

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Fifth Semester B.Sc Chemistry Degree Examination, November 2019

BCHE5B07 – Organic Chemistry II

(2017 Admission onwards)

Time: 3 hours

Max. Marks: 80

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

1. Propene reacts with HI to yield.....
2. Arrange Phenol, P-methoxy phenol and p-nitrophenol in the increasing order of pka.
3. The rearrangement of allyl phenyl ether to o- Allyl phenol is known as.....
4. Benzaldehyde when treated with concentrated NaOH yields and sodium benzoate.
5. In Oppenauer oxidation, secondary alcoholic group is converted in to.....
6. 95.6% solution of alcohol is called.....
7. The product formed in the hydrolysis of ethanenitrile is.....
8. Among trimethyl amine, methyl amine and aniline which is the most basic?
9. The conversion of an acid amide into a primary amine by the treatment with bromine and alkali is called.....
10. Which position is most preferred in the electrophilic substitution of pyridine?

(10 x 1 = 10 Marks)**Section B (Short answer)***Answer any ten questions. Each question carries 2 marks*

11. What is E1 elimination reaction?
12. How is eosin prepared?
13. What are crown ethers? Give an example.
14. What is Wolff-Kishner reduction? Give an example.
15. Write the structure of the product formed by the reaction of acetaldehyde with 2,4-dinitrophenylhydrazine under acidic condition.
16. Explain Reformatsky reaction with an example.
17. How can you convert aniline in to iodobenzene?
18. Discuss Blanc's rule with a suitable example.

19. How can you synthesize cinnamic acid through Knoevenagel reaction?
20. Write a method for conversion of nitrobenzene into azobenzene.
21. Explain the preparation of benzenediazonium chloride from aniline.
22. What is an active methylene group? Give examples of compounds containing this group.

(10 x 2 = 20 Marks)

Section C (Paragraph)

Answer any five questions. Each question carries 6 marks

23. Explain the role of N-bromosuccinimide in allylic bromination of alkenes.
24. What are the products obtained when methyl magnesium chloride reacts with
(i) Acetaldehyde, (ii) Acetone, (iii) CO₂ and the product in each case is subjected to acidic hydrolysis.
25. Explain the effect of electron-withdrawing groups on the acidity of phenol.
26. Explain Claisen rearrangement with suitable examples and suggest a mechanism for the reaction.
27. What is Beckmann rearrangement? Explain with suitable example.
28. Explain Reimer-Tiemann formylation reaction with mechanism.
29. Explain Hoffmann elimination reaction and its regioselectivity with suitable example.
30. Give the products formed in the following reactions with equations:
 - (i) Friedel-Crafts acylation of furan
 - (ii) Friedel-Crafts acylation of Indole
 - (iii) Reimer-Tiemann reaction of Indole

(5 x 6 = 30 Marks)

Section D (Essay)

Answer any two questions. Each question carries 10 marks

31. (a) What is Pinacol-pinacolone rearrangement?
(b) Explain the Victor Meyer's test to distinguish between 1°, 2° and 3° alcohol.
32. (a) Illustrate Sandmeyer's and Gattermann's reactions with suitable examples.
(b) What is Perkin condensation reaction. Explain with mechanism and suitable example.
33. (a) How will you convert benzene into meta-nitrobenzoic acid.
(b) Explain esterification and transesterification reaction.
(c) Discuss the relative acidity of carboxylic acids and sulphonic acids.
34. (a) How is Guanidine prepared? Explain its basicity.
(b) Illustrate how 1°, 2° and 3° aromatic amines react differently with nitrous acid.

(2 x 10 = 20 Marks)

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE
Fifth Semester B.Sc Chemistry Degree Examination, November 2019

BCHE5B08 – Physical Chemistry II

(2017 Admission onwards)

Time: 3 hours

Max. Marks: 80

Section A (One word)

Answer all questions. Each question carries 1 mark

1. Name the phenomenon that causes the glow of phosphorous in air observed in the dark.
2. The half life of a first order reaction $A \longrightarrow B + C$ is 10 min. The concentration of A would be reduced to 10% of the original concentration in minutes.
3. acts as poison to Pt catalyst in the manufacture of sulphuric acid by contact process.
4. Pumice stone and thermocol belongs to the colloidal system.....
5. Alum is used as a water purifier because of its property
6. What type of adsorption shows an initial increase in its extent with an increase in temperature?
7. Effective separation of lanthanides was made possible first bychromatography.
8. Shift of absorption maxima towards longer wavelength is calledshift.
9. The time taken by a particular analyte peak to reach the detector after sample introduction in GLC is called
10. Shielding shifts the δ values of an NMR signal tovalues.

(10 x 1= 10 Marks)

Section B (Short Answer)

Answer any ten questions. Each question carries 2 marks

11. Identify the Schoenflies symbol of eclipsed and staggered ferrocene molecules by bringing out the symmetry elements.
12. What is Franck-Condon principle?
13. Explain the principle and conditions for a liquid to be purified by steam distillation.
14. State the selection rule for the vibrational transitions of a harmonic oscillator.
15. Write the Michaelis –Menten equation and explain the terms.
16. What is meant by quantum yield?.
17. What is R_f value? Explain its significance.

