

Roll No. ....

**3006**

**B. Tech. 1st Semester (Common for All  
Branches)**

**Examination – December, 2018**

**CHEMISTRY - I**

**Paper : BSC-CH-101-G**

*Time : Three Hours ]*

*[ Maximum Marks : 75*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt *five* questions in all, selecting at least *one* question from each Unit. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (a) Write Schrodinger wave equation for hydrogen.

2.5 × 6 = 15

(b) What is ionization energy ?

(c) What is plane of symmetry ?

(d) What is corrosion ?

(e) Why does a sample of hard water not form lathers with the soap ?

(f) What is principle of flame photometry ?

## UNIT - I

2. (a) How do the d-orbital energy level split when a metal ion is placed in octahedral, tetrahedral and square planar field of the ligands ? 8
- (b) Draw molecular orbital diagram for CO and compare its stability with  $\text{CO}^+$ . 8
3. (a) What is effective nuclear charge ? Calculate the effective nuclear charge for one of the outer electrons (2p) of oxygen atom which has configuration  $1s^2 2s^2 2p^4$ . 8
- (b) What is electronegativity ? How does it vary in a period and group in the periodic table ? 7

## UNIT - II

4. (a) Differentiate between stereoisomerism and structural isomerism with suitable examples. 10
- (b) Explain dissymmetry is an essential condition for optical activity. 5
5. (a) What are the main types of organic reaction ? Explain addition reactions giving suitable example. 10
- (b) Give the synthesis of paracetamol drug. 5

## UNIT - III

6. (a) Derive Vander Waal's equation of state for " moles of gases. 7

- (b) What is meant by hardness of water and why is it caused ? How is the hardness of a sample of water usually expressed ? 8
7. (a) What do you mean by softening of water ? Describe the lime soda process and elaborate the functions of lime and soda in the process. 10
- (b) Explain the factors which influence the corrosion. 5

#### UNIT – IV

8. (a) What is the origin of electronic spectra ? Discuss the theory and principle. 8
- (b) Explain the different molecular vibrations in infrared spectroscopy. 7
9. (a) Discuss the applications of NMR spectroscopy. 9
- (b) Write a note on shielding and deshielding of protons showing diagram. 6

---

3006

**B.Tech. 2nd Semester G-Scheme**  
**(Common for all branches) Examination,**

**May-2019**

**CHEMISTRY-I**

**Paper-BSC-CH-101-G**

Time allowed : 3 hours]

[Maximum marks : 75

*Note : Attempt five questions in all, selecting at least one question from each unit. Question No. 1 is compulsory. All questions carry equal marks.*

1. (a) What is electronegativity ?
  - (b) Name the factors that govern the magnitude of crystal field splitting.
  - (c) Distinguish between configuration and conformation.
  - (d) What are the limitations of van der Waal's equation?
  - (e) Define hardness of water.
  - (f) What is Bathochromic and Hypsochromic shift ?
- 6×2.5=15

**Unit-I**

2. (a) Write schrodinger wave equation for hydrogen. What are the various parameters used in the equation ? What are radial and angular wave functions.

8

3006-P-3-Q-9(19)

[P.T.O.]

- (b) Draw MO energy level diagram of NO molecule and predict its Bond order and magnetic properties. 7
3. (a) What is Ionization energy ? On what factor it depends ? How does the ionization energy of the elements vary in a group and period. 8
- (b) Explain the polarization and polarizing power. 7

### Unit-II

4. (a) Draw various conformations of n-butane and compare their stability. 10
- (b) Distinguish between enantiomers and diastereomers with suitable example. 5
5. (a) What are the main types of organic reaction ? Explain substitution reactions giving suitable example. 10
- (b) Give the synthesis of Aspirin drug. 5

### Unit-III

6. (a) How is the hardness of a water sample estimated by EDTA method ? Describe the principle involved and the procedure. 10
- (b) What are critical constants ? Derive relationship between them. 5

7. (a) Describe the zeolite process used for the softening of water. 8
- (b) Explain the mechanism of the following : 7
- (i) Pitting corrosion
  - (ii) Galvanic corrosion

#### Unit-IV

8. (a) Discuss the applications of IR spectroscopy. 9
- (b) What is flame photometry? Describe its principle and applications. 6
9. (a) What is chemical shift and on what factors it depends? Explain. 8
- (b) Write note on Magnetic Resonance Imaging. 7

Roll No. ....

