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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Sixth Semester B.Sc Chemistry Degree Examination, April 2024

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. Explain why transition metals form a large number of complexes.

2. Ce^{3+} is a good reducing agent. Why?

3. Give the IUPAC names of $K_4[Mo(CN)_8]$ and $[Ag(NH_3)_2]Cl$.

4. Calculate the E.A.N of $[Cr(NH_3)_6]^{3+}$

5. What are polynuclear carbonyls? Give an example.

6. Explain the term hapticity.

7. What is Ziegler-Natta catalyst?

8. Explain 18 –electron rule.

9. What is chelation therapy ?

10. Name the metals present in chlorophyll and cytochrome P-450.

11. What is cofactor? Give an example.

12. What are the advantages of carboplatin over cisplatin in chemotherapy?

[Ceiling of marks: 20]

Section B (Paragraph)

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

13. Discuss the cause and consequences of Lanthanide contraction.

14. Discuss briefly the basis of Scanning Electron Microscopy

15. Explain the ion-exchange method for the separation of lanthanides.

16. Explain the crystal filed splitting in square planar complexes.

17. Explain the bonding in ferrocene.

18. Predict the magnetic properties of $[Fe(CN)_6]^{3-}$ and $[FeF_6]^{3-}$. Justify your answer with the help of VBT.

19. Write a short note on the role of hemoglobin in the transport of oxygen and carbon dioxide.

[Ceiling of marks: 30]

Section c (Essay)

(Answer any one. Each question carries 10 marks)

20. Discuss the basic principles and important applications of Thermogravimetric analysis (TGA).

21. Discuss the applications of metal complexes in qualitative and quantitative analysis.

[1 x 10 = 10 Marks]

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Sixth Semester B.Sc Chemistry Degree Examination, April 2024

BCH6B10 - Organic 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. Which are the characteristic absorptions of amides in IR?

2. Describe the term auxochrome with an example.

3. Explain the principle of liquid-liquid chromatography.

4. Which are the possible electronic transitions in NO_2 group?

5. Why sucrose is a non-reducing sugar?

6. Draw the structure of β-D-glucopyranose.

7. Glucose and fructose will give the same osazone. Give reason

8. Describe the importance of Sodium potassium tartrate in Fehling's test.

9. Explain the chemistry of Biuret test.

10. Describe one method for the hydrogenation of unsaturated oils.

11. Mark the isoprene units in menthol.

12. Why sunlight is necessary for the synthesis of vitamin D?   [Ceiling of marks: 20]

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

13. Describe the working of gas chromatography.

14. Compare the ^{1}H NMR of toluene and acetophenone.

15. Describe a method for the conversion of an aldopentose to aldohexose.

16. Explain Sanger's method for the structural determination of peptides.

17. Briefly explain the biological functions of lipids in our body.

18. Dimerisation of ethylene is photochemically favored and thermally not. Give reason

19. Describe one method for the isolation of essential oils.   [Ceiling of marks: 30]

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

20. Describe the important steps in solid phase peptide synthesis.

21. a) Draw the HOMO and LUMO of 1,3,5-hexatriene;

     b)Prove that Cope rearrangement is [3,3] sigmatropic.

                                                       (6+4)

                                                [1 x 10 = 10 marks]

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Sixth Semester B.Sc Chemistry Degree Examination, April 2024

BCH6B11 - Physical Chemistry III

(2019 Admission onwards)

Time: 2 hours   Max. Marks : 60

SECTION A (Short Answers)
(Answerquestions up to 20 marks. Eachquestion carries 2 marks)

1. What are the characteristics of ions which show Frenkel defect ?

2. Illustrate the concept *ionic product* and *solubility product* with suitable examples.

3. What is the Debye-Huckel-Onsager equation? Mention the terms involved.

4. Define the term *Liquid Junction Potential*.

5. How does the Standard Electrode Potential help in predicting the direction of redox reactions?

6. What is optical exaltation and in which context is it observed?

7. Describe the Van't Hoff factor and its role in explaining abnormal molecular mass.

8. How *depression in freezing point* is used to calculate molecular weights?

9. What is the mechanism of buffer action in solution?

10. What is meant by *common ion effect*?

11. Draw 222 and 101 planes.

12. Differentiate between Intrinsic and extrinsic conduction.

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

13. What are *Conductometric titrations*? Discuss with the graph for weak acid-strong base and strong acid-weak base titrations.

