

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.
 $2.5 \times 6 = 15$
- (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 ?

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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 CO^+ . 7
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 n 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