647510

BSCcheCC1010

Seat No :_____

B.Sc. Semester - 1 (*CBCS*) Examination

Jan/Feb.-2022 (NEW COURSE)

CHEMISTRY(CORE)

Time: 1:30 Hours **Marks: 42**

Instructions:

1. Figures to the right indicate marks.
2. There are five questions in the question paper.
3. Answer any three of the following questions.

Q.1(A) **Answer the following question.** (04)

1. Explain metallic character and polarizing power of P block elements.

Q.1(B) **Answer any two questions out of three.** (10)

1. What is the diagonal relationship? Explain diagonal relationship of boron with silicon.
2. Give the difference between bonding and antibonding molecular orbital.
3. Explain sp^3 hybridization with example.

Q.2(A) **Answer the following question.** (04)

1. What is hyperconjugation? Explain with suitable example.

Q.2(B) **Answer any two questions out of three.** (10)

1. Discuss mesomeric effect in detail with suitable example.
2. Give state and rule of saytzeff &Hofmann elimination reaction with suitable example
3. Compare kinetics, mechanism, molecularity, factor affect on it and stereochemistry of SN^1 & SN^2 reaction.

Q.3(A) **Answer the following question.** (04)

1. State difference between molecularity and Order of reaction.

Q.3(B) **Answer any two questions out of three.** (10)

1. Derive equation of rate constant for first order reaction.
2. State characteristic of second order reaction.
3. Explain the important characteristic of enzyme catalysed reactions

Q.4(A) **Answer the following question.** (04)

1. Discuss acidity of monocarboxylic acid using inductive effect.

Q.4(B) **Answer any two questions out of three.** (10)

1. Define: Quantum numbers? Explain the all four quantum numbers.
2. Define inductive effect and discuss in detail with example of alkyl halide
3. Explain activated complex theory of reaction rate.

Q.5(A) **Answer the following question.** (04)

1. Differentiate chemical adsorption and physical adsorption.

Q.5(B) **Answer any two questions out of three.** (10)

1. Draw MOT diagram of O_2 molecule and calculate it's bond order, bond length, HOMO & LUMO orbitals and Magnetic property.
2. Discuss E_1 Vs E_2 reaction.
3. Derive Langmuir equation.

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647510

0301102C1010

Seat No :_____

B.Sc. Semester - 1 (*CBCS*) Examination

Jan/Feb.-2022 (OLD COURSE)

CHEMISTRY (CORE)

Time: 1:30 Hours **Marks: 42**

Instructions:

1. Figures to the right indicate marks.
2. There are five questions in the question paper.
3. Answer any three of the following questions.

Q. 1 (a) Answer the following question. (4)

(1) State 'Heisenberg's uncertainty principle'.

(2) Give the name of allotrope of carbon.

(3) Define catenation.

(4) Which force is responsible for physical adsorption?

(b) Answer any one question (2)

(1) Why the electron affinity of chlorine is higher than fluorine?

(2) State the factor responsible for anomalous behavior of elements?

(c) Answer any one question (3)

(1) Give difference between Chemical adsorption and Physical adsorption.

(2) Discuss structure graphite.

(d) Answer any one question (5)

(1) Explain Inert pair effect.

(2) Discuss the factor affecting on adsorption and its characteristic.

Q. 2 (a)Answer the following question. (4)

(1) Define ionic bond

(2) Give shape and bond angle of BF_3

(3) Define bond length.

(4) Draw the structure showing hybridization in $SnCl_2$.

(b) Answer any one question (2)

(1) Explain bond angle in H_2O is smaller than NH_3.

(2) Give differences between BMO and ABMO

(c) Answer any one question (3)

(1) What is hybridization? Explain sp hybridization.

(2) Explain sigma and pi molecular orbitals.

(d) Answer any one question (5)

(1) Draw the energy level diagram of N_2 molecule and calculate bond order, Bond length and magnetic property.

(2) Explain VSEPR theory.

Q. 3 (a)Answer the following question. (4)

(1) Define Isomerism.

(2) Define electromeric effect.

(3) Write alkyle halides in decreasing order of their bond length.

(4) Write four functional groups which shows -M effect.

(b) Answer any one question (2)

(1) Discuss inductive effect with suitable example.

(2) What is rearrangement reaction? Give an example.

(c) Answer any one question (3)

(1) Discuss hyperconjugation effect with suitable example.

(2) Give three preparation of (i) Carbocations (ii) carbine (iii) benzyne.

