1B4M17033 (Pages : 2) Reg. No:.....

Name: .....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Fourth Semester B.Sc Chemistry Degree Examination, March 2017

CHE4C04 – Physical & Applied Chemistry

(2015 Admission onwards)

Max. Time: 3 hours Max. Marks: 64

Section A (One word)

Answer all questions. Each question carries 1 mark

1. To which type of colloidal system does milk belong to?
2. What is the unit of rate constant of a zero order reaction?
3. Use of finely divided iron in the Haber process for the manufacture of ammonia is an example for ..... catalysis.
4. What is the stationary phase in paper chromatography?
5. A shift of absorption maximum to shorter wavelength is called .....
6. The functional group responsible for an intense peak at IR frequency ~1720cm^{-1} is .....
7. The monomer of Teflon is .....
8. Excess consumption of nitrates by humans leads to the child disease called .....
9. What is the chemical name of Ajinamoto?
10. .....is a dipeptide used as the principal artificial sweetner nowadays.

(10 x 1= 10 Marks)

Section B (Short answer)

Answer any seven questions. Each question carries 2 marks

11. What is meant by Brownian movement?
12. Define the term molecularity of a reaction.
13. Acid hydrolysis of ethyl acetate in dilute aqueous solution is a pseudo first order reaction. Comment.
14. Give two applications of TLC.
15. H_2 molecule is IR inactive whereas HCl molecule is IR active. Why?
16. Give the relationship between absorbance and transmittance.
17. What is meant by vulcanization?
18. Define the term octane number.
19. What are tranquilizers? Give an example.
20. What is meant by thermal pollution?

(7 x 2 = 14 Marks)

Section C (Paragraph)

Answer any four questions. Each question carries 5 marks

21. Differentiate between lyophilic and lyophobic colloids.
22. Briefly discuss the influence of temperature on reaction rate, on the basis of collision theory.
23. Distinguish between adsorption chromatography and partition chromatography.
24. CO_2 molecule has four normal modes of vibrations but it shows only two peaks in its IR spectrum. Explain.
25. Discuss the classification of polymers on the basis of molecular forces.
26. Write on the composition of talcum powder.

(4 x 5 = 20 Marks)

Section D (Essay)

Answer any two questions. Each question carries 10 marks

27. a) Derive the integrated rate equation for a first order reaction.

    b) The rate constant of a reaction doubles when temperature is increased from 298K to 308K. Calculate the activation energy for the reaction.

28. a) Explain the following terms with suitable examples.

    i) Chemical shift ii) Spin-spin coupling

    b) Briefly discuss the applications of UV-Visible spectroscopy.

29. a) Discuss the terms BOD and COD.

    b) Describe various methods adopted in solid waste management.

30. a) Explain the term dye. What are the requirements of a good dye?

    b) Briefly discuss the manufacture of soap from fats and oils.

(2 x 10 = 20 Marks)

2B4M17032 (Pages : 2) Reg. No:.....

Name: .....

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Fourth Semester B.Sc Chemistry Degree Examination, March 2017

CHE4B04 – Organic Chemistry- I

(2015 Admission onwards)

Max. Time: 3 hours Max. Marks: 80

Section A (One word)

Answer all questions. Each question carries 1 mark

1. Arrange ethyl, ethenyl and ethynyl carbanions in the increasing order their stability.
2. What is the product obtained when benzene is first methylated in presence of anhydrous $AlCl_3$ and then nitrated with a mixture of fuming HNO_3 and fuming H_2SO_4?
3. Ozonolysis of 2 methyl but-2-ene followed by hydrolysis gives.....
4. Most stable conformation of ethylene chlorohydrin is ---------
5. The IUPAC name of formic acid is ----------
6. Write the structural formula of the alkene which on treatment with hot acidified $KMnO_4$ gives only acetone.
7. Dehydration of 3,3-dimethyl-2-butanol with conc. H_2SO_4 gives -------as the major product.
8. Give an example of non benzenoid aromatic compound
9. When benzene is subjected to reductive ozonolysis, the product formed is -------
10. The electrophile in aromatic chlorination reaction is ---------

(10 x 1 = 10 Marks)

Section B (Short answer)

Answer any ten questions. Each question carries 2 marks

11. The enol form of cyclohexa-2,4-dienone is more stable than its keto form. Justify?
12. Draw the E and Z forms of 3-bromo-4-chlorohex-3-ene.
13. Discuss the Haworth synthesis of naphthalene.
14. An organic compound with molecular formula C_5H_{10} on ozonolysis yield acetone as one of the product. Write the structural formula of C_5H_{10} and explain the reaction.
15. Express d-tartaric acid in the RS form?
16. Taking suitable examples differentiate between homolysis and heterolysis.
17. Discuss the Kolbe's electrolysis of succinic acid.
18. Starting from carbon and hydrogen, how is 3-methyl-1-pentyne synthesized?
19. Write the mechanism of addition of bromine to but-1-ene in the absence of light and heat.
20. How many sigma and pi bonds are present in 9,10-anthraquinone?
21. Arrange the following acids in the increasing order of p^{Ka} values: formic acid ,acetic acid ,2-chloro acetic acid, 2,2dichloro acetic acid.
22. What is meant by *trans* hydroxylation? What are the reagents used for this reaction?

(10 x 2 = 20 Marks)

Section C (Paragraph)

Answer any five questions. Each question carries 6 marks

23. Discuss the mechanism of addition of HBr to (i) 2-metylbut-2-ene (ii) 3-methylbut-1-ene. (iii) 3,3-dimethylcyclohexene.

24. Draw the conformations of *n*-butane. Compare their stability.

25. Write a note on optical isomerism in biphenyls

26. Which is more basic, pyrrole or pyridine? Justify your answer.

27. State and explain Markonikov's rule with suitable example.

28. What is heat of hydrogenation? How is it related to the stability of an alkene.

29. Discuss the hybridization and stability of carbocations.

30. Discuss the methods used for the resolution of racemic mixtures.

(5 x 6 = 30 Marks)

Section D (Essay)

Answer any two questions. Each question carries 10 marks

31. (a) What is mesomeric effect? Using this concept compare the basicity of aniline, *p*-nitroaniline and *p*-anisidine.

    (b) Draw the resonance forms of (i) divinyl ether (ii) diphenyl ether (iii) anilinium cation.

32. (a) With suitable examples, explain the terms enantiomeres, diastereomeres and meso form.

    (b) Discuss the mechanism of (i) the reaction between propene and HCl in presence of dibenzoyl peroxide (ii) the reaction between propene and HBr in the absence of dibenzoyl peroxide.

33. What are reaction intermediates? Write a note on any four type of reaction intermediates.

34. (a) Discuss the following reactions in alkenes with suitable examples. (i) acid catalysed hydration (ii) Reductive and oxidative ozonolysis (iii) Baeyer's test (iv) oxidation with $KMnO_4$.

    (b) Compare the electrophilic addition rate of alkenes and alkynes.

(2 x 10 = 20 Marks)