13

Time: 3 hours

Max. Marks: 80

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

1. Mond's process is used for the purification of --------

2. The most abundant metal in earth's crust is --------

3. The most common oxidation state of lanthanides and actinides is --------

4. Among promethium, terbium, protactinium, ytterbium, which is an actinide?

5. Name the ore found in the beach sands of Kerala that contain thorium.

6. The formula of diamminesilver(I) chloride.

7. The CFSE for an octahedral high-spin d^4 system is --------

8. The formula of Zeise's salt is --------

9. The metal present in chlorophyll is --------

10. The EAN of Co in $[Co(NH_3)_6]^{3+}$ is --------

(10 x 1 =10 Marks)

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

11. Explain the term chelate effect.

12. Calculate the CFSE for a d^4 system in a tetrahedral field.

13. Tetrahedral complexes are generally high spin. Why?

14. What is effective atomic number rule? Explain.

15. Give the IUPAC names of (i) $K_4[Mo(CN)_8]$ and (ii) $[Ni(CO)_4]$

16. Name any two iron containing enzymes.

17. On the basis of VBT, account for the geometry and magnetic behaviour of $[NiCl_4]^{2-}$.

18. What are metal carbonyls? Give two examples.

19. Explain the term calcination with a suitable example.

20. Name any two anticancer drugs.

21. What is smelting?

22. Why is the first ionization energy of Zn exceptionally high?

(10 x 2 = 20 Marks)

M18247   (Pages : 2)   Reg. No:..........................

                                               Name: ....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Sixth Semester B.Sc Chemistry Degree Examination, March 2019

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)

Which vibration does the strong broad band in the range 1680-1630 cm^{-1} in the IR spectrum of acetamide?

Give an example of a polysaccharide which can yield β-glucose on hydrolysis?

Which compound has known as Sanger's reagent?

A solution of .... is called Molisch's reagent.

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

Deficiency of .... causes scurvy.

In DNA base pairing, guanine pairs with.............

.... is an example of amine hormone?

The fragrance of flowers are due to the presence of.................compounds?

For the electrocyclic reaction of hexatriene............rotation is thermally allowed.

(10x1= 10 Marks)

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

1. Using Woodward Fieser rules, calculate the UV λ_{max} of the following compound.

2. How can you differentiate the two isomers of C_2H_6O by using IR spectroscopy?

3. Discuss mutarotation of sugar with respect to glucose?

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

5. What is the xanthoproteic test for detection of protein?

6. Discuss the specificity and efficiency of enzyme catalysis ?

7. Write the structure of vitamin C?

8. Write any two biological functions of lipids?

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

20. Write structure and one physiological activity of coniine?

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

23. Write a note on the structural isomerism exhibited by coordination complexes.

24. Discuss the structure and functions of haemoglobin.

25. What are alloy steels? Give their compositions and uses.

26. What is van Arkel method? Explain its application in the purification of titanium.

27. What are the postulates of Werner's coordination theory?

28. What are the factors affecting the stability of complexes?

29. Briefly discuss the consequences of lanthanide contraction.

30. How can you explain structures of carbonyls with the help of 18 electron rule.

(5 x 6 = 30 Marks)

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

31. Explain method of preparation, properties and structure of ferrocene.

32. (a) Discuss the mechanism of sodium-potassium pump.

   (b) Discuss the crystal field splitting in octahedral complexes.

33. Explain

   (i) Electrolytic refining (ii) oxidative refining

   (iii) Vapour phase refining (iv) Zone refining

34. Write a note on the classification of organometallic compounds.

(2 x 10 = 20 Marks)

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119248   (Pages : 2)   Reg. No:.............................