(5)

(d) Answer any one question
(1) Explain SN^2 reaction in detail.
(2) Explain acidity of aliphatic carboxylic acids. (4)

Q. 4 (a)Answer the following question.
(1) What are general formula of alkynes?
(2) Give anti Markownikovs's rule.
(3) Give the statements of saytzeff rule?
(4) State activation energy. (2)

(b) Answer any one question
(1) Explain Syn and anti- hydroxylation (Oxidation) of alkene
(2) What is function of catalytic promoters and inhibitors in chemical reactions? (3)

(c) Answer any one question
(1) Explain Hofmann elimination rule for alkene.
(2) Describe nucleophilic addition reaction of alkynes. (5)

(d) Answer any one question
(1) Give difference between E1 and E2 reaction.
(2) Discuss the theory of heterogeneous catalysis and illustrate with examples.

Q. 5 (a) Answer the following question. (4)
(1) Give equation of half-life period of zero order reaction?
(2) Define: order of chemical reaction.
(3) Define: specific rate constant
(4) Give two example of second order reaction.

(b) Answer any one question (2)
(1) Derive following equation for first order reaction $t_{1/2}=\frac{0.693}{k}$
(2) Give characteristic of second order reaction.

(c) Answer any one question (3)
(1) Explain: Van't Hoff differential method for determination of order of reaction.
(2) Give the Difference between Order of reaction and Molecularity

(d) Answer any one question (5)
(1) Explain the factors affecting on rate of chemical reaction.
(2) Write the short note on collision theory of reaction rate.

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BSCcheCC1010

B.Sc. Semester - 1 (*CBCS*) Examination

Feb/Mar. -2021 (NEW COURSE)

CHEMISTRY (CORE)

Marks: 42

Time: 1:30 Hours

Instructions:

1. Figures to the right indicate marks.
2. There are five questions in the question paper.
3. Answer any three of the following questions.

Q.1(A) **Answer the following question.** (04)

(1) Explain metallic character of **S** and **P** block elements.

Q.1(B) **Answer any two questions out of three.** (10)

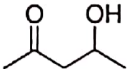
(1) What is ionic radius? Discuss pauling method for determination of ionic radius.

(2) Draw MOT diagram of N_2 molecule and calculate it's bond order, bond length, HOMO & LUMO orbitals and Magnetic property.

(3) Explain Valence bond theory

Q.2(A) **Answer the following question.** (04)

(1) Give IUPAC name of the following:

a) $CH_3\text{-}CH_2\text{-}\overset{\overset{O}{\|}}{C}\text{-}CH_3$ b)  c) $CH_3\text{-}\overset{\overset{Cl}{|}}{C}H\text{-}CH_3$ d) $H\text{-}\overset{\overset{O}{\|}}{C}\text{-}NH_2$

Q.2(B) **Answer any two questions out of three.** (10)

(1) Explain Relative strength of carboxylic acid.

(2) Explain Markovnikoff's and Anti-markonikoff's rule with suitable example.

(3) Discuss E_1 Vs E_2 reaction.

Q.3(A) **Answer the following question.** (04)

(1) Explain factor affecting adsorption with its characteristic.

Q.3(B) **Answer any two questions out of three.** (10)

(1) Derive equation of rate constant for second order reaction (When concentration is same).

(2) Explain Collision theory of reaction rate.

(3) What is heterogeneous catalysis? Discuss the theories of heterogeneous catalysis with examples.

Q.4(A) **Answer the following question.** (04)

(1) a) Discuss types of Organic reactions.

b) Give difference between Inductive and mesomeric effect.

Q.4(B) **Answer any two questions out of three.** (10)

(1) What is Diagonal relationship? Discuss diagonal relationship of Li with Mg.

(2)What are reactive Intermediates? Give name of each and discuss carbocation in detail.

(3) Describe the methods for determination of order of reaction.

Q.5(A) **Answer the following question.** (04)

(1) State difference between molecularity and Order of reaction.

Q.5(B) **Answer any two questions out of three.** (10)

(1) Explain sp^3d^2 hybridization with example.

(2) Discuss in detail SN^2 Vs SN^1 reactions.

(3) Explain Freundlich adsorption isotherm and it's limitation.

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647510

Seat No :_____

0301102C1010

B.Sc. Semester - 1 (*CBCS*) Examination

Feb/Mar. -2021 (OLD COURSE)

CHEMISTRY (CORE)

Marks: 42

Time: 1:30 Hours

Instructions:

1. Figures to the right indicate marks.
2. There are five questions in the question paper.
3. Answer any three of the following questions.

