

FEDERAL BOARD HSSC-II 2016

CHEMISTRY HSSC-II SECTION - A (MARKS 17)

Max Marks: 17

Time Allowed: 20 Minutes

Note: Circle the correct option i.e., a / b / c / d. Each carries equal marks.

- In the organic compounds, the carbon atoms generally forms: (Fed 2016)
(A) Hydrogen bond (B) Ionic bond (C) Metallic bond (D) Covalent bond
- Which one of the following oxides is basic in nature? (Fed 2016)
(A) Al_2O_3 (B) P_4O_{10} (C) SO_3 (D) Na_2O
- Due to inert pair effect, the element of group IV having electronic configuration ns^2, np^2 will forms: (Fed 2016)
(A) M^{4+} cation (B) M^+ cation (C) M^{2+} cation (D) M^{3+} cation
- The oxidation states $-1, +1, +3, +5$ and $+7$ are shown by all the halogens except: (Fed 2016)
(A) Bromine (B) Iodine (C) Chlorine (D) Fluorine
- Pale - green is a characteristic flame colour of; (Fed 2016)
(A) Sodium (B) Calcium (C) Barium (D) Strontium
- Group VIII elements are generally called; (Fed 2016)
(A) Halogens (B) Alkali metals (C) Noble gases (D) Coinage elements
- The functional group having structure $R-C(=O)-R$ represents the family called; (Fed 2016)
(A) Ketones (B) Ethers (C) Esters (D) Carboxylic acid
- The IUPAC name of the compound $HC \equiv C - CH = CH_2$ is; (Fed 2016)
(A) Penta - 3 - ene - 5 - yne (B) Penta - 3 - ene - 1 - yne
(C) Penta - 4 - ene - 2 - yne (D) Penta - 2 - ene - 4 - yne
- The compounds, n butane and isobutene are best considered as; (Fed 2016)
(A) Chain isomers (B) Positional Isomers
(C) Metamers (D) Functional group isomers
- Reduction of alkyl nitrites gives; (Fed 2016)
(A) Alcohols (B) Alkanes (C) Primary amines (D) Secondary amines
- Acetone can be obtained by the oxidation of; (Fed 2016)
(A) Propanal (B) Ethanol (C) 1-propanal (D) 2-propanal
- The nitration of phenol at $25^\circ C$ produces; (Fed 2016)
(A) Toluene (B) O-nitrophenol (C) Benzene (D) Phenol nitrate
- The long chain of monosaccharaides are called; (Fed 2016)
(A) Vitamins (B) Oils (C) Carbohydrates (D) Proteins
- Which of the following is NOT an alternative to ozone depleting chlorofluorocarbon (CFCs)? (Fed 2016)
(A) CO_2 (B) Hydrofluorocarbon (HFCs)
(C) Perfluorocarbons (PFCs) (D) Hydrocarbons [Contain more than one option]
- Which of the following technique DOES NOT involve electromagnetic radiations? (Fed 2016)
(A) Ultraviolet (B) Infrared spectroscopy
(C) Mass spectroscopy (D) Nuclear magnetic resonance spectroscopy
- Double bond is formed as a result of; (Fed 2016)
(A) Polymerization reaction (B) Substitution reaction (C) Elimination reaction (D) Addition reaction
- $3Ca + N_2 \rightarrow ?$ (Fed 2016)
(A) CaN_2 (B) Ca_3N_2 (C) (D)

1	D	2	D	3	A	4	D	5	C	6	C	7	A	8	B	9	A	10	C
11	D	12	B	13	C	14	B	15	C	16	C	17	A						

(SUBJECTIVE PART)

Time Allowed: 2:35 Hours

Total Marks: Section B & C = 68

Note: Section 'B' and 'C' are to be answered on the separately provided answer book. Answer any ten the questions 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 (14) short questions.

