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2B6A23015

(Pages : 2)

Reg. No:.....

Name: .....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Sixth Semester B.Sc Chemistry Degree Examination, April 2023

BCH6B09 - Inorganic Chemistry IV

(2019 Admission onwards)

Time: 2 hours

Max. Marks : 60

Section A (Short answers)
(Answer questions up to 20 marks. Each question carries 2 marks)

1. Give the number of unpaired electrons in strong and week octahedral fields for Cr^{3+}?
2. State Beer-Lambert Law?
3. Which is more stable. Fe^{3+} or Fe^{2+}? Explain.
4. Transition metal ions form a number of interstitial compounds? Explain.
5. Account for Cr^{3+} is a stronger reducing agent than Fe^{2+}.
6. Given the IUPAC names of (i) $[Co(NH_3)_4Cl_2]Cl$ (ii)$[Ni(CO)_4]$
7. Explain the term Chelate effect.
8. When a coordination compound $CoCl_3.6NH_3$ is mixed with AgNO3, 3 moles of AgCl are precipitated per mole of the compound. Write the structural formula of the complex and its IUPAC name.
9. Name the catalyst used for (i) polymerization of alkene and (ii) hydrogenation of alkene.
10. What is 18 electron rule?
11. What mechanism transports Na^+ ions out of the cell in exchange of K^+ units?
12. When is the presence of a metal considered toxic to living organisms? Name the metal which produced outbreak of the Minamata disease by means of water pollution?

(Ceiling of marks : 20)

Section B (Paragraph)
(Answer questions up to 30 marks. Each question carries 5 marks)

13. Discuss photosynthesis.
14. Differentiate between Scanning Electron Microscopy and Transmission Electron Microscopy.
15. How do lanthanides and actinides differ with respect to (i) oxidation state (ii)complex formation?

16. On the basis of VBT, account for the fact that (i) $[Ni(CN)4]^{2-}$ is square planar while $[NiCl4]^{2-}$ is tetrahedral (ii) which of the two is diamagnetic in nature?

17. Explain the term Jahn- Teller Effect taking the example of Cu(II)in octahedral ligand environment?

18. Discuss the bonding in metal carbonyls.

19. What is transmission electron microscopy? Explain the basic principles of the method?

(Ceiling of marks : 30)

Section C (Essay)

(Answer any one. Each question carries 10 marks)

20. Discuss the crystal field theory and splitting of d orbitals in octahedral complexes?

21. (i) Discuss the structure and significance of Cis platin

(ii) Mention role of Zn and Co in living beings?

(1 x 10 = 10 marks)

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Sixth Semester B.Sc Chemistry Degree Examination, April 2022

BCH6B10 - Organic Chemistry III

(2019 Admission onwards)

Time: 2 hours

Max. Marks : 60

Section-A (Short Answers)

Answers questions up to 20 marks. Each question carries 2 marks

1. Why is the C=O stretch frequency band in the IR spectrum of *carboxylic acid* normally broader than that for an aldehyde or ketone ?
2. Explain the action of Benedict's solution on glucose.
3. Define isoelectric point.
4. Define the saponification value.
5. What are the sources of vitamin D ? Draw the structure of Vitamin D.
6. State isoprene rule.
7. What are electrocyclic reactions ? Give an example.
8. What is meant by spin-spin coupling in NMR spectroscopy ?
9. Define R_f value. What are the factors affecting R_f value ?
10. Draw the structure of α-D- glucose.
11. Name the purine bases found in RNA.
12. Give the physiological activities of nicotine and connine.

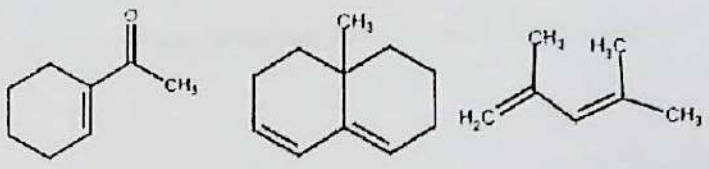
Section-B (Paragraph)

Answers questions up to 30 marks. Each question carries 5 marks

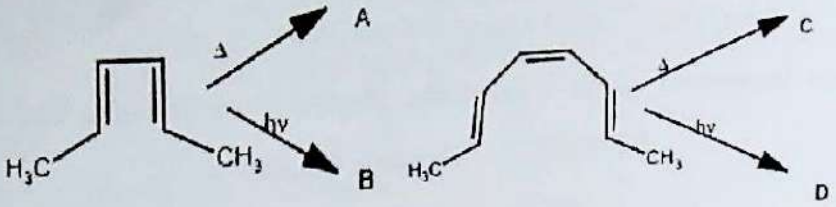
13. Discuss Strecker synthesis with the help of an example.
14. Explain the following with suitable examples

    (i) Cope rearrangement (ii) Claisen rearrangement.
15. (a) What is meant by vulcanization ? Explain with example.

    (b) What are the advantages of vulcanization ?
16. What are lipids ? Explain the biological functions of lipids.
17. Explain Killiani-Fischer synthesis with example.
18. Calculate λ_{max} for the following molecules.



19. Give the stereochemistry of the product A,B,C &D and explain the formation of the products with the help of FMO method.



Section-C (Essay)

Answer any one question. Each question carries 10 marks

20. Discuss the various steps involved in peptide synthesis and illustrate with an example for dipeptide synthesis.

21. (a) What are terpenoids ? How are they classified?

    (b) What are essential oils? How are they isolated from their natural sources ?