Q.1(A) Answer the following questions. (04)

1. State aufbau principle.
2. Which metal ion is present in chlorophyll?
3. Write definition of adsorption.
4. What is the hybridization of carbon atom in diamond?

Q.1(B) Answer any one out of two. (02)

1. Explain principal quantum number.
2. Explain properties of diamond.

Q.1(C) Answer any one out of two. (03)

1. Explain Heisenberg's uncertainty principle.
2. Explain differences between chemical adsorption and physical adsorption.

Q.1(D) Answer any one out of two. (05)

1. Explain hund's rule and pauli's principle.
2. Write a note on factors affecting adsorption.

Q.2(A) Answer the following questions. (04)

1. Draw structure of methane.
2. Give definition of hybridization.
3. Write electronic configuration of carbon atom.
4. Write electronic configuration of hydrogen atom.

Q.2(B) Answer any one out of two. (02)

1. Write a note on bonding molecular orbital (BMO).
2. Write a note on sigma bond.

Q.2(C) Answer any one out of two. (03)

1. Explain sp hybridization.
2. Explain valance bond theory.

Q.2(D) Answer any one out of two. (05)

1. Explain difference between valance bond theory (VBT) and molecular orbital theory ((MOT).
2. Draw the energy level diagram of C_2 molecule and calculate it's bond order.

Q.3(A) Answer the following questions. (04)

1. Give IUPAC name of $CH_3 - CH_2 - CH_2 - CH_3$.
2. Give IUPAC name of $CH_3 - CH_2 - OH$.
3. Define substitution reaction.
4. Define hemolytic fission.

Q.3(B) Answer any one out of two. (02)

1. Give definitions of Carbocation and carbanion.
2. Give definitions of enantiomers and diastereomers.

Q.3(C) Answer any one out of two. (03)

1. Explain SN^1 reaction.
2. Explain inductive effect.

(05)

Q.3(D) Answer any one out of two.

1. Explain SN^2 reaction with mechanism.
2. Explain rules for the determination of R and S nomemclature. (04)

Q.4(A) Answer the following questions.

1. Define alkene.
2. Define E^2 reaction.
3. What is catalyst?
4. What is enzyme catalyst? (02)

Q.4(B) Answer any one out of two.

1. Explain saytzeff's rule.
2. Write characteristics of enzyme catalyst. (03)

Q.4(C) Answer any one out of two.

1. Explain markovnikov's rule with example.
2. Write a note on heterogeneous catalysis. (05)

Q.4(D) Answer any one out of two.

1. Explain E^1 reaction with mechanism.
2. Write a note on acid-base catalyst. (04)

Q.5(A) Answer the following questions.

1. What is order of reaction?
2. What is rate of reaction?
3. Give definition of activation energy.
4. What is temperature coefficient? (02)

Q.5(B) Answer any one out of two.

1. Give characteristics of first order reaction.
2. Explain molecularity of reaction. (03)

Q.5(C) Answer any one out of two.

1. Explain factors affecting on rate of reaction.
2. Explain collision theory. (05)

Q.5(D) Answer any one out of two.

1. Explain third order reaction.
2. Discuss any two methods for the determination of order of reaction.

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BSCcheCC1010 Seat No :_____

B.Sc. Semester - 1 (*CBCS*) Examination

Oct/Nov. -2019 (NEW COURSE)

CHEMISTRY (CORE)

Time: 2:30 Hours Marks: 70

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

Que-1 (a) **Answer the following question.** (04)

(1) Explain any two quantum numbers.

Que-1 (b) **Answer any two questions out of three.** (10)

(1) Write a note on aufbau principle and hund's rule.

(2) Explain sp^3 hybridization.

(3) Explain difference between Valance bond theory (VBT) and molecular orbital theory (MOT).

Que-2 (a) **Answer the following question.** (04)

(1) Explain SN^1 reaction with mechanism.

Que-2 (b) **Answer any two questions out of three.** (10)

(1) Explain SN^2 reaction with mechanism.

(2) Write a note on inductive effect.

(3) Write a note on carbocation.

Que-3 (a) **Answer the following question.** (04)

(1) Give difference between physical and chemical adsorption.

Que-3 (b) **Answer any two questions out of three.** (10)

(1) Discuss in detail: Factors affecting rate of chemical reaction.

(2) Write a note on characteristics of catalysis.

(3) Explain factors affecting adsorption.

Que-4 (a) **Answer the following question.** (04)

(1) Explain E^1 reaction with mechanism.

Que-4 (b) **Answer any two questions out of three.** (10)

(1) Write de Broglie equation and explain the terms.