- (i)
 - a. Why are the elements of group I called alkali metals?
 - b. How do the elements of group I resemble with group II elements?
- (ii) Write down the chemical reactions of the following elements of 3rd period with chlorine:
 - a. Sodium
 - b. Aluminum
 - c. Silicon
- (iii) Briefly discuss the metallic and Non-metallic character of group IV elements.
- (iv) Why is Zinc group included in transition elements? Give reason.
- (v) What is the trend of following properties of group VII elements?
 - a. Atomic radius
 - b. Melting and Boiling points
- (vi) Write down the procedure for the detection of carbon and hydrogen in the organic compound.
- (vii)
 - a. Define the term homologous series.
 - b. Give four characteristics of Homologous series.
- (viii) How can alkenes be used to prepare?
 - a. Vicinal dibromide
 - b. Alkyl halides
 - c. Alkane
- (ix) Predict the major product of bromination of following compounds by their reactions:
 - a. Toluene
 - b. Nitrobenzene
 - c. Benzene
- (x) Write down condensation reactions:
 - a. Between two identical ketones
 - b. Between aldehyde and ketone
- (xi) Starting from Ethyl chloride, how will you prepare:
 - a. Ethanol
 - b. Primary Amines
 - c. n-Butane
- (xii) How is phenol prepared from?
 - a. Chlorobenzene
 - b. Sodium Benzene sulphonate
 - c. Aryldiazonium salt
- (xiii)
 - a. What are alkanolic acids?
 - b. Write down the reactions for the preparation of its two derivatives.
- (xiv) Give step-wise mechanism for alcohol condensation to give an ether.

- (xv) a. What is the difference between organic and inorganic compounds?
 b. Write down four uses of organic compounds in our daily life.
- (xvi) Define and give one example of each the following:
 a. Dyes
 b. Thermosetting polymers
 c. Petro chemicals
- (xvii) What are Ethers? Give their classification:
- (xviii) a. What is acid rain?
 b. Write down two adverse effects of acid rain on our environment.
- (xix) a. What are proteins?
 b. Give two important functions of proteins in the human body.

SECTION - C (MARKS 26)

Attempt any TWO questions. All questions carry equal marks.

- Q.3(a) Explain the periodicity of following properties of 3rd period elements of periodic table:
 (i) Atomic radius
 (ii) Ionization Energy
 (iii) Electrical Conductivity
- (b) Discuss the trends in solubility of Hydroxides of group II elements.
- (c) What is spectroscopy? Name four spectroscopic techniques used in modern methods of analysis.
- Q.4(a) Give a flow-sheet diagram for the classification of Hydrocarbons on the basis of structure. Also give one example of each type.
- (b) Write down the steps of free radical chain mechanism for the bromination of methane.
- (c) Write down two chemical reactions in which Benzene behaves as an unsaturated compound.
- Q.5(a) Distinguish Primary, Secondary and Tertiary alcohols with the help of reactions.
- (b) Write down the structures of following compounds:
 (i) Trans-Butene dioic acid
 (ii) n-Butyl bromide
 (iii) 3-Methyl-1-Butyne
 (iv) Cyclo-1, 3-hexadiene
- (c) Explain the following with the help of suitable examples:
 (i) Metamerism
 (ii) Geometrical Isomerism

CHEMISTRY (OBJECTIVE PART)

