure of cocaine.
21. Give the general methods of determining the structure of camphene.
22. Discuss the general methods for the elucidation of the structure of flavonols.
23. How will you isolate testosterone? Give its physiological actions and its structure.
24. Explain the theories of aromaticity.

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APRIL 2020 SEMESTER EXAMINATIONS

IV SEMESTER – M.Sc., CHEMISTRY

Paper Code : **PEM4H** Title of the Paper : **Chemistry of Macromolecules**

DATE **: 25.09.2020 FN** Time : **90 Minutes** Maximum Marks : **75 Marks**

PART – A

Answer any **FIVE** Questions from the following

1. What are polymer additives? Give two examples.
2. What are fillers? Give two examples.
3. Write the mechanism of anionic polymerization.
4. What are living polymers? Give an example.
5. Define the term 'glass transition temperature'.
6. What are cross linked polymers? Give an example.
7. Define the term ablation in polymer chemistry.
8. What are antioxidants? Give an example.
9. Name any two advanced techniques of polymerization.
10. What is group transfer polymerization?
11. What are plasticizers?
12. What do you mean by oxidative degradation of polymers?

PART – B

Answer any **THREE** Questions from the following

13. Write a note on water dispersible polymers.
14. Give the mechanism of radical polymerization taking a suitable example.
15. Enumerate the factors affecting the glass transition temperature.
16. How is photo degradation of polymers carried out?
17. Write a note on metathesis polymerization.
18. How is molecular weight of a polymer determined by osmometric method?
19. Write a note on RAFT polymerization.

PART – C

Answer any **TWO** Questions from the following

20. Explain the preparation and biological activity of the following compounds :
    a) Polyacrylamide b) Polyisothiocyanates.
21. Discuss in detail about the kinetics of ionic polymerization.

22. Explain the principle and the procedure involved in the determination of molecular weight of a polymer by

    a) Light scattering method (b) Ultra centrifuge method.

23. Write a note on the following :

    (a) Biodegradation of polymers (b) Thermal degradation of polymers.

24. Write a note on the following :

    (a) Atom transfer radical polymerization

    (b) Group transfer polymerization.

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