FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Fifth Semester B.Sc Chemistry Degree Examination, November 2020

BCHE5B06 – Inorganic Chemistry III

(2018 Admission onwards)

Time: 3 hours Max. Marks: 80

Section A (One word)

Answer all questions. Each question carries 1 mark

1. Suppressing the dissociation of a weak electrolyte by the addition of strong electrolyte having common ion is known as .....
2. 100% Para hydrogen can be prepared by reducing the temperature of hydrogen sample to .....
3. Lightest metal in periodic table is.....
4. The oxide of nitrogen which is highly soluble in ferrous sulphate is.....
5. Tailing of mercury is due to the formation of .....
6. Most abundant noble gas is.....
7. Smallest repeating unit in pyroxene is.....
8. Photo chemical smog is also known as.....
9. The compound responsible for Bhopal tragedy was----------
10. Optimum value of dissolved oxygen for good quality water is.....

(10 x 1 = 10 Marks)

Section B (Short answer)

Answer any ten questions. Each question carries 2 marks

11. What is solubility product ? Write expression for the solubility product of aluminium sulphate
12. Catenation is a peculiar property of carbon. Explain
13. Why borazine is more reactive than benzene, even though they are isostructural and isoelectronic.?
14. Nitrogen oxides are linear while oxides of phosphorous possess cage like structure. Explain
15. Electron affinity of chlorine is higher than that of fluorine. Comment
16. Write the balanced chemical equation for the complete hydrolysis of XeF_6.Mention the structure of major product also.

17. Write down any two harmful effects of SO_2?
18. What is Eutrophication
19. Explain the term biogasification
20. What is a *sanitary landfill*
21. What are phosphazenes? Give the structure of $P_3N_3Cl_6$.
22. Write any two uses of silicone polymers

(10 x 2 = 20 Marks)

Section C (Paragraph)

Answer any five questions. Each question carries 6 marks

23. Give an account of precipitation gravimetry
24. Discuss the order of lewis acidic strength of boron halides
25. Write a note on crystalline allotropes of carbon
26. What are inter halogen compounds . Discuss their classification with structure and examples
27. Discuss contact process using diagram. Also mention any two properties of sulphuric acid
28. What are zeolites? Mention one important application of the class.
29. What are non aqueous solvents? Discuss their classification.
30. Write a short note on *Plachimada Movement*

(5 x 6 = 30 Marks)

Section D (Essay)

Answer any two questions. Each question carries 10 marks

31. Discuss the classification of silicates with special reference to their structure
32. Discuss the preparation ,properties and uses of diborane
33. (a)Explain different types of errors that arise in analytical experiments. Discuss the classification of each type

    (b)How errors can be minimised in quantitative analysis
34. What is thermal pollution? Explain the causes, consequences and control measures of thermal pollution

(2 x 10 = 20 Marks)

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Fifth Semester B.Sc Chemistry Degree Examination, November 2020

BCHE5B07 – Organic Chemistry II

(2018 Admission onwards)

Time: 3 hours Max. Marks: 80

Section A (One word)

Answer all questions. Each question carries 1 mark

1. Benzenediazonium chloride on treatment with CuCl/HCl yields.....
2. Draw the structure of Picric acid.
3. Zeisel's method is used for the estimation of .....
4. Formaldehyde when treated with concentrated NaOH yeilds ..... and sodium formate.
5. MPV reduction is used for the selective reduction of.....
6. What is absolute alcohol?
7. The reaction of benzoic acid with PCl_5 forms.....
8. Aromatic amines are ..... basic than aliphatic amines.
9. Name an azo dye used as an acid base indicator.
10. Which position is most preferred in the electrophilic substitution of Indole?

(10 x 1 = 10 Marks)

Section B (Short answer)

Answer any ten questions. Each question carries 2 marks

11. What is E2 elimination reaction?
12. What is alizarin? How it is prepared?
13. Discuss the important applications of Crown ethers.
14. What is Clemmensen reduction? Give an example.
15. Give a test to differentiate aldehydes from ketones.
16. Explain Reformatsky reaction with an example.
17. What is Blanc's rule?
18. How can you prepare pyridine?
19. Give a method for synthesis of citric acid.

20. How cyanobenzene is converted in to benzylamine?

21. Illustrate Schmidt reaction with an example.

22. What type of tautomerism is exhibited by acetoacetic ester? Formulate it.

(10 x 2 = 20 Marks)

Section C (Paragraph)

Answer any five questions. Each question carries 6 marks

23. What is meant by S_N2 reaction? Using alkyl halide as an example explain its mechanism.

24. What are the products obtained when methyl magnesium chloride reacts with (i) HCN, (ii) Ethylene oxide, (iii) CO_2 and the product in each case is subjected to acidic hydrolysis.

25. Explain the effect of electron-donating groups on the acidity of Phenol.

26. Illustrate the acid-catalyzed and base catalyzed ring opening reactions of epoxides with two examples each.

27. What is Beckmann rearrangement? Explain with suitable example.

28. Give one method of preparation of Cinnamic acid. Explain its ozonolysis reaction.

29. Explain Hoffmann elimination reaction and its stereoselectivity with suitable example.

30. Briefly discuss the structure of furan and two of its electrophilic substitution reactions.

(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 Lucas test to distinguish between 1°, $2^\circ$and 3° alcohols.

