Chemistry: **2017**

Time: 20 min **Max. Marks:17**

(Section "A" Multiple Choice Question)

Q1. Sellect the most appropriate answer for each from the given options:

1- Chemical composition of colemanite is:
   a) $Ca_2B_6O_{11} \cdot 5H_2O$
   b) $CaB_4O_7 \cdot 4H_2O$
   c) $Na_2B_4O_7 \cdot 4H_2O$
   d) $CaNaB_5O_7 \cdot 8H_2O$

2- Coinage metals are elements of 1B group & these Include:
   a) Cu, Ag, Au
   b) Zn, Cd, Hg
   c) Fe, Co, Ni
   d) Cu, Zn, Ni

3-Having Half-Filled valance shield, Hydrogen resembles the.
   a) Element of VA group.
   b) Element of IVA group.
   c) Element of VIA group.
   d) Element of VIIA group.

4- Plaster of paris is obtained by heating:
   a) Gypsum
   b) Epsom.
   c) Limestone.
   d) Dolomite.

5- The mixture of Aluminum powder and Aluminum nitrate is known as:
   a) Aluminum bronze.
   b) Duralumin
   c) Ammonal
   d) Alum

6- The commercial name of phenol Formaldehyde Polymer is:
   a) Celluloid
   b) Teflon
   c) P.V.C
   d) Bakelite.

7-In the following hydrogenation reaction

$$CH{\equiv}CH \xrightarrow[\text{Heat}]{H_2/Ni} CH_2 = CH_2 \xrightarrow[\text{Heat}]{H_2/Ni} CH_1 - CH_1 .$$

Is Changed in hybridization state of carbon atoms is:
   a) sp^3 -> sp^1-> sp
   b) sp -> sp^2-> sp^3
   c) sp^2 -> sp^3-> sp
   d) sp^3 -> sp-> sp^2

8- The first step is similar in three mechanism.
   a) E_1 and E_2
   b) SN^1 and E_2
   c) $E_1$and SN^2
   d) SN^1 and E_1

9- In acetone the no of bonds are:

a) Nine σ and one π
b) ten σ
c) Eight σ and two π
d) Nine π and one σ

10- Octane no is related to:
a) Gasoline
b) Kerosene
c) Diesel oil
d) HCI

11- The reagent convert acetic acid into Acetyl Chloride is:
a) NaCl
b) HCI/ZnCl_2
c) SOCl_2
d) HCI

12- Sodium Burn with excess of oxygen to form its:
a) Peroxide
b) Superoxide
c) Monoxide
d) Dioxide

13- Its is not a member of vitamin B complex:
a) Niacin
b) Folic acid
c) Retinol
d) Riboflavin

14- Royal water is a mixture in the ratio of 1:3 by volume of:
a) HCI, H_2SO_4
b) HNO_3, HCI
c) H_2SO_4, HNO_3
d) HCI, HF

15- The temperature at which two allotropic from of an element exist in equilibrium state is:
a) Transition temperature
b) Equilibrium temperature
c) Normal temperature
d) Unstable temperature

16- CH_4 ---(700°C, Absence of Oxygen)--→ $2H_2$ + A. In the given reaction A is:
a) CO_2
b) C
c) CO
d) H_2O

17- This is not nitrogenous fertilizer:
a) Ammonium nitrate
b) Urea
c) Ammonium sulphate
d) Triple Phosphate.

SECTION "B" (Short Question Answers)

Time: 2 hour 40 min Marks 68

Note: Attempt 10 Part Question, Select five questions from organic chemistry and, five questions from inorganic chemistry.

Inorganic Chemistry

1- How is copper matte obtained from its concentrated Sulphide ore?

2- Give scientific reason of the following.

I. Alkali mates cannot be used in voltalic cell.
II. Alkaline earth metal are harder than alkali metal
III. Boric acid is soft and silky
IV. Anhydrous CuSO_4 is white while hydrated CuSO_4 is blue.

3- Write the I.U.P.A.C names of the following:

a) [Pt$(NH_3)Cl_2$]
b) [Fe(CO_4)]
c) $Na_3[AlF_6]$
d) $[CoBr_2(en)_2]Br$

4- Write the electronic configuration and identify the period, group and block of element bearing the following atomic no 17, 24, 29, 49

5- Give complete and balance equation of the following reaction

a) Soda ash heated with silica
b) Boric acid is reacted with Sodium Carbonate
c) Litharge is heated with excess of air
d) Aluminum is reached with sodium hydroxide

6- Give 4 industrial method for the preparation of hydrogen gas(Except electrolysis of water)

7- Why are the cathode and anode compartments separated in the extraction of sodium, describe the extraction of sodium by down's process.

