



**PBO-003-0011003**

Seat No. \_\_\_\_\_

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

November / December - 2018

**Chemistry : C - 101**

*(New Course)*

**Faculty Code : 003**

**Subject Code : 0011003**

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

[Total Marks : 70

- Instructions :** (1) This question paper contains five questions. All are compulsory.  
(2) Figures to the right indicate full marks.

- 1 (a) Answer the following questions : 4  
(1) What is Ionic radius ?  
(2) Define : Covalent radius.  
(3) Define : Electron affinity.  
(4) Define : Adsorbent.
- (b) Answer in brief : (any **one** out of two questions) 2  
(1) Explain Metallic character of s and p-block elements.  
(2) Why  $IP_2$  (Ionization Potential) is greater than  $IP_1$  ?
- (c) Answer in detail : (any **one** out of two questions) 3  
(1) Discuss periodic trend of electronegativity.  
(2) Discuss Fajan's Rule of polarizing power and polarizability.
- (d) Explain in detail : (any **one** out of two questions) 5  
(1) Discuss diagonal relationship between Li and Mg.  
(2) Derive Langmuir equation with modification in equation at very low pressure and high pressure.

- 2 (a) Answer the following questions : 4
- (1) What is  $sp^2$ -hybridization ?
  - (2) Define : Bond order.
  - (3) Define : Lone pair of electrons.
  - (4) Give shape and hybridization of  $BeCl_2$  molecule.
- (b) Answer in brief : (any **one** out of two questions) 2
- (1) Explain A.B.M.O.
  - (2) Explain Bond angle order :  
 $CH_4(109^\circ 28') > NH_3(107^\circ 3') > H_2O(104^\circ 5')$
- (c) Answer in detail : (any **one** out of two questions) 3
- (1) Discuss the shape of Stannous chloride ( $SnCl_2$ ) molecule.
  - (2) Explain M.O. energy level diagram of  $C_2$  molecule.
- (d) Explain in detail : (any **one** out of two questions) 5
- (1) What is Hybridization ? Discuss  $sp^3$  hybridization with suitable example.
  - (2) Discuss M.O. energy level diagram of  $N_2$  molecule and compare its stability with  $N_2^{+1}$  molecule ion.
- 3 (a) Answer the following questions : 4
- (1) Give the IUPAC name of  $CH_3 - CH = CH - CH_3$
  - (2) Write the structural formula for 2, 3-Dimethyl butane.
  - (3) What is Carbene ?
  - (4) Define : Elimination reaction.
- (b) Answer in brief : (any **one** out of two questions) 2
- (1) Write a short note on Electromeric effect.
  - (2) Explain Substitution reaction.

- (c) Answer in detail : (any **one** out of two questions) **3**
- (1) Discuss Geometrical isomerism.
  - (2) Explain Inductive effect with examples.
- (d) Explain in detail : (any **one** out of two questions) **5**
- (1) What is nucleophilic substitution reaction ?  
Explain  $S_N^1$  reaction with mechanism.
  - (2) Describe Carbocation, Carbanion and Benzyne with examples.
- 4 (a) Answer the following questions : **4**
- (1) Define : Vicinal dihalides.
  - (2) Give any one example of a catalyst which is used for the dehydration of Alcohol.
  - (3) What is Catalyst ?
  - (4) What is Negative catalysis ?
- (b) Answer in brief : (any **one** out of two questions) **2**
- (1) Explain Acid-Base catalysis with an example.
  - (2) Explain Catalytic reduction of Alkene.
- (c) Answer in detail : (any **one** of two questions) **3**
- (1) Explain Markovnikov's rule with example.
  - (2) Explain Ozonolysis reaction of Alkene.
- (d) Explain in detail : (any **one** out of two questions) **5**
- (1) Explain  $E^1$  reaction with mechanism.
  - (2) Explain Intermediate compound formation theory of Homogeneous catalysis.
- 5 (a) Answer the following questions : **4**
- (1) Define Second order reaction.
  - (2) If specific rate constant is  $1.08 \times 10^2 \text{ mole/lit} \cdot \text{sec}$ .  
What is the order of reaction ?
  - (3) What is Temperature coefficient ?
  - (4) Name any two factors which affect reaction rate.

- (b) Answer in brief : (any **one** out of two questions) **2**
- (1) Explain Molecularity of reaction with an example.
  - (2) Give the reasons for failure of Collision theory.
- (c) Answer in detail : (any **one** out of two questions) **3**
- (1) Derive the equation of rate constant for Zero order reaction.
  - (2) For a reaction  $A \rightarrow B$ , at  $10^{\circ}\text{C}$  temperature, rate constant is  $1.6 \times 10^{-3}$  and at  $20^{\circ}\text{C}$  temperature is  $1.625 \times 10^{-2} \text{ sec}^{-1}$  respectively, calculate energy of activation ( $R = 1.987$ ).
- (d) Explain in detail : (any **one** out of two questions) **5**
- (1) Describe Integration and Graphical methods for determining the order of reaction.
  - (2) Derive integrated rate equation for First order reaction and explain its characteristics.
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