Max Marks: 20

Time Allowed: 20 Minutes

Note: Section-A is compulsory. All parts of this section are to be answered on question paper itself. It should be completed in first 20 minutes and handed over to the 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) Which of the following is not present in acid rain: (Fed 2017)
 (A) CH_3COOH (B) HNO_3 (C) H_2CO_2 (D) H_2SO_4
- (ii) Which region of electromagnetic radiation is involved in NMR spectroscopy? (Fed 2017)
 (A) Radio waves (B) Ultraviolet (C) Visible (D) Microwaves
- (iii) Which of the following compound gives an acidic solution with water? (Fed 2017)
 (A) BaCl_2 (B) SiCl_4 (C) NaCl (D) KCl
- (iv) When a complex reflects back whole of the white light, its colour will be: (Fed 2017)
 (A) Green (B) Red (C) White (D) Black
- (v) Which one of the following oxide is used as a catalyst in Contact process? (Fed 2017)
 (A) V_2O_5 (B) P_2O_5 (C) Fe_2O_3 (D) Mn_2O_3
- (vi) Full name of Bucky Balls is: (Fed 2017)
 (A) Buckminster Carbenes (B) Buckminster Abbey
 (C) Buckminsterenes (D) Buckminster Fullerenes
- (vii) Which of the following alcohol is easy dehydrated to give an alkene? (Fed 2017)
 (A) 3-Propanol (B) 2-Methyl-2-propanol (C) 1-Propanol (D) 2-Propanol
- (viii) Benzoic acid is obtained by the oxidation of: (Fed 2017)
 (A) p-Xylene (B) m-Xylene (C) Benzene (D) Toluene
- (ix) Which of the following alkyl halides cannot be prepared by the direct reactions of alkanes with halogens? (Fed 2017)
 (A) RI (B) RF (C) RBr (D) RCl
- (x) When phenol reacts with CH_3COCl the product formed is: (Fed 2017)
 (A) Ethanol (B) Ethanal (C) Ether (D) Ester
- (xi) Which of the following can undergo Aldol condensation reaction? (Fed 2017)
 (A) Benzaldehyde (B) Trimethylacetaldehyde (C) formaldehyde (D) Acetaldehyde
- (xii) IUPAC name of valeric acid is: (Fed 2017)
 (A) Propanoic acid (B) Ethanoic acid (C) Pentanoic acid (D) Butanoic acid
- (xiii) Hydrolysis of nitriles produces: (Fed 2017)
 (A) TNT (B) Carboxylic acid (C) Nitrates (D) Nitroalkanes
- (xiv) Most abundant macromolecule on earth is: (Fed 2017)
 (A) Carbohydrates (B) Olive oil (C) Lipids (D) Vitamins
- (xv) Which one among the following is a trace mineral in human diet? (Fed 2017)
 (A) Potassium (B) Calcium (C) Zinc (D) Sodium
- (xvi) Petrochemicals are classified into how many classes? (Fed 2017)
 (A) Three (B) Four (C) One (D) Two
- (xvii) Ozone layer is present at a height of about: (Fed 2017)
 (A) 80Km above earth (B) 100Km above earth (C) 5Km above earth (D) 28Km above earth

1	A	2	A	3	B	4	C	5	A	6	D	7	B	8	D	9	A	10	D
11	D	12	C	13	B	14	A	15	C	16	A	17	D						

(SUBJECTIVE PART)

Time Allowed: 2:35 Hours

Total Marks Section B, C and D: 68

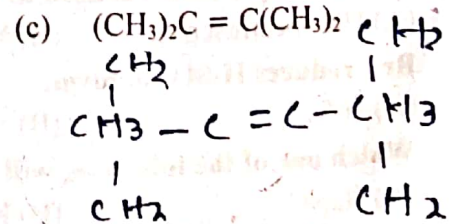
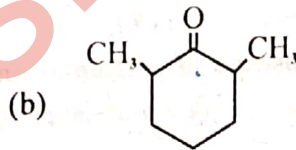
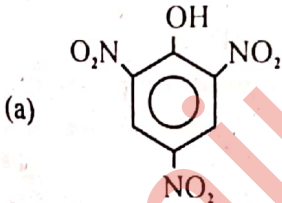
Note: Section B and C comprise pages 1 – 2. Answer any fourteen parts from Section 'B' and any two questions from Section 'C' on the separately provided answer book. Use supplementary answer sheet i.e., Sheet-B if required. Write your answers neatly and legibly.

SECTION - B

(MARKS 42)

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

- (i) Na, Si and Cl are present in the same period of the periodic table but they have different melting points. Why?
- (ii) Salts of Be^{2+} can have four water molecules as water of crystallization. Explain how Be^{2+} is associated with four water molecules.
- (iii) What is Ligand? Give an example of a tridentate and a hexadentate ligand?
- (iv) How are chromate and dichromate ions interconverted to one another? Write balance equation to show this interconversion and mention the colour change during this interconversion.
- (v) State and explain the Morkownikev's rule.
- (vi) What are optical isomers? Draw enantiomers of lactic acid.
- (vii) Write the reaction equations for the preparation of following compounds using Methyl magnesium bromide.
 - (a) Ter-butyl alcohol
 - (b) Acetic acid
- (viii) Explain the acidic oxidation of Cumene.
- (ix) Write the equations of reaction of 2,4-DNPH with following compounds.
 - (a) Acetaldehyde
 - (b) Acetone
- (x) What is Fischer esterification? Give an example. Write the name of an ester used as orange flavor.
- (xi) Write the names of following compound:



(xii) How open chain structure of glucose is converted to its cyclic forms?

