



Nagarjuna Degree College
38/36, Ramagondanahalli,
Yelahanka Hobli,
Bengaluru - 560 064.

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Reg. No.

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I Semester B.Sc. Degree Examination, April - 2022

CHEMISTRY - I

(CBCS Semester Scheme Repeaters 2020-2021 onwards)

Paper : I

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

1. Question paper has two sections. Answer both the sections.
2. Write chemical Equations & diagrams wherever necessary.

SECTION-A

Answer any **five** of the following questions. Each question carries **seven** marks. (5×7=35)

1. a) Give the significance of all four quantum numbers.
b) What is an orbital? Draw the radial probability distribution curve for 2s orbital. (4+3)
2. a) Write the postulates of quantum mechanics.
b) State $(n+l)$ rule.
c) Write Rydberg formula and indicate the terms involved. (4+2+1)
3. a) Derive an expression for the radius of n^{th} orbit of Hydrogen atom.
b) State Hund's rule of maximum multiplicity.
c) Write the stable electronic configuration of the element with atomic No. 29. (4+2+1)
4. a) Derive Schrodinger's time independent wave equation starting from the sine wave equation $\psi = A \sin\left(\frac{2\pi x}{\lambda}\right)$.
b) Write de-Broglie's equation and indicate the terms involved.
c) State Pauli's exclusion principle. (4+2+1)
5. a) Predict the magnetic behaviour of oxygen molecule using molecular orbital energy level diagram.
b) Explain sp^3 hybridisation with suitable example. (4+3)

[P.T.O.]



6. a) Discuss the Band Theory of solids taking Lithium metal as an example.
b) Define dipole moment. Mention its SI unit.
c) Mention the limitations of VBT. (3+2+2)
7. a) State Fajan's rules.
b) Set up Born - Haber cycle for the formation of ionic crystal of the type MX. Write the expression for lattice energy. (3+4)

SECTION - B

Answer any **five** of the following questions. Each question carries **seven** marks. (5×7=35)

8. a) What is geometrical isomerism? Write the geometrical isomers of but-2-ene.
b) What is chiral centre? Write the structure of lactic acid indicating the chiral centre. (4+3)
9. a) State Markownikoff's rule? Discuss the mechanism of addition of HBr to propene.
b) Arrange $CH(CH_3)_2^+$, $CH_2(CH_3)^+$, $C(CH_3)_3^+$ and CH_3^+ in the order of decreasing stability and justify. (4+3)
10. a) Draw the Newmann projection formulae for different conformations of butane. Explain their reactive stabilities.
b) How do you prepare alkanes by Corey-House synthesis? Explain with an example. (4+3)
11. a) Explain the following reactions with suitable examples :
i. Birch reduction.
ii. Sand Meyer's reaction.
b) What are conjugated dienes? Explain Diels-Alder reaction with an example. (4+3)
12. a) Explain the orienting influence of -OH group in phenol towards electrophillic substitution reactions.
b) Give one example each for addition and substitution reactions. (4+3)
13. a) Explain the mechanism of nitration of Benzene.
b) State and explain Huckel's rule with a suitable example. (4+3)
14. a) How is styrene prepared from ethyl benzene? Mention any one of its uses.
b) How is Toluene converted to benzaldehyde?
c) Explain Wittig's reaction with an example. (3+2+2)
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