1B6M18246　　　　　　　　(Pages : 2)　　　　Reg. No:...........................

Name: ....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Sixth Semester B.Sc Chemistry Degree Examination, March 2018

CHE6B09 – Inorganic Chemistry IV

(2015 Admission onwards)

Max. Time: 3 hours　　　　　　　　　　　　　　　　　　　Max. Marks: 80

Section A (One word)

Answer all questions. Each question carries 1 mark

1. Magnetite is an ore of --------

2. Give the composition of Gun metal.

3. The reduction of the ore to the molten metal at higher temperature is called as --------

4. The intense violet colour of $KMnO_4$ is due to -------- transitions.

5. The denticity of EDTA is --------

6. The number of unpaired electrons in $[Co(NH_3)_6]^{3+}$ is --------

7. The $CFSE_{octahedral}$ for a high spin d^4 system is --------

8. -------- is used as the metal ion indicator in Ca^{2+} *vs* EDTA titration.

9. Wilkinson's catalyst is --------

10. The metal present in Vitamin B_{12} is --------

(10 x 1 = 10 Marks)

Section B (Short answer)

Answer any ten questions. Each question carries 2 marks

11. What is zone refining?

12. Give the composition and uses of German silver and Brass.

13. What is lanthanide contraction? Explain.

14. What is an ambidentate ligand? Give an example.

15. What is Ziese's salt? Give its structure.

16. What is spectrochemical series? Why is it called so?

17. What are the functions of haemoglobin and myoglobin?

18. Give the IUPAC names of (i) $[Cr(NH_3)_6]^{3+}$ and (ii) $K_3[Fe(ox)_3]$.

19. Name two zinc containing enzymes.

20. What are misch metals? Mention two of their applications.

21. Transition metal ions form a large number of complexes. Explain.

22. Draw the optical isomers of $[Co(en)_3]^{3+}$.

(10 x 2 = 20 Marks)

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

23. Discuss sodium-potassium pump.

24. How is pure nickel obtained from its ore?

25. Discuss the splitting of d-orbitals in tetrahedral complexes according to Crystal field theory.

26. Write a note on metal carbonyls.

27. How 18 electron rule is helpful to determine structure of carbonyls.

28. Write a note on anticancer drugs.

29. Explain the geometry and magnetic behaviour of $Fe(CN)_6]^{4-}$ and $[Fe(CN)_6]^{3-}$ on the basis of Valence bond theory.

30. Distinguish between calcination and roasting with suitable examples.

(5 x 6 = 30 Marks)

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

31. (a) Discuss the crystal field splitting in octahedral complexes.

    (b) Briefly discuss the merits and demerits of Crystal field theory.

32. Explain how individual lanthanides are isolated from monazite sand.

33. Discuss the steps involved in the extraction of pure copper from its ore.

34. (a) Discuss the reactions of ferrocene that illustrate its aromatic character.

    (b) Discuss the applications of complexes in quantitative analysis.

(2 x 10 = 20 Marks)

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE
Sixth Semester B.Sc Chemistry Degree Examination, March 2018
CHE6B10 – Organic Chemistry III
(2015 Admission onwards)

Max. Time: 3 hours   Max. Marks: 80

Section A (One word)
(Answer all questions. Each question carries 1 mark)

1. Which vibration corresponds to the broad band at 3500-3200 cm^{-1} in the IR spectrum of propanol.

2. Write the structure of the product of reaction of glucose with excess of phenyl hydrazine.

3. What is Edman's reagent?

4. Benedict's reagent is.........................

5. Curdling of milk is an example for...........................

6. Deficiency of .... causes beri-beri.

7. The source of menthol is.............

8. .... is an example of peptide hormone?

9. .... is responsible for the transmission of hereditary character.

10. For the electrocyclic reaction of butadiene............rotation is thermally allowed.

(10x1= 10 Marks)

Section B (Short answer)
(Answer any 10 questions. Each question carries 2 marks)

11. Using Woodward Fieser rules, calculate the UV λ_{max} of the following compound.
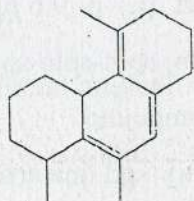
12. How can you differentiate methyl acetate from propanamide by IR spectroscopy?

