DCY-003-2011004 Seat No. _____

# B. Sc. (Sem. I) (CBCS) (W.E.F. 2019) Examination

**August - 2022**

**Chemistry : C-101**

**Faculty Code : 003**

**Subject Code : 2011004**

Time : **2:30** Hours] [Total Marks : **70**

**Instructions:** (1) This question paper contains ten questions, attend any five.

(2) Figures to the right indicate full marks.

**1** (A) Answer the following. **4**

(1) Define Ionization potential.

(2) State Paul's priciple.

(3) Group II elements are known as _____ metals.

(4) Define Sorption.

(B) Answer in brief. (Any One) **2**

(1) Write uses of Diamond.

(2) Explain factor affecting Ionic radii.

(C) Answer in detail. (Any One) **3**

(1) Explain principle quantum number.

(2) Write short note on Hydration energy.

(D) Answer any one. **5**

(1) Define Ionic radius. Discuss the variation of ionic radius in period and group

(2) Describe diagonal relationship of Li and Mg.

**2** (A) Answer the following. **4**

(1) Define atomic radius.

(2) State Aufbau principle.

(3) Which group belongs to 'S' block elements?

(4) The solid which adsorb gas is called _____.

(B) Answer in brief. (Any One) **2**

(1) State Freundlich equation.

(2) Explain Vander walls radius.

(C) Answer in detail. (Any One) **3**

(1) Write short note on ionization potential.

(2) Differentiate Chemical and Physical adsorption.

(D) Answer any one. **5**

(1) Derive Langmuir adsorption isotherm.

(2) Explain anomalous behavior of Li.

**3** (A) Answer the following. **4**

(1) Define Bond order.

(2) Give shape of $PCl_5$ molecule.

(3) What is BMO?

(4) Define Hybridization.

(B) Answer in brief. (Any One) **2**

(1) Explain $CO_2$ is linear while $SO_2$ is angular?

(2) Explain condition of LCAO method.

(C) Answer in detail. (Any One) **3**

(1) Describe Valance bond theory.

(2) What is Hybridization? Explain sp Hybridization.

(D) Answer any one. **5**

(1) Explain VSEPR theory.

(2) Describe energy level diagram of NO molecule and $NO^+$ ion and compare its bond order and magnetic property.

**4** (A) Answer the following. **4**

(1) Define Ionic bond.

(2) Give shape of $SF_6$ molecule.

(3) Give bond order of $N_2$ molecule.

(4) Define $sp^3$ Hybridization.

(B) Answer in brief. (Any One) **2**

(1) Explain limitation of valence bond theory.

(2) Calculate bond order of $O_2$, $O_2^-$ and $O_2^+$.

(C) Answer in detail. (Any One) **3**

(1) Give difference between BMO and ABMO.

(2) Explain Sigma and Pi molecular orbital.

(D) Answer any one. **5**

(1) Explain main point of MO theory.

(2) Describe energy level diagram of CO molecule and calculate its bond order.

**5** (A) Answer the following. **4**

(1) What is Heterolytic fission?

(2) Give IUPAC name of: $CH_3CH_2COCl$

(3) Define Free radical.

(4) Write Curly arrow rules.

(B) Answer in brief. (Any One) **2**

(1) Explain electrometric effect.

(2) Explain elimination reaction.

(C) Answer in detail. (Any One) **3**

(1) What is Nucleophile and Electrophile? Give one example of each.

(2) Discuss stability of Carbocation.

(D) Answer any one. **5**

(1) Explain $SN^1$ mechanism with example.

(2) Discuss CIP rules with example.

**6** (A) Answer the following. **4**

(1) What is Hemolytic fission?

(2) Give IUPAC name of: $CH_3$-$CH_2$-O-$CH_3$

(3) Define Enantiomers.

(4) Give IUPAC name of: $CH_3$-CH=CH-CHO

(B) Answer in brief. (Any One) **2**

(1) Explain Resonance effect.

(2) Explain substitution reaction.

(C) Answer in detail. (Any One) **3**

(1) Explain geometrical isomerism with Cis and Trans nomenclature.

(2) Discuss stability of Carbanion.

(D) Answer any one. **5**

(1) Explain $SN^2$ mechanism with example.

(2) Explain Fisher projection formula with their characteristics.

7 (A) Answer the following. **4**

(1) What is the general formula of Alkynes?

(2) Define saturated Hydrocarbon.

(3) State Saytzeff rule.

(4) What is called Alkenes?

(B) Answer in brief. (Any One) **2**

(1) Explain dehydration reaction of alcohol.

(2) Explain Wurtz Fitting reaction of alkane's synthesis.

(C) Answer in detail. (Any One) **3**

(1) Explain 1 : 2 and 1 : 4 addition reactions in conjugated dienes.

(2) Explain the free radical substitution reaction of Alkane.

(D) Answer any one. **5**

(1) Explain Markownicov rule and Anti Markownicov rule with Mechanism.

(2) Explain $E^1$ mechanism with example.

8 (A) Answer the following. **4**

(1) What is the general formula of Alkane?

(2) Define Paraffin.

(3) Define unsaturated Hydrocarbon.

(4) What is called alkynes?

(B) Answer in brief. (Any One) **2**

(1) Explain hydroboration reaction of alkenes.

(2) Discuss acidity of alkynes.

(C) Answer in detail. (Any One) **3**

(1) Explain Diels Alder reactions.

(2) Explain dehalogenations reaction of vicinal and germinal dihalides.

(D) Answer any one. **5**

(1) Explain electrohilic addition reaction of alkynes.

(2) Explain $E^2$ mechanism with example.

**9** (A) Answer the following. **4**

(1) What is Order of reaction?

(2) Give Arrhenius equation.

(3) Give one example of Homogeneous catalysis reaction in solution.

(4) What is called Catalyst?

(B) Answer in brief. (Any One) **2**

(1) Derive following equation for first order reaction $t_{1/2} = 0.693/K$.

(2) Give limitaion of collision theory.

(C) Answer in detail. (Any One) **3**

(1) Discuss factors affect the reaction rate.

(2) Explain term Catalyst promoter and Catalyst poison.

(D) Answer any one. **5**

(1) Derive equation of rate constant for second order reaction when concentration is different.

(2) Write short note on Enzyme catalysis.

**10** (A) Answer the following. **4**

(1) Define Activation energy.

(2) What is catalyst promoter?

(3) Give one example of Zero order reaction.

(4) Write unit of rate constant K for second order reaction.

(B) Answer in brief. (Any One) **2**

(1) What is heterogeneous catalysis? Explain giving one example.

(2) Explain important characteristics of enzyme catalysis.

(C) Answer in detail. (Any One) **3**

(1) Explain with example autocatalysis.

(2) Derive equation of rate constant for first order reaction.

(D) Answer any one. **5**

(1) Derive an expression for the rate of an acid catalyzes reaction.

(2) Describe Transition state theory.

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