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FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Fifth Semester B.Sc Chemistry Degree Examination, November 2023

BCH5B06 – Inorganic Chemistry – III

(2019 Admission onwards)

Time: 2 hours   Max. Marks: 60

SECTION A
All questions can be attended. Each question carries 2 marks

1. What is common ion effect?

2. What is meant by roasting?

3. ClF_3 molecule has a T shaped structure. Explain?

4. How does iodine monochloride react with alkali?

5. What is the shape of XeO_3 molecule?

6. Noble gases have low boiling points. Explain?

7. What are called island structures?

8. Write short notes on autoionization of solvents with suitable examples.

9. How is polymeric sulphur nitride prepared? Give its applications?

10. What is the importance of ozone layer? What are the causes of depletion of ozone layer?

11. What are the adverse effects of acid rain?

12. Triple R is an important term in managing waste. Justify.

(Ceiling 20 Marks)

SECTION B
All questions can be attended. Each question carries 5 marks

13. Distinguish between coprecipitation and post precipitation.

14. What are intramedullary rods? Discuss their applications.

15. What are interhalogen compounds? Give examples. Discuss the structure of IF_5.

16. Discuss the structure of $XeOF_2$.

17. Explain with examples any three different kinds of reaction taking place in liquid N_2O_4 and liquid SO_2.

18. What is COD? Explain how COD of water sample is determined?

19. Discuss the adverse impacts of e-waste. Explain the methods of disposal of e-waste?

(Ceiling 30 Marks)

SECTION C

Answer any one question. Each question carries 10 mark.

20. Discuss the significance and applications of *Ellingham Diagrams*.

21. Discuss the classification of silicates.

(1 x 10 = 10 Marks)

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Fifth Semester B.Sc Chemistry Degree Examination, November 2023

BCH5B07 – Organic Chemistry II

(2019 Admission onwards)

Time: 2 hours

Max. Marks: 60

SECTION A

All questions can be attended. Each questions carries 2 marks

1. An alkoxide is a stronger base than hydroxide. Why?

2. How methyl magnesium bromide can be converted to ethanol? Explain.

3. What is Victor Meyer's test?

4. What are crown ethers? Give two examples.

5. How can benzaldehyde be converted to toluene?

6. What is Wolf-Kishner reduction?

7. Arrange the following in the decreasing order of acidity.

   CH_3COOH, $Cl-CH_2-COOH$, CCl_3-COOH, $(CH_3)_3C-COOH$.

8. What is Fischer esterification?

9. Give an example for the Kolbe's electrolytic reduction.

10. Give one method of preparation of pyridine.

11. Explain why furan does not show the normal addition reaction?

12. How can acetoacetic ester be converted into (i) butanoic acid and (ii) butanone?

(Ceiling 20 Marks)

SECTION B

All questions can be attended. Each questions carries 5 marks

13. How is fluorescein prepared? Mention its major applications.

14. Discuss Williamson's ether synthesis and its limitations.

15. Illustrate Cannizzaro reaction with mechanism.

16. What is Beckmann rearrangement? Explain with example.

17. How is benzene sulphonic acid prepared? How can it be converted to (i) phenol and (ii) aniline.

18. Explain the mechanism and regioselectivity of Hofmann elimination reaction with suitable example.

19. Discuss the effect of substituents on the basicity of aromatic amines.

(Ceiling 30 Marks)

SECTION C

Answer any one question. Each question carries 10 marks

20. Explain

   (i) Reimer-Tiemann reaction.

   (ii) Oxymercuration-demercuration reaction.

   (iii) Tollen's test

   (iv) Fehling's test

21. Explain

   (i) How citric acid is prepared by Reformatsky reaction?

   (ii) The urease method for the estimation of urea.

   (iii) Sandmeyer reaction.