13. Discuss mutarotation of sugar with respect to glucose?

14. Write one method for the determination of sugar in a blood sample?

15. What is the Biuret test for protein?

16. Show the formation of a peptide bond from the condensation of any two amino acid molecules?

17. Write the structure of Methandrostenolone.

18. Why hydrogenation of an oil is called hardening of oil?

19. Give the ring formula of D-ribose and 2-deoxy-D-ribose.

20. Write structure and one physiological activity of piperine.

21. Give the mechanism of Claisen rearrangement?

22. What is the symmetry criterion for [2+2] cycloaddition reactions?

(10 x 2 = 20Marks

Section C (Paragraph)
(Answer any 5 questions. Each question carries 6 marks)

23. Explain the position of signal, spin-spin splitting pattern and hence draw the ^{1}H NMR spectrum of propanoic acid.

24. How will you convert D (+)-glucose in to D (-)-arabinose?

25. Explain aminomalonate synthesis of amino acids in detail?

26. Discuss the structure and biological functions of sex hormones?

27. What is iodine number of fats and oils? How it is calculated?

28. Explain in detail the source, structure and uses of citral.

29. Describe Watson and Crick model of DNA.

30. Discuss Diels-Alder reaction using FMO approach.

(5x6= 30 Marks)

Section D (Essay)
(Answer any 2 questions. Each question carries 10 marks)

31. The spectral data of a compound shows following characteristics signals.

    (a) UV - λ_{max}–250 nm

    (b) IR- (i) 1615 cm^{-1}, 1475cm^{-1} (ii) 1715cm^{-1}(iii) 2800 cm^{-1}, 2720cm^{-1} (iv) 3050 cm^{-1}

    (c) NMR (i) δ- 7-8 ppm, 5H, multiplet (ii) δ- 9.6 ppm, 1H, singlet.

    Explain each and every peaks, position, spin-spin splitting pattern of signals and hence suggest a suitable structure for the compound.

32. Discuss (a) primary, secondary, tertiary and quaternary structure of proteins.

    (b) Cyclic structure of sucrose and lactose.

33. (i) Explain in detail about (a) peptide hormones (b) amine hormones (c) steroid hormones.

    (ii) Write the structure of Vitamin A and Vitamin B$_3$.

34. (a) Explain the source, structure and physiological functions of nicotine and quinine

    (b) Discuss the stereochemistry of 4n cyclisation reactions.

(2x10= 20 Marks)

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Section-A (One word)
Answer all questions. Each question carries 1 mark

1. On dilution, specific conductance of a solution --------------

2. The fraction of total current carried by a particular ion is called its -------------

3. For a spontaneous reaction the EMF of the cell should be -----------

4. The greater the pKa of an acid, the acid is-------------

5. The pH of 0.0001M HCl solution is -----------

6. When a solute undergoes association in a particular solvent, Van't Hoff factor is ---------
   one.

7. The vapour pressure of a liquid --------- with increase in temperature.

8. The number of atoms per unit cell in a BCC lattice is -----------

9. The deliberate addition of an impurity to a pure semiconductor inorder to enhance its
   conductivity is called------------

10. The stoichiometric point defects that cause a decrease in the overall density of a crystal are
    the ---------- defects.   **(10 x 1 = 10 Marks)**

Section-B
Answer any 10 questions. Each question carries 2 mark.

11. What is meant by intrinsic semiconductivity?.

12. What is an imperfection in a crystal?

13. State the law of constancy of interfacial angles?

14. What are Weiss indices ?

15. State and explain Roult's law.

16. How does pressure affects the solubility of a gas in a given liquid at constant temperature?

17. What is meant by a differentiating solvent?

18. Calculate the degree of hydrolysis and pH of a 0.2M solution of NH_4Cl. Given K_b for
    NH_4OH is 1.8×10^{-5}.

19. What is a Quinhydrone electrode ?

20. What is meant by standard electrode potential?

21. State and explain Faraday's second law of electrolysis.

22. Define cell constant.

Section-C
Answer any five questions. Each question carries 6 marks.

23. Define specific conductance and molar conductance. Explain the effect of dilution on thes for strong electrolytes.

24. State and explain Kohlrausch's law and give one of it's applications.

25. A voltaic cell is set up at 25^0C with the half cells, Al/Al^{3+} (0.001M) and $_{Ni/Ni2+}$ (0.50M). Write the equations for the reaction that occurs when the cell generate an electric current and determine the cell potential. [Given $E^0_{Ni/Ni2+}$= -0.025V ,$E^0_{Al/Al3+}$ = -1.66V]

26. What is meant by buffer action ? Explain the buffer action of Ammonium acetate.

27. Derive an expression for the degree of hydrolysis of a salt of weak acid and strong base.

28. Arrive at a relationship between the elevation of boiling point for a dilute solution of a solute and the molar mass of the solute.

29. Explain the principle and method of purification of sea water by reverse osmosis.

30. a)Derive the Bragg equation. What are its applications.

    b)How the density of a cubic unit cell determined.

Section-D
Answer any two questions. Each question carries 10 marks.

31. Discuss the powder method for the X-ray Diffraction study of crystals and analysis of the diffraction pattern for the cubic lattice.

32. What is Corrosion? Discuss the electrochemical theory of corrosion. Briefly explain how corrosion can be prevented.

33. Discuss the distillation behavior of the three types of binary miscible liquid systems.

34. A) Derive the Henderson's equation s for the pH of an acidic buffer.

    B) A buffer solution is prepared by mixing 5g of acetic acid and 7.5g of sodium acetate an then making up the volume to 500mL.What is the pH of the buffer solution? K_a of acetic acid = 1.8×10^{-5} at 298K.

