



SE – 158

**II Semester B.Sc. Examination, September 2020  
(CBCS) (F + R) (2014-15 and Onwards)  
CHEMISTRY – II**

Time : 3 Hours

Max. Marks : 70

- Instructions :** i) The question paper has **two** Parts. Answer **both** the Parts.  
ii) Write equation, draw diagrams **wherever** necessary.

PART – A

I. Answer **any eight** of the following questions. (8×2=16)

- 1) Write de-Broglie's equation. Explain the terms.
- 2) State Heisenberg's uncertainty principle.
- 3) Write the values of all the four quantum numbers for 2S' electron.
- 4) Na is highly reactive but not Na<sup>+</sup>. Explain.
- 5) Write Born-Landé equation for the calculation of lattice energy and indicate the terms involved.
- 6) Explain intermolecular hydrogen bonding with an example.
- 7) Write the general electronic configuration of noble gases.
- 8) Calculate the Magnetic moment of Fe in ferrous sulphate (Atomic number of iron = 26).
- 9) Why "f" block elements are called inner transition elements ?
- 10) Classify the following into ortho, para and meta orienting groups – NO<sub>2</sub>, – Cl, – CH<sub>3</sub>, – OH.
- 11) Give an example of Diels – Alder reaction.
- 12) Arrange in the increasing order of reactivity of the following. Ethyl chloride, Isopropyl chloride, Benzyl chloride and chlorobenzene.

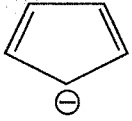
PART – B

II. Answer **any nine** of the following questions. (9×6=54)

- 13) a) Give the postulates of quantum mechanics.  
b) Write any two limitations of Bohr's theory of atomic structure. (4+2)
- 14) a) Explain the significance of the terms (i) Hamiltonian operator (ii) Eigen function.  
b) Calculate the energy associated with Bohr's 3<sup>rd</sup> orbit. Given the energy of Bohr's 1<sup>st</sup> orbit is  $-2.17 \times 10^{-18}$  J. (4+2)

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- 15) a) Derive Schrodinger equation for particle in one dimensional box.  
b) What are radial probability and angular probability distribution ? (4+2)
- 16) a) Set-up Born-Haber cycle for the formation of NaCl. Write the expression for lattice energy using this cycle.  
b) Mention any two properties of ionic compounds. (4+2)
- 17) a) Explain the shape of  $\text{BrF}_3$  molecule based on VSEPR theory.  
b) Calculate the bond order of carbon monoxide. (4+2)
- 18) a) Explain the hybridization involved in the formation of  $\text{BF}_3$ .  
b) State Fajan's rule. (4+2)
- 19) a) Give the preparation of  $\text{XeF}_6$ . Write its structure and mention any one property.  
b) Define Dipole moment. Write its SI unit. (4+2)
- 20) a) What are Zeolites ? Explain their molecular sieve property and base exchanger property.  
b) Name the following and mention whether it is aromatic or antiaromatic.  
 (4+2)
- 21) a) Explain the characteristics of transition elements with respect to (i) formation of coloured compounds. (ii) Magnetic properties.  
b) What are the oxidation states of copper ? In which oxidation state copper is more stable ? (4+2)
- 22) a) Explain the electronic configuration and oxidation states of lanthanides.  
b) What is lanthanide contraction ? Mention any one of its consequences. (4+2)
- 23) a) Explain the structure of benzene based on molecular orbital theory.  
b) What happens when toluene is heated with alkaline  $\text{KMnO}_4$  ? Give equation. (4+2)
- 24) a) With the help of resonance structures explain the orienting influence of  $-\text{CH}_3$  group in toluene.  
b) Explain Birch reduction with an example. (4+2)
- 25) a) Explain the mechanism of hydrolysis of t-butyl bromide.  
b) State Saytzeff rule. Give an example. (4+2)