



HDT-003-0011003 Seat No. _____

B. Sc. (Sem. I) (CBCS) Examination

November / December – 2017

Chemistry : C - 101

(New Course)

Faculty Code : 003

Subject Code : 0011003

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

Instruction : This question paper contains five questions. All are compulsory. Figures to the right indicate full marks.

- 1 (A) Answer the following questions : 4
- (1) What is Aufbau principle?
 - (2) Define : Atomic radii.
 - (3) Define : Catenation.
 - (4) Define : Adsorption
- (B) Answer in brief : (Any **one** out of two questions) 2
- (1) Explain Inert Pair Effect.
 - (2) Explain Principal Quantum no. 'n'.
- (C) Answer in detail : (Any **one** out of two questions) 3
- (1) Write a short note on "Hund's rule of maximum multiplicity"
 - (2) Differentiate adsorption and absorption.
- (D) Answer any **one** out of two questions : 5
- (1) Discuss diagonal relationship between B and Si.
 - (2) Derive Langmuir isotherm equation.

- 2 (A) Answer the following questions : 4
- (1) What is Linear hybridization ?
 - (2) Define: Bond pair of electron.
 - (3) Define: Gerade Molecular orbital.
 - (4) Give shape and hybridization of PCl_5 molecule.
- (B) Answer in brief : (Any **one** out of two questions) 2
- (1) Explain B.M.O.
 - (2) Explain Bond angle order :
 $NH_3(107^\circ 3') > NF_3(102^\circ)$
- (C) Answer in detail : (Any **one** out of two questions) 3
- (1) Discuss the shape of Carbonate (CO_3^{-1}) ion.
 - (2) Draw molecular orbital energy level diagram of NO molecule.
- (D) Answer any **one** out of two questions : 5
- (1) What is Hybridization ? Discuss sp^3d^2 hybridization with suitable example.
 - (2) Discuss M.O. energy level diagram of O_2 molecule and compare it's stability with O_2^{+1} molecule ion.
- 3 (A) Answer the following questions : 4
- (1) Give the IUPAC name of $C(CH_3)_4$.
 - (2) Write the structural formula for 1,3-dibromo-2-methyl propane.
 - (3) Arrange of following in increasing order of Basicity.
 $(CH_3)_3 - N$:, $:NH_3$, $(CH_3)_2 - NH$, $CH_3 - NH_2$
 - (4) Define: Carbanion.

- (B) Answer in brief : (Any **one** out of two questions) **2**
- (1) Discuss Homolytic fission with examples.
 - (2) Explain Benzynes.
- (C) Answer in detail : (Any **one** out of two questions) **3**
- (1) Discuss Inductive effect.
 - (2) Discuss Carbocation with examples.
- (D) Answer any **one** out of two questions : **5**
- (1) What is nucleophilic substitution reaction ? Explain SN^2 reaction mechanism.
 - (2) Describe Electromeric effect and Mesomeric effect.
- 4 (A) Answer the following questions : **4**
- (1) Define : Markovnikove's rule.
 - (2) Define : Alkene.
 - (3) What is Catalysis ?
 - (4) Define : Homogeneous catalysis.
- (B) Answer in brief : (Any **one** out of two questions) **2**
- (1) Explain Positive catalysis with an example.
 - (2) Explain Dehydrohalogenation of Vicinal dihalides.
- (C) Answer in detail : (Any **one** out of two questions) **3**
- (1) Explain Diels-Alder reaction.
 - (2) Explain Dehydration of Alcohols.
- (D) Answer any **one** out of two questions : **5**
- (1) Explain E^2 reaction with mechanism.
 - (2) Explain Modern adsorption theory of Heterogeneous catalysis.

- 5 (A) Answer the following questions : 4
- (1) What is Rate of reaction?
 - (2) Name only two examples of first order reaction.
 - (3) What is Molecularity of reaction?
 - (4) What is the unit of velocity constant (K) for second order reaction?
- (B) Answer in brief : (Any **one** out of two questions) 2
- (1) Explain Zero order reaction.
 - (2) Explain Energy of activation.
- (C) Answer in detail : (Any **one** out of two questions) 3
- (1) Discuss Collision theory of rate of reaction.
 - (2) Decomposition of a gas is of second order. It takes 40 minutes for 40% of a gas to be decomposed when its initial concentration is 4×10^{-2} mole/lit. Calculate the specific reaction rate for a second order reaction.
- (D) Answer any **one** out of two questions : 5
- (1) Derive equation of rate constant for Second order reaction and mention its Characteristics (when $a = b$).
 - (2) Describe any two methods used to determine the order of reaction.
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