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Sixth Semester B.Sc Chemistry Degree Examination, March 2018

CHE6B12 – Advanced & Applied Chemistry

(2015 Admission onwards)

Max. Time: 3 hours

Max. Marks: 80

Section A (One word)
Answer all questions. Each question carries 1 mark

1. --------- is an example of zero dimension nano-particle.

2. The hybridisation of carbon atoms in carbon nano-tubes is ---------

3. ----------------is an example of a green solvent.

4. ------------is the monomer of nylon-6.

5. Give the major component present in CNG

6. Give an example of tranquilizer drug.

7. Titanium dioxide pigment is prepared mainly from --------- in Travancore Titanium Products Ltd.

8. Draw the structure of DDT molecule.

9. --------- is an example of mordent dye.

10. Give an example of an artificial sweetener.

(10 x 1 = 10 Marks)

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

11. Write a note on fullerenes.

12. What is meant by operating systems? Give one example.

13. Explain tacticity of polymers.

14. Discuss linear and non-linear regression.

15. Give any two examples of synthetic rubber. What are their monomeric units?

16. What is the composition of tooth paste? Give any two health effects of it.

17. Differentiate pharmacodynamics and pharmacokinetics.

18. What is meant by TFM?

19. Define herbicides?

20. Draw the structure of BHT and BHA.

21. What is meant by pasteurisation?

22. Differentiate antiseptics and disinfectants.

(10 x 2 = 20 Marks)

23. Explain combinatorial synthesis with its application in drug discovery.

24. Discuss the classifications of nano-materials.

25. Discuss molecular mechanics and molecular orbital methods for computational analysis of chemical systems.

26. What are biodegradable polymers? Discuss the methods of preparation of PGA, PLA and PHBV.

27. In the light of Endosulfan disaster in Kerala, discuss harmful effects of pesticides.

28. The potential uses of nano-materials are significant in electronics, optics, catalysis and medicine. Establish the statement with examples.

(5 x 6 = 30 Marks)

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

29. Discuss the composition and applications of various food additives.

30. Explain any five principles of green chemistry with explanations

31. a) Discuss the composition and uses of nirogeneous, phosphatic and potash fertilisers. (6 marks)

    b) Discuss the applications of polythene, PVC, Nylon-66, and Kevlar. (4marks)

32. a) Explain analgesics, antacids and antihistamines with examples. (5 marks)

    b) Discuss the composition and health effects of hair dye, perfumes, and antiperspirants. (5 marks)

(2 x 10 = 20 Marks)

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Name: ....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE
Sixth Semester B.Sc Chemistry Degree Examination, March 2018
CHE6B13(E2) – Polymer Chemistry
(2015 Admission onwards)

Max. Time: 3 hours   Max. Marks: 80

Section A (One word)
Answer *all* questions. Each question carries *one* mark

1   The monomer(s) present in *nylon66* is ....

2   Among PTFE, nylon6, PVC, and Bakelite, the thermosetting polymer is ....

3   Name the product obtained by the polymerization of phthalic acid and ethelene glycol.

4   Nomex is a polymer of .... and .... monomers.

5   Give an example for polycarbonates.

6   The polymer used for the manufacturing of soft drink bottles are --------------

7   The class of monomers present in proteins are -------------

8   Melmac is used as --------------------

9   The structure of Bisphenol-A is ------------------

10   ----------- is the monomer of starch.

(10 x 1 = 10 Marks)

Section B (Short Answer)
Answer any *ten* questions. Each question carries *two* marks

11   How do you classify the polymers based on its origin?

12   How do you calculate viscosity average molecular weight?

13   What are HDPE and LDPE? Mention one use each.

14   Give an example for anionic polymerization.

15   Write any two radical initiators used in radical polymerization reactions.

16   What is weight average molecular weight in a polymer?

17   What is injection moulding?

18   What are conducting polymers? Give one example.

19 What are copolymers? Give one example.

20 What is polydispersity index? What is its significance?

21 What are fire resistant polymers? Give an example.

22 What do you mean by vulcanization?

Section C (paragraph)
Answer any *five* questions. Each question carries *six* marks

23 Differentiate between thermoplastics and thermosetting plastics. Give one example eac for them.

24 Discuss the classification and important applications of Carbon fibers.

25 Write a note on plastic recycling.

26 Discuss the preparation and use of any two biodegradable polymers.

27 Write a note on blow moulding and thermoforming techniques. Give examples.

28 Write a note on the tacticity in polymer molecules. Write the structure and use of each o them.

29 Differentiate between thermal and photo degradation reactions in polymers.

30 Write one example each the reactions

(a) ring opening polymerisation (b) group transfer polymerisation.

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

31 Discuss the mechanism of Zeigler – Natta Polymerisation. What are its advantages?

32 Discuss the any five polymerisation techniques.

33 What is Tg? Discuss the importance and factors affecting Tg.

34 Discuss the preparation, properties and uses of Synthetic Rubbers.