32. (a) Explain why aryl halides are less reactive to S_N1 or S_N2 reactions.

    (b) What is Aldol condensation reaction? Explain with suitable example and give its mechanism.

33. (a) Explain the origin of acidity, effect of substituents on acidity of aliphatic and aromatic carboxylic acids.

34. (a) How is Guanidine prepared? Explain its basicity.

    (b) Illustrate how 1°, 2° and 3° aliphatic amines react differently with nitrous acid.

(2 x 10 = 20 Marks)

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Fifth Semester B.Sc Chemistry Degree Examination, November 2020

BCHE5B08 – Physical Chemistry II

(2018 Admission onwards)

Time: 3 hours Max. Marks: 80

Section A (One word)

Answer all questions. Each question carries 1 mark

1. The number of molecules reacting per quantum of radiation absorbed is called ……..
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. The unit of rate constant *k* for a third order reaction is ……..
4. The number of elements in a finite group is called its…….
5. A substance that stabilizes an emulsion is called an ……
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 by …….chromatography.
8. Electromagnetic radiation in the ……..region is used to study electron spin resonance
9. The initial rate of a second order reaction becomes ……times when the initial concentrations of the reactants are doubled.
10. The number of peaks in the NMR spectrum of $CH_2Cl - CH_2Cl$ is ……..

(10 x 1= 10 Marks)

Section B (Short Answer)

Answer any ten questions. Each question carries 2 marks

11. Define activation energy of a reaction.
12. Explain the Franck-Condon principle?
13. Explain the conditions for a liquid to be purified by steam distillation.
14. What is meant by Dorn effect?
15. Give the BET equation and explain the terms.
16. Explain the process of bioluminiscence.
17. Distinguish between vertical and dihedral mirror planes.

18. What is the $t_{1/2}$:$t_{3/4}$ ratio for a first order reaction?

19. Explain the term catalytic promoter and inhibitor with an example each.

20. Differentiate deliquescence and efflorescence.

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 as 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. Explain the factors influencing the chemical shift in molecules.

24. Mention the merits, applications and limitations of gas-liquid chromatography.

25. How will you evaluate the activation energy of a reaction?

26. Explain water one component system using the phase diagram.

27. If the force constant of HCl bond is 482.086 Nm^{-1}, calculate the *fundamental vibrational frequency*. [H =1.008; Cl = 35.45]

28. Discuss the adsorption theory of heterogeneous catalysis.

29. Explain the principle of photosensitisation with the help of 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. Explain the principle of Raman spectroscopy, the quantum mechanical concept of Raman effect and its applications.

32. Write notes on Gel permeation chromatography and thin layer chromatography.

33. Derive an equation for the rate constant of a bimolecular second order reaction from collision theory.

34. Draw the Jablonski diagram and explain the various types of radiative and non-radiative transitions.

(2 x 10 = 20 Marks)

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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Fifth Semester B.Sc Chemistry (Open Course)Degree Examination, November 2020

BCHE5D02 – Chemistry in Daily Life

(2018 Admission onwards)

Time: 2 hours Max. Marks: 40

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

1. Nylon 66 is prepared from the polycondensation of ..... and .....
2. Natural rubber is the polymer of .....
3. Write an example of synthetic rubber.....
4. What is the main constituent of LPG?
5. Hard soaps are.....salt of fatty acids
6. Give an example of conducting polymer
7. Write an example of insecticide .....
8. Dettol is an example .....
9. Saccharin is .....
10. Butylatedhydroxyanisole is an example of .....

(10 x 1 = 10 Marks)

SECTION B (Short answer)
Answer any five questions. Each question carries 2 marks

11. Explain octane number of fuels
12. What are dyes? Give two examples
13. Explain two classes of drug with example
14. Explain the harmful effect of modern food-habit
15. What is the need for plastic recycling, explain.
16. What do you understand by the term flash point, what is its significance?
17. Explain the term nanotechnology

(5 x 2 = 10 Marks)

SECTION C (Paragraph)

Answer any two questions. Each question carries 5 marks

18. Write (a) classification of detergents, (b) importance of alkali content in soaps

19. Explain the harmful effect of burning of fossil fuels

20. Write about Endosulphan tragedy in Kerala

(2 x 5 = 10 Marks)

SECTION D (Essay)

Answer one question. Each question carries 10 marks

21. Enumerate (a) two uses of following polymers,

(i) High density Polyethene (HDPE),

(ii) Poly(propylene) (PP), (iii) Poly(vinylchloride) (PVC), (IV) Poly(styrene)(PS),

(V) Poly(methylmethacrylate) (PMMA),

(b) What is meant by plant nutrients and discuss natural and synthetic fertilisers

(5+5)

22. Write

(a) cleaning action of detergents,

(b) Discuss the adverse effect associated with the excessive use of pesticides.

(5+5)

(1 x 10 = 10 Marks)