SN – 333

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I Semester B.Sc. Examination, November/December 2017
(CBCS) (2014-15 and Onwards) (F+R)
CHEMISTRY (Paper – I)

Time : 3 Hours Max. Marks : 70

Instructions: *1) The question paper has **two** parts. Answer **both** the parts.*
*2) **Draw** diagram and write chemical equations **wherever** necessary.*

PART – A

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

1. What are exact and inexact differentials ?
2. Differentiate log sin X with respect to X.
3. Calculate RMS velocity of SO_2 at 300 K. (Molecular weight of $SO_2 = 64 \times 10^{-3}$ kg, $R = 8.314 \times 10^{-3}$ KJK^{-1} mol^{-1})
4. Define Collision number of gas molecules.
5. What are the differences between Thermal and photochemical reactions ?
6. What is the principle of fractional distillation ?
7. Write Sugden equation. Indicate the terms.
8. State Nernst distribution law.
9. Define the term ionisation potential.
10. What is meant by diagonal relationship ? Give examples.
11. Define Accuracy and Precision.
12. Explain Corey-House reaction with an example.

P.T.O.

PART – B

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

13. a) Explain Cagniard de La Tour's method of determining critical temperature and critical pressure of a gas.

    b) Differentiate $\cos^{-1}X$ with respect to X. **(4+2)**

14. a) Derive an expression for the most probable velocity from Maxwell-Boltzmann distribution of velocities in a gas.

    b) State the law of corresponding states. **(4+2)**

15. a) Describe in detail Andrew's experiment on carbon dioxide.

    b) What is Joule-Thomson effect ? **(4+2)**

16. a) State the laws of photochemistry.

    b) What is Bioluminescence ? Give one example. **(4+2)**

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

    b) Write a short note on chemical sensors. **(4+2)**

18. a) Define the following terms and explain the effect of temperature :
        i) Surface tension
        ii) Viscosity.

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

19. a) The boiling point of chloroform was raised by 0.325 K, when 5.141 g of anthracene was dissolved in 35 g of chloroform. Calculate the molar mass of Anthracene. (K_b for chloroform is 3.9).

    b) How do you determine the electronegativity of an element from Pauling's method ? **(3+3)**

20. a) Discuss the properties of group 2 elements with reference to
        i) their reaction with halogens
        ii) thermal stability of their carbonates.

    b) State Modern Periodic Law. **(4+2)**

21. a) Define atomic radius of an atom. Explain how it varies in the periodic table.
    b) Calculate the normality of a solution containing 1.53 g of sodium carbonate dissolved in 250 cm^3 of water. (Atomic mass of Na = 23, O = 16, C = 12) **(4+2)**

22. a) What are significant figures ? Give example.
    b) How do you minimize the determinate errors ?
    c) State Markownikoff's rule. **(2+2+2)**

23. a) What are Carbocations ? Explain the stability and reactivity of free radicals on the basis of Inductive effect and hyperconjugation effect.
    b) What are electrophiles ? Give example. **(4+2)**

24. a) Write a note on Baeyer's strain theory of cycloalkanes. Give its limitations.
    b) Draw chair and boat forms of cyclohexane. Among the both which form is more stable. **(4+2)**

25. a) How do you prepare Alkenes by Wittig reaction ?
    b) Explain Diels Alder reaction with an example.
    c) Write a note on ozonolysis reaction for alkenes. **(2+2+2)**
