11322

Reg. No. | | | | | | | | |

III Semester B.Sc. Degree Examination, March/April - 2021

CHEMISTRY

(CBCS 2019-20 & Onwards Scheme)

Paper : III

Time : 3 Hours **Maximum Marks : 70**

Instructions to Candidates:

1) The question paper has two parts. Answer both parts.
2) Write diagrams and chemical equations wherever necessary.

PART - A

Answer any **Eight** of the following questions. Each question carries **Two** marks. **(8×2=16)**

1. Mention two limitations of simple collision theory.
2. Define efficiency of a heat engine. Write the expression for efficiency in terms of temperature of source and sink.
3. Write Arrhenius equation and explain the terms.
4. What are Adsorption indicators? Give an example.
5. Aluminium is the best reducing agent for the reduction of chromic oxide than carbon. Give reasons.
6. Derive the relationship $C_p - C_v = R$.
7. What is condensation polymerisation? Give an example.
8. What is the action of Con. H_2SO_4 on glycerol? Give equation.
9. What are Thiols? Give an example.
10. Explain the effect of $-CH_3$ group on the acidity of phenols.
11. What are mixed fertilizers? Give an example.
12. How Lithium dialkyl cuprate is synthesised from methyl Iodide?

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PART - B

Answer any **nine** of the following questions. Each question carries **six** marks. **(9×6=54)**

13. a) Define half life period of a reaction. Derive the relationship between half life and rate constant of a second order reaction.

b) What is the principle of Ostwald's isolation method of determining the order of a reaction. **(4+2)**

14. a) Define energy of activation. The rate constants for a reaction at 300 K and 320 K are $2.5\times10^{-5}S^{-1}$ and $5.5\times10^{-5}S^{-1}$ respectively. Calculate the energy of activation of the reaction.

(Given, $R = 8.314JK^{-1}\ mol^{-1}$).

b) What is temperature coefficient of a reaction? **(4+2)**

15. a) Derive Van't Hoff reaction isotherm.

b) Give any two statements of Second law of Thermodynamics. **(4+2)**

16. a) What is an isothermal process? Calculate the workdone when 3 moles of nitrogen gas expands, isothermally and reversibly from a volume of $5dm^3$ to $10dm^3$ at 330K.

b) How is Boron trifluoride synthesised? Write its structure. **(3+3)**

17. a) Derive the integrated form of clausius - clapèyron equation for liquid - vapour equilibrium.

b) Write Kirchhoff's equation and indicate the terms. **(4+2)**

18. a) Discuss Freundlich adsorption isotherm. Mention its limitations.

b) Write BET equation and indicate the terms involved in it. **(4+2)**

19. a) How are ethers prepared by the following methods?

i. Williamson's ether synthesis.

ii. Dehydration of alcohols.

b) How epoxides are synthesised from peracid? **(4+2)**

20. a) Explain the process of extraction of Thorium from Monozite sand.

b) Discuss the extraction of plutonium from spent nuclear fuel. **(4+2)**

21. a) Explain the mechanism of oxidation of glycols by periodic acid.

b) How methane thiol reacts with hydrogen peroxide. (4+2)

22. a) Explain the following reactions.

i. hydroboration

ii. Formation of thioesters.

b) Explain the preparation of methyl magnesium iodide. (4+2)

23. a) How phenol is converted to

i. methyl salicylate

ii. Aspirin

b) What are silicones? Mention one use. (4+2)

24. a) Give any two salient features of Ellingham diagrams.

b) Explain a chemical reaction which indicates that ethers act as lewis base.

c) Explain esterification reaction with an example. (2+2+2)

25. a) What are nitrogeneous fertilizers? Describe the manufacture of urea.

b) How methane thiol reacts with Con.Nitric acid? (4+2)