**3006**

**B. Tech 1st Semester (Common for All  
Branches) Examination – December, 2019**

**CHEMISTRY - I**

**Paper : BSC-CH-101-G**

**Time : Three Hours ]**

**[ Maximum Marks : 75**

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

---

**Note :** Question Number 1 is *compulsory*. Attempt *four* questions from remaining *four* Units selecting *one* question from each Unit. Use of non programmable calculator is allowed.

1. (a) Give *two* examples of anomalous electronic configuration. 1.5 × 10 = 15
- (b) Define doping in semiconductors.

3006-4250-(P-4)(Q-9)(19)

P. T. O.

- (c) What is polarizability ?
- (d) Mention at least three elements of symmetry.
- (e) Differentiate configuration and conformation.
- (f) Write balanced chemical equation for the oxidation and reduction of carboxyl compounds.
- (g) Define critical temperature.
- (h) Write advantages of demineralization process.
- (i) What is Bathochronic Shift ?
- (j) What are equivalent and non-equivalent protons in NMR Spectrum ?

### UNIT - I

2. Write short notes on the following :

15

- (a) Crystal field splitting in octahedral complex.
- (b) Molecular orbitals theory.
- (c) Define ion I.E & its variation in periodic table.



3. (a) What are Bonding and Antibonding molecular orbitals ? Explain formation of  $N_2$  molecules on the basis of molecular orbital energy level diagram. 10
- (b) Explain the term angular wave function. 5

### UNIT - II

4. (a) What are structural isomers and stereo isomers ? Classify them and explain its types. 10
- (b) Write short note on isomerism in transition metals. 5

5. Explain the following terms : 15

- (a) Nucleophilic substitution reactions.
- (b) Synthesis of Paracetamol.
- (c) Addition reactions.

### UNIT - III

6. (a) Define Vander-Waals interactions. Explain its types with suitable example of each. 10

P. T. O.

- (b) Write short note on critical phenomenon. 5
7. (a) Explain EDTA method to measure the hardness of water. 10
- (b) Explain environmental factors affecting corrosion. 5
8. (a) Discuss in detail the basic principle and application of IR spectroscopy. 10
- (b) Write short note on magnetic resonance imaging. 5

#### UNIT - IV

9. Explain the following terms : 15
- (a) Flame photometry.
- (b) Shielding and de-shielding of proton.
- (c) Splitting of NMR signal

Roll No. ....

**3006**

**B. Tech 1st Semester (Common for All  
Branches) Examination – December, 2019**

**CHEMISTRY - I**

Paper : BSC-CH-101-G

Time : Three Hours ]

[ Maximum Marks : 75

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Question Number 1 is *compulsory*. Attempt *four* questions from remaining *four* Units selecting *one* question from each Unit. Use of non programmable calculator is allowed.

1. (a) Give *two* examples of anomalous electronic configuration. 1.5 × 10 = 15

(b) Define doping in semiconductors.

P. T. O.

3006-4250-(P-4)(Q-9)(19)

- (c) What is polarizability ?
- (d) Mention at least three elements of asymmetry.
- (e) Differentiate configuration and conformation.
- (f) Write balanced chemical equation for the oxidation and reduction of carboxyl compounds.
- (g) Define critical temperature.
- (h) Write advantages of demineralization process.
- (i) What is Bathochromic Shift ?
- (j) What are equivalent and non-equivalent protons in NMR Spectrum ?

### UNIT - I

2. Write short notes on the following; 15
- (a) Crystal field splitting in octahedral complex.
  - (b) Molecular orbitals theory.
  - (c) Define ion I.E & its variation in periodic table.

3. (a) What are Bonding and Antibonding molecular orbitals ? Explain formation of  $N_2$  molecules on the basis of molecular orbital energy level diagram. 10
- (b) Explain the term angular wave function. 5

### UNIT – II

4. (a) What are structural isomers and stereo isomers ? Classify them and explain its types. 10
- (b) Write short note on isomerism in transition metals. 5

5. Explain the following terms : 15

- (a) Nucleophilic substitution reactions.
- (b) Synthesis of Paracetamol.
- (c) Addition reactions.

### UNIT – III

6. (a) Define Vander-Waals interactions. Explain its types with suitable example of each. 10

P. T. O.

3006-4250-(P-4)(Q-9)(19) (3)

- (b) Write short note on critical phenomenon. 5
7. (a) Explain EDTA method to measure the hardness of water. 10
- (b) Explain environmental factors affecting corrosion. 5

#### UNIT – IV

8. (a) Discuss in detail the basic principle and application of IR spectroscopy. 10
- (b) Write short note on magnetic resonance imaging. 5
9. Explain the following terms : 15
- (a) Flame photometry.
- (b) Shielding and de-shielding of proton.
- (c) Splitting of NMR signal.