(xiii) Define the following:

- (a) Inhibitors
- (b) Lipids
- (c) Saponification

(xiv) Which functional groups are used as chromophore and auxochromes in azodyes? Give name of two azo dyes.

(xv) Give the composition of following cosmetics:

- (a) Nail polish
- (b) Nail polish remover

(xvi) Write the sources and environmental effects of following pollutants.

- (a) ozone
- (b) PAN

(c) Oxides of Sulphur

- (xvii) What is the role of leather tanneries in water pollution? What health problem can be caused by this pollutant? How can we control this pollutant?
- (xviii) What is combustion analysis? Give its drawback.
- (xix) What is mass spectrometer? How various ions are produced in a mass spectrometer?

SECTION - C

(MARKS 26)

(13 × 2 = 26)

Note: Attempt any TWO questions. All questions carry equal marks.

- Q.3**
- Discuss the effect of heat on Carbonates and Nitrates of alkaline earth metals.
 - What are coordination compounds? Give an example of a positively charged complex, a negatively charged complex and a neutral complex along with their IUPAC name.
 - How would you prepare Lassaigne's solution? For what purpose is it used?
- Q.4**
- Discuss the mechanism of Sulphonation of benzene.
 - What is Cannizzoro's reaction? Explain the mechanism of this reaction using a suitable example.
 - Starting from acetylene how would you prepare the following compounds?
 - Acetaldehyde
 - 1,1,2,2-tetrabromo ethane
- Q.5**
- How does an enzyme work? Using labeled diagrams explain two mechanisms of enzyme action.
 - What is a condensation polymer? Explain the formation of Nylon-6,6 using chemical equation.
 - What is industrial smog? Write the conditions for development of photochemical smog.

FEDERAL BOARD 2018 HSSC – II

CHEMISTRY

(OBJECTIVE PART)

Time Allowed: 20 Minutes

Max Marks: 20

Note: Choose the correct answer A/B/C/D by filling the relevant bubble for each question on the OMR Answer Sheet according to the instructions give there. Each part carries one mark.

- (i) Nail polish remover is composed of: (Fed 2018)
 (A) Acetone and ethyl alcohol (B) Acetone and ethyl acetate
 (C) Ethyl alcohol and ethyl acetate (D) Acetic acid and Acetone
- (ii) The industrial smog contains smoke mixed with: (Fed 2018)
 (A) SO₂ (B) SO₃ (C) CO₂ (D) O₃
- (iii) The technique which is used to determine the position of carbon atoms in an organic compound is: (Fed 2018)
 (A) UV spectroscopy (B) NMR spectroscopy (C) Mass spectroscopy (D) IR spectroscopy
- (iv) Br⁻¹ reduces H₂SO₄ to form: (Fed 2018)
 (A) H₂S (B) SO₂ (C) SO₃ (D) S
- (v) Which one of the following will NOT product nitrite on heating? (Fed 2018)
 (A) NaNO₃ (B) KNO₃ (C) RbNO₃ (D) LiNO₃
- (vi) In the reaction with aqueous copper (II) complex; [Cu(H₂O)₆]²⁺, NH₃ acts as a ligand as well as: (Fed 2018)
 (A) A base (B) A salt (C) A nucleophile (D) An acid
- (vii) The correct name of the complex ion, [Zn (NH₂ – CH₂ – CH₂ – NH₂)₃]²⁺ is: (Fed 2018)
 (A) Tri ethylene di ammine zincate (II) (B) Tris ethylene di ammine zinc (II)
 (C) Tris ethylene di ammine zincate (II) (D) Tri ethylene di ammine zinc (II)
- (viii) –SH is the functional group present in the organic compounds known as: (Fed 2018)
 (A) Hydrogen sulphides (B) Sulphones (C) Thiols (D) Sulphides
- (ix) The electrophile in the aromatic sulphonation reaction of benzene is: (Fed 2018)

