2010

Roll No. | | | | | | |

Answer Sheet No._____

Sig. of Candidate._____

Sig. of Invigilator._____

CHEMISTRY HSSC–II

SECTION – A (Marks 17)

Time allowed: 25 Minutes

NOTE:- Section–A is compulsory and comprises pages 1–2. All parts of this section are to be answered on the question paper itself. It should be completed in the first 25 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q. 1 Circle the correct option i.e. A / B / C / D. Each part carries one mark.

(i) Mark the correct statement from the following about the properties of elements in periodic table.

A. Melting point of halogens first increases and then decreases down the group
B. The ionization energy of calcium is higher than that of beryllium
C. Covalent character of metal halides increases from left to right in a periodic table
D. Lu is bigger in size than Ce

(ii) Lithium is the first member of group I.A of the periodic table, yet it shows deviation in physical properties from other members of its own family because of_____.

A. Its smaller size
B. Absence of d orbitals for bonding
C. Having one electron in its valence shell
D. Having high charge density

(iii) Which of the following is the end product when Boric acid is strongly heated?

A. B_2O_3
B. $H_2B_4O_7$
C. H_3BO_3
D. HBO_2

(iv) Sulphur forms three different compounds with chlorine. The type of hybridization shown by sulphur in SCl_6 is _____.

A. SP^3
B. SP^3d
C. SP^2
D. SP^3d^2

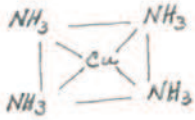
(v) Halogen acids act as reducing agents. Choose from the following the **CORRECT** order of reducing power of these acids.

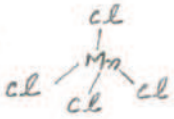
A. $HF > HCl < HBr < HI$
B. $HF < HCl < HBr < HI$
C. $HF > HCl > HBr > HI$
D. $HF < HCl < HBr > HI$

(vi) Which of the following compounds forms trigonal bipyramidal shape?

A. 

B. 

C. 

D. 

(vii) In isomerism, compounds have same molecular formula, but different structures. The possible isomers formed by pentane are_____.

A. Five
B. Four
C. Three
D. Two

(viii) Choose from the following the catalyst which is used for the partial hydrogenation of alkynes to form trans alkenes.

A. $\frac{Pb \quad Hg(SO_4)}{Quinoline}$
B. $\frac{Pd \quad (Hg\,SO_4)}{Quinoline}$
C. $\frac{Pd \quad (Ba\,SO_4)}{Quinoline}$
D. $\frac{Na/Liquid \;\; NH_3}{-33^\circ C}$

(ix) Which of the following compounds will be sulphonated most readily?

A. Toluene
B. Benzene
C. Aniline
D. Chlorobenzene

(x) The rate of SN_1 mechanism depends upon__________.

A. The concentration of nucleophile
B. The concentration of substrate
C. The concentration of substrate and nucleophile
D. The concentration of catalyst

(xi) Alcohols react with con. H_2SO_4 and give different products. What is the product as a result of the Equation $2C_2H_5-OH \xrightarrow[140^\circ C]{Conc.H_2SO_4}$

A. $CH_2=CH_2$ B. CH_3-CH_3
C. $C_2H_5-O-C_2H_5$ D. $CH\equiv CH$

(xii) Which of the following reagents will react with both aldehydes and ketones?

A. Grignards reagent B. Tollen's reagent
C. Benedict's reagent D. Fehling's reagent

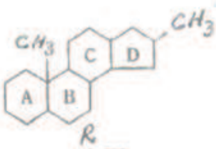
(xiii) Given the general reaction:

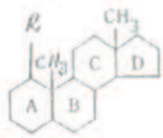
$$R-CH_2-OH+[O]\xrightarrow[H_2SO_4]{K_2Cr_2O_7}X\xrightarrow{[O]}Y\xrightarrow{[O]}Z$$

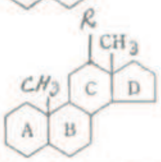
Select X, Y and Z from the following set of products:

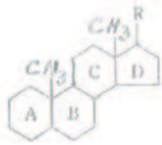
	X	Y	Z
A	CO_2	Alcohol	Carboxylic acid
B	Aldehyde	Carboxylic acid	CO_2
C	Alcohol	Aldehyde	CO_2
D	None of these		

(xiv) Which of the following is the **CORRECT** formula of Steroid nucleus?

A. 

B. 

C. 

D. 

(xv) Which of the following is non-calcarious?

A. Lime B. Lime stone
C. Sea shells D. NH_4OH

(xvi) Which of the following disinfects drinking water?

A. NH_4Cl B. HCl
C. $HOCl$ D. NH_4OH

(xvii) Which of the following is an electrophile?

A. $H_2\ddot{O}:$ B. H_2S^{-}
C. Cl_2 D. BF_3

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For Examiner's use only:

Total Marks: 17

Marks Obtained:

2019

CHEMISTRY HSSC–II

Time allowed: 2:35 Hours **Total Marks Sections B and C: 68**

NOTE:- **Sections 'B' and 'C' comprise pages 1–2 and questions therein are to be answered on the separately provided answer book. Answer any fourteen parts from Section 'B' and attempt any two questions from Section 'C'. Use supplementary answer sheet i.e. Sheet–B if required. Write your answers neatly and legibly.**

SECTION – B (Marks 42)

Q. 2 Attempt any FOURTEEN parts. The answer to each part should not exceed 5 to 6 lines. (14 x 3 = 42)

(i) Oxidation state is the charge which an element carry in the compound.
- a. On what is different in ionic and covalent compounds basis it. 01
- b. On what factors does oxidation state of typical elements depend? 01
- c. Transition elements show more than one oxidation state. Why? 01

