

I Semester B.Sc. Examination, November/December 2018
 (2011 - 12 & Onwards (N.S.))
 (Repeaters - Prior to 2014 - 15) (Semester Scheme)
 CHEMISTRY (Paper - I)

Time : 3 Hours

Max. Marks : 70

Instructions : 1) The question paper has **two** Parts. Answer **both** Parts.
 2) Write equations **wherever** necessary.

PART - A

Answer **any eight** of the following questions. **Each** question carries **two** marks. (8x2=16)

1. Integrate w.r.t. x a) $\cos x$ b) $x^2 dx$.
2. What is the value of $\log_{10} 100$?
3. State Pauli's exclusion principle.
4. Mention any two defects of Bohr's theory of atomic model.
5. Define electron affinity.
6. What is protic solvent ? Give an example.
7. Write any two differences between ideal and non-ideal solutions.
8. Write the IUPAC names of
 - a) Acetone
 - b) Oxalic acid.
9. What are carbenes ? Give an example.
10. Explain heterolytic cleavage with an example.
11. Define inductive effect.
12. Explain Corey - House reaction with an example.

PART - B

Answer **any nine** of the following questions. **Each** question carries **six** marks. (9x6=54)

13. a) Derive an expression for the energy of n^{th} orbit of hydrogen atom. (4+2)
 b) Write Schrödinger wave equation and mention the terms involved.
14. a) Give the significance of quantum numbers. (4+2)
 b) State Hund's rule of multiplicity.



15. a) Explain Eigen value and Eigen function.
b) Write the electronic configuration of
i) Cr (Z = 24)
ii) Cu (Z = 29). (4+2)
16. a) Define atomic radius. How it varies along a period and down the group ?
b) Explain diagonal relationship between beryllium and aluminium. (4+2)
17. a) Discuss properties of group 2 elements w.r.t.
i) Formation of carbonates and
ii) Formation of halides.
b) Explain why Cl^- is larger in size than Cl ? (4+2)
18. a) Describe the determination of electronegativity by Pauling's method.
b) Explain with example the salvalysis reaction of liquid sulphur dioxide. (4+2)
19. a) Balance the following reaction by oxidation number method
 $\text{HCl} + \text{KMnO}_4 \rightarrow \text{Cl}_2 + \text{MnCl}_2 + \text{KCl} + \text{H}_2\text{O}$
b) Calculate the oxidation number of Cr in $\text{K}_2\text{Cr}_2\text{O}_7$. (4+2)
20. a) Explain the determination of surface tension of liquid using stalagmometer.
b) State Raoult's law of ideal solution. (4+2)
21. a) Describe the determination of molecular mass of solute by Berkeley - Hartley method.
b) Write Diel's Alder reaction. (4+2)
22. a) Explain determination of critical solution temperature of water-phenol system.
b) Explain the acidity of terminal alkynes. (4+2)
23. a) Explain the mechanism of Markownikoff's rule for addition of HBr to propene.
b) What are nucleophiles ? Give an example. (4+2)
24. a) Explain conformational analysis of ethane.
b) Write the oxidation reaction of alkenes with KMnO_4 . (4+2)
25. a) Explain free radical mechanism of chlorination of methane.
b) Explain Wurtz reaction with an example. (4+2)