2B6M21580

(Pages : 2)

Reg. No:.....

Name: .....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Sixth Semester B.Sc. Degree Examination, March/April 2021

BCHE6B09 – Inorganic Chemistry IV

(2018 Admission onwards)

Time: 3 hours

Max. Marks: 80

Section A (One word)

Answer all questions. Each question carries 1 mark

1. Wilkinson's catalyst is .....
2. What is misch metal?
3. Write an ore of Iron.
4. Write an example for unsymmetrical bidentate ligand.
5. Calculate the number of unpaired electrons in the following gaseous ions: Mn^{3+} and Cr^{3+}.
6. What are high spin complexes? Give an example.
7. The purest form of commercial iron is .....
8. Name one biologically important cobalt containing compound.
9. $[(CH_3)_2Mg]_n$ belongs to the category of organometallic compound with

(a) multicentre bonds, (b) π- bonded ligands, (c) only metal- carbon σ - bonds, (d) ionic bonds

10. Name the metals present in the enzymes (a) carbonic anhydrase and (b) catalase.

(1 x 10 = 10 Marks)

Section B (Short answer)

Answer any ten questions. Each question carries 2 marks

11. Give the IUPAC names of (a) $[Co(NH_3)_6](NO_3)_3$ and (b) $K_3[Fe(CN)_6]$
12. Give two important uses of potassium dichromate.
13. What is EAN rule? Give one example each for compounds which obey and do not obey EAN rule.
14. Why Sm^{2+}, Eu^{2+} and Yb^{2+} ions in solutions are good reducing agents but an aqueous solution of Ce^{4+} is a good oxidising agent?
15. Calculate the CFSE for a d^4 system in a tetrahedral field.
16. Distinguish between calcination and roasting.
17. What is a bridging ligand? Give an example.
18. What are advantages of oxaliplatin over cisplatin?
19. What are metalloenzymes?
20. Draw the structure of Zeise's salt. Mention any one use of it.
21. What is the coordination number of iron in haemoglobin? How many heme units are present in haemoglobin molecule?
22. What is gun metal?

(2 x 10 = 20 Marks)

Section C (Paragraph)

Answer any five questions. Each question carries 6 marks

23. Briefly discuss the preparation of pure Ni from its principal ore.
24. Explain the structural isomerism in coordination compounds.
25. What is lanthanide contraction? Mention any two consequences of lanthanide contraction.
26. Draw and explain the crystal field splitting in octahedral complexes.
27. Explain the principle involved in the froth floatation process, liquation and zone refining.
28. On the basis of VBT explain the structure and magnetic property of

    (i) $Ni(CO)_4$ and (ii) $[Cu(NH_3)_4]^{2+}$
29. Explain with balanced equations the action of $KMnO_4$ in acid medium on the following:

    (i) halogen acids, (ii) SO_2 and (iii) $FeSO_4$.
30. Explain the biochemical function of sodium- potassium pump.

(6 x 5 = 30 Marks)

Section D (Essay)

Answer any two questions. Each question carries 10 marks

31. Discuss the manufacture of steel by *open- hearth* process, and Bessemer process. Compare the two processes.
32. Write briefly on the application of co-ordination compounds in qualitative and quantitative analysis.
33. Explain the reason for the colour and catalytic action of transition metal complexes.
34. Discuss the preparation, proportion and structure of Ferrocene.

(10 x 2 = 20 Marks)

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2B6M21581 (Pages :2) Reg. No:.....

Name: .....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Sixth Semester B.Sc. Degree Examination, March/April 2021

BCHE6B10 – Organic Chemistry III

(2018 Admission onwards)

Time: 3 hours Max. Marks: 80

PART A

Answer all the questions. Each question carries 1 mark

1. The number of peaks in the ^{1}H NMR spectrum of cyclohexane is.....
2. C—O stretching frequencyof alcohols in IR will appear at .....cm^{-1}
3. The chromaphoric group present in methyl orange is .....
4. Draw the structure of *D*-erythrose and *D*-threose.
5. The red colored precipitate formed on Fehling's test for glucose is due to .....
6. The RNA generated during transcription is .....
7. Give example for a peptide hormone.
8. ..... and .....are the recommended levels of HDL and LDL in humans.
9. The heterocyclic system other than quinoline in quinine is .....
10. The number of carbon atoms in a sesquiterpenoidis .....

