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 ?

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 paracetamal 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 line 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