(1 x 10 = 10 Marks)

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Sixth Semester B.Sc Chemistry Degree Examination, April 2023

BCH6B11 - Physical Chemistry III

(2019 Admission onwards)

Time: 2 hours

Max. Marks : 60

Section A (Short answers)
(Answer questions up to 20 marks. Each question carries 2 marks)

1. What is meant by common ion effect?
2. Draw the conductometric titration curve for HCl × NaOH and CH_3COOH × NaOH.
3. What is meant by reference electrode? Give an example.
4. Explain the term levelling effect of a solvent.
5. State and explain the law of constancy of interfacial angle.
6. Draw the (100) and (111) planes of a primitive cubic lattice.
7. What is a fuel cell? Give an example.
8. Explain Frenkel defect.
9. Calculate the hydrogen ion concentration of a solution whose pH is 7.23.
10. What is reverse osmosis?
11. Explain intrinsic semiconductivity.
12. Define colligative property. Give one example.

(Ceiling of marks : 20)

Section B (Paragraph)
(Answer questions up to 30 marks. Each question carries 5 marks)

13. What are metal excess defects? Explain with illustration.
14. Explain the construction and working of calomel electrode.
15. Derive Bragg's equation for the diffraction of x-rays by crystal lattice.
16. Calculate the freezing point of aqueous solution of a non- volatile solute which boils at 380 K. For water, K_f= 1.86 K Kg mol^{-1} and K_b = 0.52 K Kg mol^{-1}.
17. Explain the method to determine solubilities and solubility products of sparingly soluble salts by Kohlrausch' slaw.
18. Define molal elevation constant. Explain the principle behind the determination of molar mass of a solute from elevation of boiling point.
19. What is liquid junction potential? How can we eliminate it?

(Ceiling of Marks:30)

Section C (Essay)

(Answer any one. Each question carries 10 marks)

20. Explain the powder diffraction patterns of NaCl, KCl and CsCl, and correlate them with their crystal structures.

21. Explain how transport number of an ion can be determined by Hittorf's method?

(1× 10 =10 Marks)

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Sixth Semester B.Sc Chemistry Degree Examination, April 2023

BCH6B12 - Advanced & Applied Chemistry

(2019 Admission onwards)

Time: 2 hours

Max. Marks : 60

Section A (Short Answers)
(Answer upto 20 marks. Each carries 2 marks)

1. What is meant by zeta potential?
2. Explain 2D nano-materials with any two examples.
3. Discuss any two characterization methods of nano-materials.
4. What are the applications of combinatorial synthesis?
5. Explain the green synthesis of ibuprofen.
6. Differentiate addition polymers and condensation polymers with examples.
7. What is the chemistry involved in the preparation of caustic soda in Travancore Cochin chemicals?
8. What is meant by annealing of glass?
9. Differentiate pharmacodynamics and pharmacokinetics.
10. What is meant by TFM? Explain its significance.
11. Explain artificial ripening agents with examples.
12. What are the compositions of hair dyes

(Ceiling of marks : 20)

Section B (Paragraph)
(Answer questions up to 30 marks Each question carries 5 marks)

13. Discuss the classifications of nano-materials.
14. Explain molecular mechanics and molecular orbital methods for computational analysis of chemical systems.
15. Discuss the synthesis and applications of nylon 6 and nylon 66.
16. a) Draw the structure of DDT and BHC.(2 marks)
    b) Write a note on the side effects of pesticides. (3 marks)
17. Explain analgesics, antacids and antihistamines with examples.
18. Discuss the chemicals used in and health effects of hair dye, perfumes, antiperspirants.
19. Explain the common food adulterants and their methods of identification in coffee powder and chili powder.

(Ceiling of marks : 30)

Section C (Essay)
(Answer any one. Each question carries 10 marks)

20. State and explain the twelve principles of green chemistry.

21. Explain the manufacture of cement. What is the chemistry behind the setting of cement?

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Sixth Semester B.Sc Chemistry Degree Examination, April 2023

BCH6B13(E2) - Polymer Chemistry

(2019 Admission onwards)

Time: 2 hours

Max. Marks : 60

Section A (Short answers)

(Answer questions up to 20 marks. Each question carries 2 marks)

1. What are Elastomers? Give an example.
2. Explain ionic polymerization.
3. What is group transfer polymerization?
4. What is number average molecular weight of polymers?
5. What is meant by Poly dispersity index?
6. What is visco elasticity of polymers?
7. What is Rotational moulding?
8. What is meant by melt condensation?
9. Explain thermoforming in polymer processing.
10. What is meant by Vulcanisation?
11. Differentiate between HDPE and LDPE.
12. What are poly carbonates? Give examples.

(Ceiling of marks: 20)

Section B (Paragraph type questions)

(Answer questions up to 30 marks. Each question carries 5 marks)

13. Explain the classification of polymers based on structure.
14. Write short note on blow molding and thermoforming.
15. What is Zeigler-Natta polymerization? Give the mechanism.
16. Explain any two polymerization techniques in detail.
17. Explain thermal and oxidative degradation of polymers.
18. Explain the determination of viscosity average molecular weight.
19. Write notes on conducting polymers.

(Ceiling of marks: 30)

Section C (Essay)

(Answer any one question. Each question carries 10 marks)

20. Explain Chain and step growth polymerization with examples.

21. Explain preparation, properties and applications of

(a) terylene (b) nylone 6 (c) lexan and (d) Teflon.

(1 X 10 = 10 marks)