Name: ....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Sixth Semester B.Sc Chemistry Degree Examination, March /April 2019

CHE6B11 – Physical Chemistry III

(2016 Admission onwards)

Time: 3 hours   Max. Marks: 80

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

1. The quantity of electricity required to discharge mole of Al^{3+} ions in electrolysis is ....Faraday

2. With decrease in concentration the molar conductance of an electrolyte solution ....

3. The process of coating iron articles with zinc is called ....

4. The pH of a solution of potassium acetate in water will be .... 7.

5. The conjugate acid of carbonate ion is ....

6. The boiling point of 0.1 molal solution of urea is .... that of 0.1 molal solution of glucose.

7. When dissociation of a solute occurs in a solvent, Van't Hoff factor is .... one.

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

9. Doping of silicon with aluminium produces a .... semiconductor.

10. The temperature at which a liquid crystal converts to the isotropic transparent liquid is called ....

(10 x 1 = 10 Marks)

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

11. What are f-centers?

12. How may the conductivity of an intrinsic semiconductor be increased?

13. What are the Miller indices of a plane making intercepts of 2a,3b,2c?

14. Sketch the (220) planes of FCC lattice ?

15. State and explain Henry's law.

16. What are azeotropes? Give one example.

17. What are amphoteric substances? Explain with examples.

18. What is meant by leveling effect ?

19. Explain reference electrode giving one example ?

20. Write down the Nernst equation for the emf of a cell? Explain the terms.

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

22. Distinguish between metallic conductance and electrolytic conductance.

(10 x 2 = 20 Marks)

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21. Discuss the pericyclic reactions taking place in human body?

22. What is the symmetry criterion for [4+2] cycloaddition reactions?   (10x2 = 20Marks)

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

23. Write the position of signal, spin-spin splitting pattern and hence draw the ^{1}H NMR spectrum of acetaldehyde and acetone.

24. Give the synthetic route for the conversion of D (-)-arabinose in to D (+)-glucose and D (+)-mannose.

25. Discuss the Strecker synthesis of aminoacids with the help of an example.

26. Discuss (a) biological functions of cholesterol (b) HDL and LDL.

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

28. Discuss the structure and vulcanization of natural rubber in detail.

29. Describe Watson and Crick model of DNA.

30. Explain pericyclic reactions taking place in human body.

(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 and details

  (a) UV - λ_{max} -265 nm

  (b) IR- (i) 1450-1375 cm^{-1} (ii) 1600cm^{-1} (iii) 1710 cm^{-1} (iv) 3000 cm^{-1} (v) 3150 cm^{-1}

  (c) NMR (i) δ- 7-8 ppm, 5H, multiplet (ii) δ - 2.3 ppm, 3H, singlet.

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

32. Write in detail (a) DNA replication (b) Biosynthesis of protein (c) Test for detecting proteins

33. (i) Explain how reducing sugars can be differentiated from non reducing sugars by
  (a) Tollen's test (b) Fehling's test (c) Benedict's test. Write the chemistry behind these tests.

  (ii) Explain Denaturation of proteins with examples.

34. (a) What are essential oils. Discuss the method for isolation of essential oils.

  (b) Explain (i) Cope rearrangement and (ii) Claisen rearrangement. Give an example for each and explain their mechanistic pathways

(2x10= 20 Marks)

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

23. Discuss the different types of reversible electrodes.

24. Explain the Lowry Bronsted concept of acids and bases with suitable examples.

25. Derive an expression for the hydrolysis constant of a strong acid and a weak base.

26. Briefly explain the Arrhenius theory of electrolytic dissociation.

27. The molar conductance of CH_3COONa, HCl and NaCl at infinite dilution are 91.0,426.2 and 126.5 S cm^2 /mol at 25^0 C. If the percentage dissociation of acetic acid in it's 0.01M solution is 4.2 . Calculate the molar conductance and conductivity of the solution.

28. Explain the term Proper rotaion axis, Mirror plane and Inversion center with regard to crystals.

29. Explain p-type semi conductivity on the basis of the band theory of solids.

30. Derive the van't Hoff osmotic pressure equation.

(5 x 6 = 30 Marks)

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

31. A) Define osmotic pressure. Describe the Berkeley and Hartley's method of determining osmotic pressure of a solution.

    B) What is reverse osmosis? How it can be used to purify sea water ?

32. Discuss the application of the principles of common ion effect and solubility product in inorganic qualitative analysis.

33. A) Discuss the construction and function of a calomel electrode.

    B) Discuss the principle underlying potentiometric redox titrations.

34. A) Explain the term transport number. Discuss the moving boundary method to determine transport numbers

    B) In a moving boundary experiment 0.01 N HCl was taken in the cell having area of cross section equal to 3.33cm^2 at 300K. On passing a current of 3mA for 45minutes, the boundary was observed to move through 2.1cm. Calculate the transport number of H$^+$ ion.