14. Describe the functioning of concentration cells with and without transference.

15. Give the electrochemical Theory of Corrosion of Metals.

16. Derive Henderson equation for an acidic buffer with a suitable example.

17. Explain the principle and applications of reverse osmosis.

18. What is the importance of Bravais lattices in understanding crystal structures?

19. What are liquid crystals, and how they are classified?

20. Define the term *Transport number*. Describe the determination of *Transport number* using moving boundary method.

21. Give the radius ratio rule. Compare the structures of simple ionic compounds like NaCl, and CsCl, how does the rotating crystal method work in X-ray crystallography?

(1 × 10 = 10 Marks)

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Sixth Semester B.Sc Chemistry Degree Examination, April 2024

BCH6B12 - Advanced & Applied 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 polyamides? Name a polyamide.

2. What is MSG?

3. How does combinatorial chemistry differ from traditional methods?

4. What is PGA? What is its significance?

5. Explain the term molecular recognition.

6. Mention the important characteristics of Pyrex glass and its use.

7. What you mean by TFM?

8. What are mixed fertilizers?

9. Name an antioxidant food additive and give its structural formula.

10. Draw the structures of Rosaniline and Indigo.

11. Explain the term octane number of a fuel.

12. Differentiate chromophores and auxochromes.

(Ceiling of marks:20)

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

13. What is tacticity? Explain taking examples.

14. Explain any three characterization techniques of nanomaterials.

15. Explain the terms electrical double layer and zeta potential.

16. Write a note on saddle point.

17. Distinguish between Ab Initio and Semi-Empirical methods.

18. Explain refractory materials with reference to properties and uses.

19. What is the chemistry behind the setting of cement?

(Ceiling of marks: 30)

Section C (Essay)

(Answer any one. Each question carries 10 marks)

20. Explain the term green synthesis and illustrate it by discussing the synthesis of ibuprofen.

21. (a) What are pesticides? Discuss five different types of pesticides.

    (b) Draw the structure of Endosulfan. Mention its harmful effects. (7 + 3)

(1x10=10marks)

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Sixth Semester B.Sc Chemistry Degree Examination, April 2024

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. Differentiate between hetero and homo polymers using suitable examples.

2. Give the structure of a polyester.

3. What is the role of a plasticiser? Give an example of a plasticiser.

4. What is the significance of glass transition temperature?

5. List any four polymers that you encounter in your everyday life.

6. What is meant by RIC and what is it used for?

7. How is Polycarbonates synthesized and what is its application?

8. What is poly dispersity index?

9. Differentiate between degree of polymerisation and polydispersity index?

10. Name a polymer used in medical field which is bio-compatible and write its structure.

11. Name two pollutants let out by polymers.

12. Name two inhibitors used in addition polymerisation.

[Ceiling of Marks:20]

Section B (Paragraph)

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

13. Describe emulsion polymerisation.

14. Explain anionic and cationic polymerization.

15. Explain injection moulding with the help of a neat diagram.

16. Why are olefins good monomers for polymerisation reactions?

17. How is number average and weight average molecular weight calculated?

18. Write the structure of polyurethane. How is PU foam prepared?

19. How is number and weight average molecular weight calculated?

[Ceiling of Marks: 30]

Section C (Essay)

(Answer any one. Each question carries 10 marks)

20. Explain Coordination polymerisation. Give a detailed description of Ziegler-Natta catalyzed manufacture of stereo regular polymers.

21. Write short notes on the following polymers:

a. Silicone rubber　　　b. Glyptal　　　c. Kevlar　　　d. PMMA

[1x10 = 10 Marks]