- (x) The Meta directing group among the following is: (A) HSO_4^- (B) SO_3 (C) SO_2 (D) H_2SO_4 (Fed 2018)
- (xi) Which one of the following reducing agents reduces the aromatic nitro compounds to amines? (A) $-\text{OCH}_3$ (B) $-\text{COOH}$ (C) $-\text{OH}$ (D) $-\text{NH}_2$ (Fed 2018)
- (xii) The alcohol with greater reactivity with respect to the cleavage of its O – H bond is? (A) Br_2/KOH (B) $\text{Na}/\text{NH}_3(\text{liq})$ (C) NaBH_4 (D) Sn/HCl (Fed 2018)
- (xiii) Ether can be prepared by the reaction of alkyl halides with: (A) Pri-alcohol (B) Sec-alcohol (C) Ter-alcohol (D) CH_3OH (Fed 2018)
- (xiv) The reagent which is used to distinguish between aldehydes and alcohols is: (A) Na_2O (B) Ag_2O (C) PbO (D) Cu_2O (Fed 2018)
- (xv) Which one of the followings will NOT give iodoform test on reaction with I_2/NaOH ? (A) Hydrazine (B) Phenyl hydrazine (C) 2,4-dinitro phenyl hydrazine (D) Hydroxyl amine (Fed 2018)
- (xvi) Reduction of carboxylic acids with LiAlH_4 results in the formation of: (A) Acetone (B) 1-propanol (C) 2-propanol (D) Acetaldehyde (Fed 2018)
- (xvii) Which one of the following is NOT a disaccharide? (A) SeC. Alcohols (B) Ter. alcohols (C) Aldehydes (D) Pri-alcohols (Fed 2018)

ANSWERS MCQs

1	B	2	A	3	B	4	B	5	D	6	A	7	B	8	C	9	B	10	B
11	D	12	D	13	B	14	C	15	B	16	D	17	B						

(SUBJECTIVE PART)

Time Allowed: 2:35 Hours

Total Marks Section B, C and D: 68

Note: Section B and C comprise pages 1 – 2. Answer any fourteen parts from Section 'B' and any two questions from Section 'C' on the separately provided answer book. Use supplementary answer sheet i.e., Sheet-B if required. Write your answers neatly and legibly.

SECTION - B

(MARKS = 21)

(7 × 3 = 21)

Q.2 Answer any SEVEN parts. All part carry equal marks. (Chapter 13, 14, 21-24)

- Why the salts of Li are slightly covalent whereas those of other alkali metals are ionic?
- Why the tetrahalides of carbon are not hydrolysed whereas these of Si, Ge and Sn are easily hydrolysed.
- Write down the reaction of $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$ with (a) NH_3 (b) CO_3^{2-} (c) SCN^-
- What is d-d-transition? How is it responsible for the colour of transition metal complexes?
- Write down three differences between DNA and RNA.
- What is the storage polysaccharide? Describe its types.
- What are the Vat dyes? How are they used? Give an example.
- Write down three harmful effects of acid rain.
- Describe the role of chlorofluorocarbons in destroying the ozone layer.
- Write down two difference between CW-NMR spectrometer and FT-NMR spectrometer.

SECTION - C

(MARKS 21)

(7 × 3 = 21)

Note: Attempt any SEVEN parts. All part carry equal marks.

- Write down three reasons which give the importance of functional groups for the organic compounds.
- Write down the mechanism for the electrophilic nitration reaction of benzene.
- Write down any two differences between structural isomerism and stereoisomerism?

- (iv) How will you prepare Ethyl amine from an alkyl halide, a nitrile and an amide?
(v) Write down any three differences between E_1 and E_2 reactions.
(vi) How is phenol prepared from? (a) Aniline (b) Chlorobenzene
(vii) Give the reactions of the following alcohols with the mixture of $K_2Cr_2O_7$ and H_2SO_4 .
(a) 2-Propanol (b) 2-Methyl-2-Butanol
(viii) How does acetone react with dil. NaOH, H-CN, NH_2-NH_2 ?
(a) NaOH (b) HCN (c) NH_2-NH_2
(ix) Write down the mechanism of acid catalyzed nucleophilic addition of H - CN to acetaldehyde.
(x) Give the reactions of acetic anhydride with H_2O , C_2H_5OH and NH_3 .

SECTION - D

(MARKS 26)

(2 × 13 = 26)

(01 + 02 + 04)

(01 + 01 + 06)

(04 + 01 + 01)

(01 + 06)

THE END