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B. Sc. (Semester-II)
Subject : GENERAL CHEMISTRY-II (US02CCHE21)

Date : 06-03-2019   Internal Test   Marks : 50

Day : Wednesday   Time : 12.30 p.m. to 2.30 p.m.

Note: (i) All questions are to be attempted.

(ii) Figures to the right indicate marks.

Q.1   **Choose the correct option for the following :**   [08]

(i)   Which of the following intermediate is produce during homolytic bond cleavage of alkyl halide ?

    (a) Carbocation   (b) Carbanion   (c) Free radical   (d) None of these

(ii)   Polyalkanes are used as ....

    (a) Fire extinguisher   (b) Medicine

    (c) Cooling agent   (d) Antifreezing agent

(iii)   How many lone pairs are present on oxygen atom of water molecule ?

    (a) 0   (b) 1   (c) 2   (d) 3

(iv)   From the following which molecule have bond order zero ?

    (a) H_2 (b) He_2 (c) O_2 (d) N_2

(v)   The outer-shell electronic configuration of Cr-atom is ....

    (a) $3d^4\ 4s^2$ (b) $3d^5\ 4s^1$

    (c) $3d^2\ 4s^2$ (d) $3d^6\ 4s^0$

(vi)   Complexes which contain two or more central metal ions are called ....

    (a) Mixed ligand   (b) Tridentate ligand

    (c) Hexadentate ligand   (d) Polynuclear complex

(vii)   Which of the following is a unit of rate constant k of the third order reaction ?

    (a) sec^{-1} (b) mole/lit   (c) lit/mole   (d) $lit^2 mole^{-2} sec^{-1}$

(viii)   Rate of chemical reaction indicates the change in the concentration of a reactant or product per ....

    (a) unit pressure   (b) unit time   (c) unit temperature   (d) unit volume

Q:2   **Answer the following (Attempt any Five) :**   [10]

(i)   Give the difference between S_N1 and S_N2 reaction.

(ii)   Explain that stability order of carbocation is $3^0 > 2^0 > 1^0 > {}^+CH_3$.

(iii)   Why the shape of H_2O molecule is angular ?

(iv)   Give the shape of NH_4^+, BrF_5 , XeF_4 and F_2O molecule.

(v)   Give the IUPAC names of the following complexes:

    (1) $[PtCl_2(NH_3)_4]Br_2$

    (2) $[COCl_2(CH_3NH_2)_2]$

(vi)   Give the valence electronic configuration of d-block elements.

(vii)   Give the difference between order of reaction and molecularity of the reaction.

(viii)   Define: (a) Rate of reaction   (b) Differential rate law

Q:3   **Answer the following:**   [08]

(A)   Arrange the increasing order of reactivity for the following molecules towards S_N2 reaction and explain your answer.

    (a) t-butyl chloride   (b) Ethyl chloride   (c) Isopropyl chloride

(B)   Aryl and vinyl halides have low reactivity towards displacement reaction. Explain.

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OR

Q:3 Answer the following: [08]

(A) Write all the possible isomeric structural formula and IUPAC name for the compound having molecular formula C_4H_9Br. Classify them as 1^0, 2^0 and 3^0 alkyl halides.

(B) Write reaction mechanism for the conversion of chlorobenzene to aniline via benzyne intermediate.

Q:4 Answer the following: [08]

(A) Discuss Sidgwick-Powell theory to explain shape of molecules.

(B) Discuss the structures of NH_3 and SF_6 molecules with the help of VSEPR theory.

OR

Q:4 Answer the following: [08]

(A) Discuss the *p-p* combination of orbitals.

(B) Describe the molecular orbital treatment of C_2 molecule.

Q:5 Answer the following: [08]

(A) Give the complete and valence shell electron configuration of the atoms of 3d-series of transition elements.

(B) Discuss the classification of ligands.

OR

Q:5 Answer the following: [08]

(A) Give the rules for nomenclature of co-ordination compounds.

(B) What is chelate ? Give the classification of chelate and its uses.

Q:6 Answer the following: [08]

(A) What is integrated rate law ? Derive integrated rate law for first order reaction.

(B) The rate constants for the decomposition of N_2O_5 gas are 3.4×10^{-5} and 4.19×10^{-4} at $25\,^0C$ and $45\,^0C$ respectively. Calculate the activation energy of the reaction. (R= 8.314 Js)

OR

Q:6 Answer the following: [08]

(A) What is reaction mechanism ? Discuss the types of elementary process for the reaction mechanism.

(B) A second order reaction where a=b is 20% completed in 500 sec. How long will the reaction take to be 60% completed ?

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