(10 x 1 = 10 Marks)

PART B

Answer any 10 questions. Each question carries 2 marks

11. How we can differentiate the NMR of acetone and Propanal.
12. The carbonyl group in 1-phenyl-2-butanone in IR will appear at 1715 cm^{-1} but for 1-phenyl-1-butanone is at 1695 cm^{-1}. Give reason for the observed change.
13. Geometrical isomers can be differentiated with the help of UV. Explain with example
14. Identify the structure of the compound with molecular formula $C_2H_6O_2$ and spectral data, H-NMR [3.0 (*s*, 3H), 3.7 (*d*, 2H), 4.9 (*t*, 1H)] and in IR broad band at3400 cm^{-1}.
15. Explain the chemistry of Molisch's test.
16. Reaction of glucose with bromine water and with nitric acid will give two different products. Draw the structures of each.
17. Explain the non covalent forces that will stabilize 2° and 3° structure of proteins.
18. Draw the structure of one purine and one pyrimidine base present in DNA.
19. Explain the relevance in calculating iodine value of an oil.

20. Give the structure of coniine and piperine.

21. Vitamin D_3 continues to be synthesized for several days after exposure to sunlight. Justify.

22. Explain the rearrangement in allyl phenyl ethers under thermal condition.

(10 x 2 = 20 Marks)

PART C

Answer any 5 questions. Each question carries 6 marks

23. In NMR acetylene proton appear at δ value 2.5 but aromatic protons appear at 7.3 *ppm*. Justify.

24. Distinguish between epimers and anomers.

25. Glucose and fructose will give identical osazones. Describe the reaction

26. Amino acids can be classified based on structure. Explain with example.

27. Briefly explain Edmann method for determining the structure of peptides.

28. Describe the biological functions of lipids.

29. With the help of FMO approach generalize the rules for electrocyclic reactions.

30. Prove that geraniol and menthol are monoterpenes.

(5 x 6 = 30 Marks)

PART D

Answer any 2 questions. Each question carries 10 marks

31. a) Explain the principle of DNA finger printing.

b) Describe the process of DNA replication. [5+5]

32. a) Give the structure of two sex hormones and describe their function in our body.

b) Identify the HOMO of pentadienyl radical under photochemical condition.

[6 + 4]

33. a) Describe the structure and functions of vitamins in our body. b) Briefly explain Diels-Alder reaction.

[7+ 3]

34. Describe methods each for ascending and descending in aldose with example.

(2 x 10 = 20 Marks)

2B6M21582 (Pages : 2) Reg. No:.....

Name: .....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Sixth Semester B.Sc. Degree Examination, March/April 2021

BCHE6B11 –Physical Chemistry III

(2018 Admission onwards)

Time: 3 hours Max. Marks: 80

Section A (One word)

Answer all questions. Each question carries 1 mark

1. Define specific conductance. Mention its units.
2. Give the relationship between equivalent and molar conductance?
3. In the lead-acid battery, during charging, the cathode reaction is ----------
4. What is emf? How it is measured potentiometrically?
5. Give an example of acidic buffer.
6. Give Raoúlt's law.
7. Calculate the pH of 0.005M $Ca(OH)_2$assuming complete dissociation.
8. The freezing point of 0.1 M aqueous solution of glucose is --------
   (cryoscopiccontantof water =1.86).
9. Number of particles per unit cell of BCC is ----------
10. Give an example of Nematic liquid crystals.

