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Reg. No.

I Semester B.Sc. Degree Examination, August – 2021
CHEMISTRY
Chemistry - I
(CBCS Semester Scheme 2018-19 Onwards Repeaters Prior to 2020-21)
Paper : I
(Old)

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

Instructions to Candidates :

    i)   The question paper carries two Parts. Answer both the Parts.

    ii)   Draw diagrams and write chemical equations wherever necessary.

PART - A

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

1.   Differentiate $\sqrt{X}$ with respect to X.

2.   Define Collision number and Collision frequency of gas molecules.

3.   Write mathematical expression of Maxwell - Boltzmann equation for velocity distribution per gas molecules.

4.   State Stark - Einstein law of photochemical equivalence.

5.   Define critical temperature of a gas.

6.   What are completely miscible liquids? Give an example.

7.   Mention the factors which affects the viscosity of a liquid.

8.   What are chalcogens?

9.   Define equivalent weight of an oxidizing agent.

10.   What are cumulated dienes? Give an example.

11.   Explain Wurtz reaction with an example.

12.   What are Cycloalkanes? Give an example.

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PART - B

Answer any **Nine** questions. Each question carries **6** marks.   (9×6=54)

13. a) i) What are exact and inexact differentials? Give one example for each.

    ii) If $\log 5 = 0.6990$ and $\log 7 = 0.8451$ find the value of $\log 35$.

    b) Integrate $\cos x$ with respect to x.   (4+2)

14. a) Describe Linde's process for the liquification of air.

    b) Calculate average velocity of Co_2 gas molecules at $310k$ $\left(R = 8.314 J/K/mol,\ M_{Co_2} = 44 \times 10^{-3} Kg\right)$.   (4+2)

15. a) Explain Cagniard delatour's method of determining critical temperature and critical pressure of a gas.

    b) Calculate critical temperature of Nitrogen gas (given Vanderwaal's constants $a = 0.1408 Nm^4 mol^{-2}$, $b = 3.91 \times 10^{-5} m^3 mol^{-1}$ $R = 8.314 J/K/mol$)   (4+2)

16. a) Explain the terms Fluorscence and phosphorescence.

    b) What are chemical sensors? Give an example.   (4+2)

17. a) Explain the determination of molecular mass of a solute by Beckmann's method.

    b) Write Sudgen equation and explain the terms involved in it.   (4+2)

18. a) Explain the Principle involved in steam distillation? Give its applications.

    b) A solution containing $2.4 \times 10^{-3} kg$ of a solute dissolved in $2.5 \times 10^{-3} m^3$ of water gave the osmotic pressure of $2.431 \times 10^5 Nm^{-2}$ at $300k$. Calculate molar mass of the solute.   (4+2)

19. a) What is electronegativity of an element? Explain the determination of electronegativity by Pauling's method.

    b) Why the radius of cation is smaller than the corresponding atom.   (4+2)

20. a) Compare the reactivities of carbonates of alkali and alkaline earth metals with an example for each.

    b) What is Atomic radius?   (4+2)

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21. a) Define the terms:

     i)   Accuracy.

     ii)   Precision.

     iii) Significant figures.

     iv) Errors.

    b) Calculate the molarity of a solution prepared by dissolving $75.5g$ of pure $NaOH$ in $500cm^3$ of solution. (Molar mass of $NaOH = 40$)   **(4+2)**

22. a) How is alkene converted into an alcohol by Hydroboration reaction?

    b) What is Diel's - alder reaction? Give an example.   **(4+2)**

23. a) Compare the stability of alkyl carbocations based on Inductive effect.

    b) What are carbenes? Give an example.   **(4+2)**

24. a) Explain Baeyer's strain theory of cycloalkanes? Give two limitations of it.

    b) What are elimination reactions? Give an example.   **(4+2)**

25. a) Draw the Newmann's projection formulae for conformations of n - butane. Which is the more stable form.

    b) How are alkanes prepared by Corey - House method?   **(4+2)**