(ii) $NaOH$ is prepared on large scale by the electrolysis of aqueous solution of sodium chloride.
- a. What two problems are faced by a chemist during this process? 02
- b. How is the first problem being solved by chemist? 01

(iii) Carbon and silicon belong to the same group of IV.A of the periodic table.
- a. Why should there be a big difference in CO_2 and silicon dioxide? 02
- b. How is viterious silica formed from SiO_2? 01

(iv) Nitrogen forms two oxyacids.
- a. Draw electronic structures of these two acids and write their names. 01
- b. Zinc combines differently with one of the above mentioned acids depending upon the concentration of an acid. Write equations for the reactions between Zinc and that acid when: 02
  (i) Acid is very dilute (ii) Acid is very concentrated

(v) Keeping in view the systematic rules for the nomenclature of oxyacids:
- a. Name the following: $HClO$, $HClO_2$, $HClO_3$, $HClO_4$ 02
- b. What is iodized salt? Why is it used in diet? 01

(vi)
- a. What is Paramagnetism? 02
- b. What is the cause of Paramagnetism? 01

(vii) The quality of gasoline is improved by the process called Reforming.
- a. What happens when the spark plug fire ignites low quality gasoline in the engine of automobile? 01
- b. How is the octane number of n-octane improved? 01
- c. Write the formula of T.E.L. 01

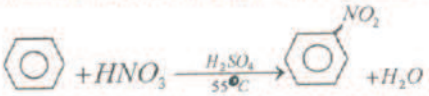
(viii) Halogenation is believed to proceed through free radical mechanism in alkanes.
- a. Write the names of steps involved in this process with examples. 01
- b. Complete the conversion of CH_3-Cl to CCl_4 during one of the above steps in detail. 02

(ix) Complete the following using given hints:

a. $Propene \xrightarrow{Br_2} ? \xrightarrow[Alchoholic]{KOH} ?$ 01

b. $Propyne \xrightarrow{HCN} ?$ c. $Ethane \longrightarrow Ethene \longrightarrow Ethyne$ (½ +1½ =2)

(x) Nitratation of benzene takes place as follows:



- a. Which is the nitrating agent and how it is generated? 01
- b. Write complete mechanism for the above conversion upto the formation of nitrobenzene. 02

2010

(xi) Alkyl halides are considered amongst the most reactive class of organic compounds. Consider the equation:

$$(CH_3)_3 - Cl \xrightarrow[Polar\ Solvent]{Base} (CH_3)_3 - OH$$

a. Suggest the name and mechanism involved for the above conversion. 02
b. What will happen to the configuration of alkyl halide during the process? ½
c. Write rate equation for this reaction. ½

(xii) Ethanol is prepared on industrial scale world over.
a. Name the process, temperature and enzymes used for the above process, when ethanol is prepared from the residue of sugar with equations. 02
b. Only 12% alcohol can be prepared by this process. Why? 01

(xiii) The reactions in which two molecules combine to form new compounds with or without elimination of a small molecule is called Condensation.
a. What type of condensation will be shown by the following: 01
(i) $CH_3 - CHO$ (ii) $C_6H_5 - CHO$
b. Write chemical equation along with mechanism for the conversion of $CH_3 - CHO$ into products. 02

(xiv) Esters formed carboxylic acids give different flavours. What type of flavours is given by **Amylacetate**, **Isobutyl formate** and **Benzylacetate**. 03

(xv) Polymers have an important utility in our daily life.
a. How is the molecular mass of the polymers determined? Give an example. 01
b. What type of polymerization is shown by the mutual reaction of two functional groups? Give example. 02

(xvi) Proteins are complicated molecules of living organisms. How many levels of structural organizations are shown by proteins? Explain by drawing structures if any. 03

(xvii) What is Smog? Which pollutants are the main cause of smog? Explain. (1+2=3)

(xviii) Benzene is an extraordinary stable molecule. Justify the truth with the help of example. 03

(xix) What is modern periodic law? Write briefly about blocks in the periodic table. (1+2=3)

SECTION – C (Marks 26)

Note:- **Attempt any TWO questions. All questions carry equal marks.** (2 x 13 = 26)

Q. 3 Nitrogen and phosphorous belong to the group V A of the periodic table.

a. Write down the names and draw molecular structure of any two allotropic forms of phosphorous. What major properties are shown by these two allotrops. Which is the most stable one. 07

b. Phosphoric acid converts itself into other acids on heating. Write down the names of products and equations of this conversion. 03

c. "P_2O_5 is strong dehydrating agent". Prove this statement giving examples. 03

Q. 4 Lipids are essential for the growth of animals.

a. (i) What are Lipids? Write their main characteristics. 03
(ii) How are these lipids classified? Draw the structure and composition of fats and oils. 02+02

b. Describe the reactions between carbonyl compounds with the following compounds:
(i) $[2, 4 - DNPH]$ (ii) $NH_2 - NH_2$
Also mention general mechanism for their conversion. 06

Q. 5 **a.** Define Reasonance. Draw all the possible resonating structures shown by a benzene. What structure would you suggest best for representing benzene? 06

b. Write structural formula of the following compounds and name them according to I.U.P.A.C. system of nomenclature: 03
(i) T.N.T. (ii) Chloroprene (iii) Mustard gas

c. How will you bring about the following conversions? 04
(i) Propanone into 2–Propanol (ii) Ethanol into Ethanoic acid