(1 x 10 = 10 Marks)

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Fifth Semester B.Sc Chemistry Degree Examination, November 2023

BCH5B08 – Physical Chemistry II

(2019 Admission onwards)

Time: 2 hours   Max. Marks: 60

SECTION A

All questions can be attended. Each question carries 2 marks

1. What are consecutive reactions? Give one example

2. The rate constant for a first order reaction is 1.54×10^{-3} sec^{-1}. Calculate its Half-life period.

3. State the adsorption theory of heterogenous catalysis.

4. Give Michaelis-Menten equation for enzyme catalysis.

5. Give Nernst Distribution law. What are the conditions for the validity of the distribution law?

6. What do you mean by eutectic point?

7. Explain the system with upper critical point with one example.

8. What are selection rules? Give the selection rule for rotational transition for the diatomic rigid rotor.

9. State Frank-Condon principle.

10. Calculate the NMR frequency (MHz) of the proton (1H) in a magnetic field of intensity 1.4092 tesla, given that nuclear g-factor, $g_N = 5.585$ and nuclear magneton, $\mu_N = 5.05 \times 10^{-27}$ J T^{-1}

11. Define Quantum Yield. Give one example for a reaction with quantum yield greater than one.

12. Draw Jablonski diagram and depict various photophysical process in it.

(Ceiling 20 Marks)

SECTION B

All questions can be attended. Each question carries 5 marks

13. 5 ml of ethyl acetate was added to a flask containing 100 of 0.1M HCl placed in a thermostat maintained at 30°C. 5 ml of the reaction mixture was withdrawn at different intervals of time and after chilling, treated against standard alkali. The following data were obtained

Time (Minutes)	0	75	119	∞
ml of alkali used	9.62	12.10	13.10	21.05

From the above data show that the reaction follows first order kinetics

14. Derive Langmuir adsorption isotherm and discuss effect of pressure on adsorption

15. Derive Gibbs phase rule from thermodynamic considerations.

16. The rotational constant (B) for ^1HCl is 10.5909 cm^{-1}. Calculate the rotational constant for ^2DCl. Given that mass of ^1H and ^2D is 1.673 x 10^{-27} Kg and 3.344 x 10^{-27} Kg respectively. (Assume that the bond length remains same for ^1HCl and ^1DCl)

17. What are the factors effecting the line width of spectral lines? Explain.

18. Draw the ^{1}H-NMR spectrum of ethanol in gaseous state and explain spin-spin splitting.

19. a)Discuss the mechanism of photosensitization with suitable example.

b) State Laws of photochemistry.

(Ceiling 30 Marks)

SECTION C

Answer any one question. Each question carries 10 marks

20. A) Describe the Lindemann theory of unimolecular reactions and derive an expression for rate constant (k_{uni}) for a unimolecular reaction, A → P **(7 marks)**

B) The vapour pressure of water at 100 °C is 760 mm. What will be vapour pressure at 95 °C? The heat of vaporization of water in this range is 41.27 kJmol^{-1}. **(3 marks)**

21. A) Give and sketch the modes of the vibration of CO_2 and H_2O. Comment on its IR and Raman activity.

(7 Marks)

B) Explain Stokes lines, anti-Stokes lines and comment on relative intensities.

(3 Marks)

FAROOK COLLEGE (AUTONOMOUS), KOZHIKODE

Fifth Semester B.Sc Chemistry Degree Examination, November 2023

(Open Course)

BCH5D02 – Chemistry in Daily Life

(2019 Admission onwards)

Time: 2 hours

Max. Marks: 60

Section A (Short answers)
(Answer questions up to 20 marks. Each question carries 2 marks)

1. What are biodegradable polymers? Give an example

2. What is Nylon 66? Give any one application of Nylon 66

3. What are hormones? Give example.

4. What are food preservatives? Give an example.

5. What is NPK value?

6. What are herbicides? Give an example.

7. Explain the cleansing action of soap.

8. What are the different kinds of shampoo?

9. What are the ingredients present in face powders?

10. What are antipyretics? Give an example.

11. What is calorific value?

12. Explain octane number.   **[Ceiling of marks: 20]**

Section B (Paragraph)
(Answer questions up to 30 marks. Each question carries 5 marks)

13. Write a note on harmful effects of modern food habits.

14. Explain food preservatives and artificial sweeteners.

15. Write a note on impact of excessive use of fertilizers on environment.

16. Discuss on harmful effects of cosmetics.

17. Explain a) Prodrug, b) Pharmacophore and c) Pharmocognosy

18. Discuss in detail the application of dyes.

19. Write a note on pollution due to burning of fossil fuels.

       [Ceiling of marks: 30]

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

20. Describe in detail the classification of polymers by giving suitable examples.

21. Write a note on vitamins with respect to its source, function and deficiency diseases.

       [1 x 10 = 10 marks]