(2) Explain Marcovnikov rule with an example.

(3) Define the terms: (i) Adsorption, (ii) Absorption, (iii) Adsorbate.

Que-5 (a) **Answer the following question.** (04)

(1) Write a short note on enzyme catalysis.

Que-5 (b) **Answer any two questions out of three.** (10)

(1) Write a note on Pauli's principle.

(2) Explain dipole moment in detail.

(3) Write a note on activation energy.

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647510

0301102C1010

Seat No :_____

B.Sc. Semester - 1 (*CBCS*) Examination

Oct/Nov. -2019 (OLD COURSE)

CHEMISTRY (CORE)

Time: 2:30 Hours

Marks: 70

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

Q. 1 (a) Answer the following question. (4)

(1) Which elements have maximum electronegativity in the periodic table?

(2) Give the name of allotrope of carbon.

(3) Define Polarizing power.

(4) Which force is responsible for physical adsorption?

(b) Answer any one question. (2)

(1) Why the ionization energy of Be is greater than Li? Give reason.

(2) Explain diagonal relationship.

(c) Answer any one question. (3)

(1) Give difference between Chemical adsorption and Physical adsorption.

(2) The internuclear distance of NaF is 2.31A° and the screening constant is 4.5. calculate r^+ (Na^+) and r^- (F^-) using Pauling's method. (Atomic number of Na =11 and F =9).

(d) Answer any one question (5)

(1) Explain Inertpair effect.

(2) Derive Freundlich Equation and it's limitation.

Q. 2 (a)Answer the following question. (4)

(1) Define Covalent bond

(2) Give shape and bond angle of BF_3

(3) Draw the structure showing hybridization n SO_4^{-2}.

(4) Give electronic configuration according to MO theory of N_2.

(b) Answer any one question. (2)

(1) Explain CO_2 molecule is linear in shape and SO_2 molecule is angular

(2) Give Limitation of valence bond theory.

(c) Answer any one question. (3)

(1) Give differences between BMO and ABMO

(2) Explain sigma and pi molecular orbitals.

(d) Answerany one question. (5)

(1) Draw the energy level diagram of NO molecule and calculate bond order, Bond length and magnetic property.

(2) Explain **sp** hybridization and **sp^2** hybridization with examples

Q. 3 (a)Answer the following questions. (4)

(1) Write four functional groups which shows +M effect.

(2) Explain Ambident nucleophile.

(3) Write alkyle halides in decreasing order of their bond length.

(4) Define geometrical isomers.

(b) Answer any one question. (2)

(1) Explain reactivity of 1^0, 2^0, 3^0 alkyle halide using inductive effect.

(2) Explain structure of free radical.

(c) Answer any one question. (3)

(1) Discuss Mesomeric effect with suitable example.

(2) Give three preparation of (i) Carbocations (ii) carbine (iii) benzyne.

(d) Answer any one question. (5)

(1) Explain SN^1 reaction in detail.

(2) Discuss stability of carbocation in details.

Q. 4 (a) Answer the following questions. (4)

(1) What is organic chemistry?

(2) Give Markownikovs's rule.

(3) Define: Autocatlyst

(4) Give only name of elimination reaction according to mechanism

(b) Answer any one question. (2)

(1) Give Wurtz-Fitting reaction for alkane synthesis.

(2) What is function of catalytic promoters and inhibitors in chemical reactions?

(c) Answer any one question. (3)

(1)Explain Syn and anti- hydroxylation (Oxidation) of alkene.

(2) Describe nucleophilic addition reaction of alkynes.

(d) Answer any one question. (5)

(1) Give difference between E1 and E2 reaction.

(2) Discuss Enzyme catalyst in detail.

Q. 5 (a) Answer the following question. (4)

(1) Give unit of rate constant for second order reaction.

(2) Define: Rate law.

(3) Give any two examples of zero order reaction.

(4)Define: Activation energy.

(b) Answer any one question. (2)

(1) Derive following equation for first order reaction $t_{1/2}=\frac{0.693}{k}$

(2) The rate constant for a reaction of zero order in A is 0.0030 mol $L^{-1}s^{-1}$. How long will it take for the initial concentration of A to fall from 0.10 M to 0.075 M

(c) Answer any one question. (3)

(1) Give the Difference between Order of reaction and Molecularity

(2)Explain: Ostwald isolation method for determination of order of reaction.

(d) Answer any one question. (5)

(1) Give characteristics of second order reaction

(2) Explain: Influence of temperature on reaction rates or Arrhenius equation

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