

PARUL UNIVERSITY
FACULTY OF APPLIED SCIENCE
B.Sc., Winter 2017-18 Examination

Semester: 1
Subject Code: 11105101
Subject Name: Chemistry-I

Date: 18/12/2017
Time: 10:30am to 1:00pm
Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

- Q.1. A) Answer the following questions. (08)**
- (a) Define quantum numbers. Explain principle quantum number and angular momentum quantum number?
 - (b) Define atomic radius and discuss effect of atomic radius across the period and down the group in periodic table?
- Q.1. B) Answer the following questions. (Any two) (04)**
- (a) Do as directed:
 1. Explain geometry of H₂O molecule on basis of VSEPR theory
 2. Define ionization energy and electron affinity
 - (b) Why s-block elements emit colors on heating? Give reasons (04)
 - (c) Give postulates for Valence bond theory. (04)
- Q.2. A) Answer the following questions. (04)**
- (a) Do as directed: (Each of 02 marks) (04)
 1. State Pauli's principle
 2. State Hund's principle
 - (b) Define hybridization. Show hybridization in ethene and ethyne molecule. (04)
- Q.2. B) Answer the following questions. (Any two) (03)**
- (a) Fill in the blanks (03)
 1. Bond order for N₂ molecule is _____.
 2. Shape of CH₄ molecule is _____.
 3. Type of hybridization for PCl₅ molecule is _____.
 - (b) Give difference between covalent bond and coordinate covalent bond? (03)
 - (c) What are Madelung constants? (03)
- Q.3. A) Answer the following Question. (08)**
- (a) Explain Born-Haber cycle for NaCl. Draw its cycle.
 - (b) State principle of flame emission spectroscopy (FES). Give its applications.
- Q.3. B) Answer the following questions. (Any two) (04)**
- (a) What are carbocations? Explain its structure and stability. (04)
 - (b) Draw MO diagram for CO and O₂. Give its bond order. (04)
 - (c) Write 4 physical properties of s-block elements. (04)
- Q.4. A) Answer the following questions. (04)**
- (a) Do as directed: (Each of 02 marks) (04)
 1. Show chain isomerism in pentane.
 2. Give reaction for catalytic hydrogenation of ethene molecule.
 - (b) Give difference between S_N1 and S_N2 mechanism. (04)
- Q.4. B) Answer the following questions. (Any two) (03)**
- (a) Do as directed: (Each of 01 marks) (03)
 1. Hydrogenolysis of 1-chloropropane in presence of catalyst will form _____.
 2. Gilman reagent is _____.
 3. Grignard reagent treated with water will form _____.
 - (b) Write short note on E-1 and E-2 mechanism. (03)
 - (c) Show free radical mechanism for chlorination of methane. (03)