18. Depict pictorially a plot of $1/C_t$ against t for a second order reaction. Identify its slope and intercept.
19. Explain the van't Hoff differential method for determination of order of a reaction.
20. State and explain Hardy-Schulz rule.
21. Draw the phase diagram for a system exhibiting a two component system involving the formation of a congruent melting compound.
22. How is higher efficiency achieved in HPLC compared to the other types of liquid chromatographic techniques?

(10 x 2 = 20 Marks)

Section C (Paragraph)

Answer any five questions. Each question carries 6 marks

23. Discuss the hyperfine splitting shown by the phenyl radical in ESR spectroscopy.
24. Explain the Group multiplication table of C_{3v} point group
25. Derive the Nernst distribution law thermodynamically. Explain its application in solvent extraction process.
26. Explain the Pattinson's process of desilverization of lead.
27. Given that the fundamental vibrational frequency of HI is 2192.5 cm^{-1} , calculate the force constant of the HI bond. [$H = 1.008$; $I = 126.9$]
28. Draw a labelled potential energy diagram for an endothermic reaction in accordance with the activated complex theory of reaction rates.
29. Explain the principle of photosensitisation. Give two examples.
30. Show that Freundlich adsorption isotherm is a special case of Langmuir adsorption isotherm.

(5 x 6 = 30 Marks)

Section D (Essay)

Answer any two questions. Each question carries 10 marks

31. Discuss the factors that influence chemical shifts in PMR spectroscopy and discuss the spectrum of ethyl acetate.
32. Write notes on Gel permeation chromatography and thin layer chromatography.
33. (i) Give the Arrhenius equation and explain the significance of Arrhenius parameters.
(ii) For the decomposition of N_2O_5 , $k = 3.46 \times 10^{-5} \text{ s}^{-1}$ at 298 K and $k = 4.87 \times 10^{-3} \text{ s}^{-1}$ at 338 K. Calculate the activation energy of the reaction.
34. (i) State and derive the Beer-Lambert's law.
(ii) A monochromatic radiation is incident on a solution of 0.05 molar concentration of an absorbing substance. The intensity of the radiation is reduced to one fourth of the initial value after passing through 10 cm length of the solution. Calculate the molar extinction coefficient of the substance.

(2 x 10 = 20 Marks)

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Fifth Semester B.Sc Chemistry Degree Examination, November 2019

BCHE5B06 – Inorganic Chemistry III

(2017 Admission onwards)

Time: 3 hours

Max. Marks: 80

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

1. Concordance between measured value and most probable value is known as.....
2. The compound $2\text{CaSO}_4 \cdot \text{H}_2\text{O}$ is known as.....
3. $\text{Mg}_3\text{N}_2 + 6\text{H}_2\text{O} \rightarrow 3\text{Mg}(\text{OH})_2 + 2\text{X}$, the hybridisation of central atom in product X is.....
4. Basicity of phosphonic acid is.....
5. Number of $d\pi-p\pi$ bonds in SO_3 is
6. The colour of old lead paints can be restored by sprayingover it.
7. Write the equation for auto ionisation of ammonia
8. Write one example for persistent pollutant
9. Wastes that can be decomposed from complex to simpler compounds by the action of microorganism are said to be
10. *Itai itai* disease is due tometal poisoning.

(10 x 1= 10 Marks)**Section B (Short answer)***Answer any ten questions. Each question carries 2 marks*

11. What is Coprecipitation ? How it can be minimised?
12. Graphite or diamond ,which has better thermodynamic stability. Why ?
13. Explain the term "Inert pair effect"
14. Write the chemical equations for the dissolution of gold in aqua regia.
15. Give the structure of (a)Cyclo tri meta phosphoric acid (b)Peroxo disulphuric acid
16. Write any four uses of noble gases

17. Explain the formation of acid rain. What are its harmful effects?
18. Differentiate between BOD and COD.
19. What is noise pollution and also write any two sources of it ?
20. Explain the toxic effect of 'CO'
21. Discuss the properties and structure of S_4N_4 .
22. What is the levelling effect of solvent

(10 x 2 = 20 Marks)

Section C (Paragraph)

Answer any five questions. Each question carries 6 marks

23. Explain how the interference of phosphate and fluoride can be eliminated
24. Describe solvay's ammonia -Soda process
25. Explain the preparation and structure of borazine
26. Discuss the electro positive character of iodine
27. What are phosphazenes .Write the properties and uses of Phosphazenes ?
28. Explain the cause and consequences of *Minamata disease*
29. What are e- waste .How they can be disposed ?
30. Discuss the anaerobic digestion method of disposing solid wastes

(5 x 6 = 30 Marks)

Section D (Essay)

Answer any two questions. Each question carries 10 marks

31. (a)Discuss the Dewar's charcoal adsorption method for the separation of noble gases
(b)Discuss the preparation, structure and hybridisation in (i) XeF_4 (ii) XeO_4
32. Detail Ostwald process. Discuss the reaction of nitric acid with
(a) Metals (b)Non metals (c) Compounds
33. Explain proper methods for solid waste disposal, discussing the advantages and limitations of each method.
34. Discuss the capability of liquid SO_2 as a solvent for ionic compounds and covalent compounds. Justify with suitable examples

(2 x 10 = 20 Marks)