(10 x 1 = 10 Marks)

Section B (Short answer)

Answer any ten questions. Each question carries 2 marks

11. what is meant by ionic product?
12. State the Debye-Huckel limiting law.
13. What is liquid function potential? How it can be eliminated?
14. What is electrochemical series?
15. Give Henderson equation.
16. Calculate the relative lowering of vapour pressure of 0.125 M aqueous solution of glucose.
17. What is radius ratio? How does coordination number vary with the radius ratio?
18. What are Non-stoichiometric defects?
19. Define intrinsic and extrinsic conduction.
20. What is meant by Bravais lattice?
21. What are Smectic liquid crystals?
22. Explain the structure of NaCl crystal.

(10 x 2 = 20 Marks)

Section C (Paragraph)

Answer any five questions. Each question carries 6 marks

23. Define transport number. How will you determine transport number?
24. Explain the difference between solubility product and ionic product.
25. Explain the variation of equivalent conductance with dilution.
26. What is meant by common ion effect? Give the applications.
27. Discuss briefly about conductometric titrations.
28. Derive an expression for calculation of molecular weight from osmotic pressure.
29. Describe the powder method of X-ray diffraction of solids.
30. Give short note on semiconductors.

(5 x 6 = 30 Marks)

Section D (Essay)

Answer any two questions. Each question carries 10 marks

31. (a) State Kohlrausch's law. How this law is useful for the calculation of molar ionicconductance at infinite dilution of weak electrolytes?

    (b)Write a note on H2-O2 fuel cell.

32. (a) What are concentration cells? How are they classified?

    (b) Write the mechanism of rusting of iron. Which are the important methods for preventing corrosion?

33. What are colligative properties? Give an expression for depression in freezing point. How molecular weight of solute is determined?
34. (a) Derive Bragg's equation

    (b) What are stoichiometric defects? How are they classified? Explain with picture and example.

(2 x 10 = 20 Marks)

2B6M21583 (Pages : 2)

Reg. No:.....

Name: .....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Sixth Semester B.Sc. Degree Examination, March/April 2021

BCHE6B12 –Advanced & Applied Chemistry

(2018 Admission onwards)

Time: 3 hours Max. Marks: 80

PART A

Answer all the questions
Each question carries 1 mark

1. The football shaped cage like allotrope of Carbon is called .....
2. The lowest energy point anywhere on the potential energy surface is called .....
3. Give an example for a solid rocket propellant
4. Green synthesis involves .....

   a) Enzymes b) Excess of solvents c) Excess of reagents d) High temperature
5. Give an example for a conductive polymer
6. Raw materials essential for the manufacture of cement are .....
7. State whether it is True or False "Branched chain hydrocarbons have less knocking tendency that straight chain hydrocarbons"
8. Give an example for an insecticide which is used in anti lice shampoos
9. The process ofspontaneous aggregation of molecules by non-covalent interaction is called .....
10. A group that increases/deepens the color of the dye is called .....

(10x 1= 10 Marks)

PART B

Answer 10 questions
Each question carries 2 marks

11. How are nanomaterials classified based on dimensions? Explain with examples.
12. List the advantages of calculating atom economy of a reaction rather than the yield.
13. Explain the term tacticity with respect to polymers.
14. Molecular Mechanics methods cannot account for the properties, which depend on electronic effects. Comment
15. List any four ingredient of tooth paste and their function.
16. Which molecule(s) among benzene, azobenzene and p-aminoazobenzene hydrochloride can be used as a dye for a fabric. Justify your answer using Witt's theory.
17. What is octane number? How is it related to the efficiency of petrol?
18. What are the major component present in Potash fertilizer

19. Explain the function of Parabens in cosmetic products.

20. List the advantages of soaps over detergents.

21. Differentiate between addition polymer and condensation polymers with example

22. Discuss the structure of grapheme

(10 x 2 = 20Marks)

PART C

Answer 5 questions

Each question carries 6 marks

23. a) A silver nanoprism of 100 nm appears red while a silver nanosphere of same dimension is yellow in colour. Explain

b) Discuss any three green methods to acquire energy efficiency during an organic synthesis.