(2 x 10 = 20 Marks)

16

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

1. Quantum dots are the example ----------- dimension nano-particle.

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

3. ----------------is an example of a supra molecular interaction.

4. -----------is the monomer of Buna-N

5. Give the major component present in LPG

6. Give an example of antihistamine drug.

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

8. Draw the structure of Endosulfan molecule.

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

10. Give the structure of BHA.

(10 x 1 = 10 Marks)

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

11. Give any four applications of metal oxide nao-particles.

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

13. Differentiate addition polymers and condensation polymers with examples.

14. Discuss linear and non-linear regression.

15. What is meant by plastic identification codes?

16. What is the ingredients and function shaving creams?

17. What is meant by prodrugs give examples?

18. Differentiate antiseptics and disinfectants?

19. Define fungicides give an example?

20. What are food preservatives give any two examples of natural food preservatives?

21. Explain the preparation of Rosaniline dye.

22. What is meant by artificial ripening agents? Give any two health effects.

(10 x 2 = 20 Marks)

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

23. Explain microwave and ultrasound assisted synthesis of Aldol condensation and Diels-Alder reaction.

24. Discuss the classifications of nano-materials.

25. Compare molecular mechanics molecular orbital methods used computational analysis in chemistry.

26. Differentiate addition and condensation polymerisation with two examples each.

27. Explain location, raw materials, chemical reactions and uses of ammonium sulphate prepared at Fertilisers and Chemicals Travancore Ltd.

28. Explain preparation, properties and significance of ant three carbon nao-structures.

(5 x 6 = 30 Marks)

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

29. Discuss any three methods of food preservation.

30. a) Explain different types of non-covalent interactions (6marks).

b) Explain the significance of microwave assisted synthesis in green chemistry (4marks).

31. a) Discuss methods and uses of various types of glasses. (6 marks)

b) Discuss the applications of Teflon, PAN, Kevlar and Bakelite. (4marks)

32. a) Explain preparation methods of Paracetamol and Aspirin. (5 marks)

b) Discuss ingredients and functions of shaving creams. (5 marks)

(2 x 10 = 20 Marks)

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

Glyptal is a polymer of -----------------

The monomer(s) used in Kevlar is ------------

PVC is prepared by ------------------- polymerization of vinyl chloride.

Kevlar is prepared from .... and .... monomers.

The moomer of Teflon is ....

Among PHBV, Nomex, polylactide, and Neoprene, the biodegradable polymer(s) is/are ....

to which category of polymers Buna-N belongs?

The monomer of superglue is -------------------

The monomer present in cellulose is --------------------

The polymer used for the manufacturing of plugs and switches is ----------------------

(10 x 1 = 10 Marks)

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

1. What are semi-synthetic polymers? Give an example.

2. How do you calculate viscosity average molecular weight?

3. How do you classify the polymers based on its structure?

4. What are HDPE and LDPE? Mention one use for each.

5. Give an example for cationic polymerization reaction.

6. What is the significance of polydispersity index?

7. What is polyurethane? Give any two uses.

18   What is PHBV? Mention its use.

19   What is number average molecular weight?

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

21   Give an example each for elastomeres and thermoplastics.

22   Mention one use each for phenol-formaldehyde resin, and PMMA.

(10 x 2 = 20 Marks)

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

23   Write a note on the Tacticity of polymers. Write the structure and use of each of them.

24   Write a note on plastic identification codes.

25   Differentiate between photo degradation and oxidative degradation of polymers.

26   Discuss the relationship between molecular weight and degree of polymerization.

27   Differentiate between melt condensation and interfacial polycondensation reactions.

28   Discuss the use of any four polymeric materials in biomedical field.

29   Discuss the preparation, properties and uses of saran, dynel and Teflon.

30   Discuss group transfer polymerization.

(5 x 6 = 30 Marks)

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

31   Write a note on any five Polymer Processing Techniques.

32   Discuss the application of polymers as (a) High Temperature polymers (b) Conducting polymers (c) fire resistant polymers (d) carbon fibers.

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

34   What is Tg? What are the factors affecting Tg?

(2 x 10 = 20 Marks)