24. Illustrate with an example the significance of molecular recognition and self assembly in biological system

25. a) Discuss the limitations of the semi empirical methods used in computational chemistry.

b) Ziegler-Natta catalysts remain dominant in the production technology for polyolefins. Why?

26. Explain the manufacturing glass. Discuss any three types of glass, its composition and uses.

27. Explain the terms (a) pharmacognosy (b) pharmacodynamics (c) pharmacokinetics

28. What are the common food adulterants in milk, tea, and chilly powder. How can we identify these adulterants?

29. Explain insecticides, herbicides and fungicides with suitable examples.

30. Explain the chemistry behind the preparation of TiO_2 through the sulphate process

(5x 6 = 30 Marks)

PART D

Answer 2 questions

Each question carries 10 marks

31 a) Describe the application of nanotechnology in catalysis.

b) Discuss the impact of combinatorial organic synthesis on drug discovery (5+5)

32. Discuss briefly

a) Programming languages b) Polymer biodegradation

c) Nutritional benefits of coconut water and Neera 3 + 4 + 3

33. a) Discuss the theories of colour and chemical constitution of fabric dyes.

b) Write short note on health effects of soft drinks 6 + 4

34. a) Discuss briefly the Carbon range and uses of various fractions of Petroleum distillation.

b) Write short notes on a) Refractory materials b) MW assisted organic synthesis

(2x10 = 20 Marks)

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2B6M21584 (Pages : 2) Reg. No:.....

Name: .....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Sixth Semester B.Sc. Degree Examination, March/April 2021

BCHE6B13(E2) – Polymer Chemistry

(2018 Admission onwards)

Time: 3 hours Max. Marks: 80

Section A (One world)
(Answer all questions. Each question carries 1marks)

1. Write the structure of polycarbonate resins.
2. What are the momomers of terylene?
3. Write any two examples of copolymers.
4. ..... is an example of plasticizer.
5. What is meant by autoacceleration in bulk polymerisation reaction?
6. Another name for teflon is.....
7. The process by which a network of crosslinks is introduced in to an elastomer with a view to improve its properties is called.....
8. Give two examples of biodegradable polymers.
9. What are bakelites.
10. Among PVC, teflon, polythene and terelene, which has the exceptional heat resistance.

(10 x 1 = 10 Marks)

Section B (Short answer)
(Answer any ten questions. Each question carries 2marks)

11. Distinguish between random polymers and alternative polymers.
12. What is polydispersity index? Explain its significance.
13. What are isotactic and syndiotactic polymers?
14. What are fibres? Explain with example.
15. What are inhibitors in polymerisation reactions?
16. What are step growth polymers? Give examples.
17. Explain the expression of viscosity average molecular weight of polymers.
18. What are nomex? Mention its uses.

19. Give two example of bifunctional momomers.
20. What is meant by parison in blow moulding?
21. What is PAN? What are it uses?
22. Write a note on fire resistant polymers.

(10 x 2 = 20 Marks)

Section C (Paragraph)
(Answer any five questions. Each question carries 6marks)

23. Explain the classification of polymers based on the origin.
24. Discuss ring opening polymerisation with example.
25. What is glass transition temperature? Explain the importance of Tg
26. What are biodegradable polymers? Name two and discuss their applications.
27. Distinguish between injection moulding and blow moulding.
28. Write a note on plastic identification code. Explain the recycling of plastics.
29. Discuss the preparation and properties of butyl rubber, neoprene rubber and silicon rubber.
30. Derive the manufacture of any one of the copolymer of styrene. Give the application of it.

(5 x 6 = 30 Marks)

Section D (Essay)
(Answer any two questions. Each question carries 10marks)

31. Explain coordination polymerisation. Give a detailed description of Zeigler-Natta catalysed reaction for the manufacture of sterio regular polymers.
32. What are different types of polymer degradation process?
33. Write a note on different types of polymerisation processes.
34. Write short notes on the following polymers.
    a) Super glue b) Glyptal c) Kelvar d) PMMA

(2 x 10 = 20 Marks)