8-Refer the list of given blow

Compound	A	B	C	D
Specific name	Gypsum	Bleaching powder	Lunar caustic	Potash alum

Write:

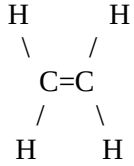
i. Formula of B and C
ii. The equation for the preparation of B
iii. Give only one common use of D
iv. Give equation for the reaction of heating "A" at 100°C

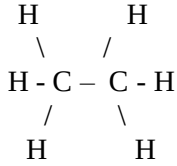
Organic Chemistry

9- Define the following

1. Functional group
2. Catenation
3. Glycosidic linkage
4. Saponifiation

10- The structure of two organic compound A and B are shown bolw:

1-


2-


a) Draw the hybrid orbital structure of "A" showing the bond
b) Write equation for the preparation of B from CH_3I
c) Write equation for the reaction of A with S_2Cl_2

11- Which equation for the following reaction:

a) Cannizaro reaction
b) William son synthesis
c) Fermentation of Molasses
d) Esterification

12- Write I.U.P.A.C name of the following :
a) $CH_2 = CH - CH_2 - COOH$
b) $C_2H_5 - (CH_2)_3COOCH(CH_3)_2$
c) $CH_3 - C(CH_3)_2COCH(CH_3)_2$
d) $CH_3 - CH_2 - OC(CH_3)_2C_2H_5$

13- What are enzymes? Explain the various factor which influence the rate of enzymes action?

14- How does the ethyl iodide react with the following reagent?
a) Sodium Ethoxide
b) Mg
c) KOH(Alcoholic)
d) Na

15- Write equation and give the mechanism of alkylation and acylation in benzene.

16- Distinguish by simple chemical test only two of the following
- Ethyne and Ethene
- Ethane and ethane
- Alkyl halide and alkane
- Formaldehyde and acetone

Section "C" (Detail Question Answer)

Note: Attempt 2Part one from organic chemistry, and one from inorganic chemistry (28)

Inorganic Chemistry

Q3(a). The flow chart represent stage in the manufacturing of HNO_3 by Ostwald's process

NH_3= Air Water H_2o

↓ ↓ ↓

Convertor → Boiler → Oxidation chamber → Absorption tower → HNO_3 → HNO_3

A B C D 68% 98%

- Give chemical reaction in stage A, C, D with conditions.
- Describe the condition to get 95% oxidation of NH_3 And NO and How 98% HNO_3 Obtained.

OR

How does caustic soda is manufactured by the electrolysis of brine using moving mercury as cathode, draw also the dig of this method

(b). What is meant by binary compound of hydrogen, give there classification and give preparation and chemical properties of covalent hydrides.

(c.). Describe any 2 of the block d element.
- Magnetic properties
- Catalytic properties
- Formation oc colour
- Variable oxide state

Q4(a). Write different oxide ores of aluminum. How aluminum is obtained from bauxite ore containing silica as impurity (draw diagram of the cell) (Refining of Al is not required)

(b). Give complete any five balance equation:
- $CaOcl_2 + CO_2 + H_2O \rightarrow$
- $Al + Fe_2O_3 \rightarrow$
- $K_2Cr_2O_7 + KCl + H_2SO_4 \rightarrow$

- $P + HNO_3 \rightarrow$
- Sb_2S_3 +HCl$\rightarrow$
- $Zn + H_2SO_4$ $\rightarrow$90°(cons)

(c.) State Mendeleev's Periodic law. Why This law was modified

Organic Chemistry

Q5(a). Explain the structure of benzene by molecular orbital treatment and discuss the stability of benzene molecule.

(b) Give structure formula of the following compounds Any 5

- Pyrogallol
- P-Cresol
- Caproic acid
- B-Methyl butraldehyde
- Phenyl hydrazine
- Diethl Acetylene

(c.) What is systematic fiber? Explain Nylon and Polyester

OR

What is amino acid? Discribe the importance of amino acid in human life?

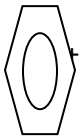
Q6(a). What are nucleophilic substituting reaction. Outline the stepwise reaction mechanism for the following

- SN^2 Reaction between bromo methane and NaOH
- SN^1 reaction between 2 – chloro-2-methyl propane and NaCN

(B) How the following conversation carry out:

- Acetone in ter. Butyl alcohol
- Ethanol into chloro ethane
- Diethyl ether into ethyl iodide
- Formaldehyde into meta formaldehyde
- Acetyl chloride to acetic anhydride

c). Complete the following reaction:

- $CH_2 = CH - CH_3 + HBr \rightarrow$
- $H - C \equiv C - H + H_2O \rightarrow$
-  $+ O_2 \rightarrow$

Chemistry: 2016

Time: 20 min **Max. Marks:17**

(Section "A" Multiple Choice Question)

Q1. Sellect the most appropriate answer for each from the given options:

1- Hydrides of group iv A are:

a) Acidic
b) Basic
c) Neutral
d) Amphoteric

2- Ruby is an oxide of:
   a) Zinc
   b) Aluminum
   c) Copper
   d) Iron

3- The electronic configuration of the outer shell of an element is $4s^2, 3d^{10}, 4p^1$. It belongs to:
   a) IA group and 3^{rd} Period
   b) IIA group and 4^{th} Period
   c) IIIA group and 3^{rd} Period
   d) IIIA group and 4^{th} Period

4- H_2S is:
   a) An oxide agent
   b) A reducing agent
   c) A bleaching agent
   d) A sulphonating agent

5- Sodium amalgam is an alloy of:
   a) Sodium and lead
   b) Sodium and Mercury
   c) Sodium and iron
   d) Sodium and silver

6- Element if group IB are called:
   a) Alkali metal
   b) Are earth metal
   c) Alkaline earth metal
   d) Coinage metal

7- Rhombic sulphur and monoclinic sulphur are in equilibrium at the temperature of
   a) 95.5 °C
   b) 96.6 °C
   c) 105 °C
   d) 113

8- Stainless steal is an alloy of:
   a) Al, cu and Ni
   b) Al, Cr and Zn
   c) Fe, Cu and Ni
   d) Fe, Cu and Al

9- Propanal and propanone are:
   a) Chain isomers
   b) Position isomers
   c) Metamers
   d) Functional group isomers

10- This is natural polymer:
   a) Cellulose
   b) PVC
   c) Nylon
   d) Terylene

11- The number of monosaccharide unit in oligosaccharides is :
   a) 2- 8
   b) 2-10
   c) 2-12
   d) 2-20

12- Thisis the general formula of ketones:

(a) R – C(=O) – H (b) R – C(=O) – R (c) R—C(=O) – OH (d) R – O –R

13- Another name for wood spirit is :
a) Methyl alcohol
b) Propyl alcohol
c) Ethyl alcohol
d) Butyl alcohol

14- Cod liver oil is a source of:
a) Vitamin A
b) Vitamin B
c) Vitamin C
d) Vitamin K

15- This acid is used for etching of glass:
a) HF
b) HCL
c) HBr
d) HI

16- Ethyl acetate is present in:
a) Pineapple
b) Orange
c) Guava
d) Lemon

17- This is used to increase the octane number and efficiency of petrol
a) Ni
b) Pt
c) V_2O_5
d) $(C_2H_5)_4Pb$

SECTION "B" (Short Question Answers)

Time: 2 hour 40 min Marks 68

Note: Attempt 10 Part Question, Select five questions from organic chemistry and, five questions from inorganic chemistry.

Inorganic Chemistry

Q2.

1- Write I.U.P.A.C. names of the following
- $[Co(NH_3)_3Cl]$
- $[Cr(en)_3]Cl_3$
- $Na_3[Cu(OH)_2(NO_3)_2]$
- $Na_2[Fe(CN)_5NO$

2- What is aqua regia? How does Gold dissolve in it? Give the reaction?

3- Give scientific reason of the following
a) Zinc hydroxide is soluble in excess of sodium hydroxide solution.
b) Alkali and alkaline earth metal form only +1 and +2 ions respectively.
c) Atomic size of sulphur is bigger then oxygen.
d) Plastic sulphur is elastic.

4(a). Define the term of isotopes and define the various types of isotopes of hydrogen.

(b) Mention the simplest ions of hydrogen and show there reaction with water.
5- Describe the two method for the preparation of water gas and give two method for the separation of pure hydrogen from it.
6- Write the equation of the following reation:

- Cons. Sulphuric acid and oxalic acid.
- Nitric acid and sulphur
- $Fe^{+3} with\ H_2S$
- Blue stone treated with Kl

7(a)- Write the chemical formula of the following:

- Suhaga
- Alunite
- Muda sang
- Chromite ore

(b) Draw the structure of the following

- Chelating agent
- Chelate

8- With the help of crystal field theory explain the color of transition metal complex ions.

Organic Chemistry

9- Define the following terms:

- Homologous series
- Cracking
- Isomerism
- Saponification

10- Draw the orbital structure of acetylene
11- Give chemical test to distinguish between the following:

- Aldehyde and ketone
- Paraffin and olefin
- n-Hexane and benzene
- 1-Butyne and 2-Butyne

12- Describe free radical mechanism reaction of chlorimation af methane in the presence of sunlight, giving all the equation involved.
13- What happen when:

- Ethyene react withcold aqueous KMnO_4 solution
- Methanol reacts with steal.
- 2-Promanone is oxidized in presence of $K_2Cr_2O_7$ and conc H_2SO_4
- Ethyl chloride react with sodium metal.

14-(a). Explain essential fatty acids.
(b). Draw the structure of the following:

- Lysine
- Nicotinamide

15- What is fermentation? Explain the manufacture of ethanol from starch.
16- Why do 1° Alkyl halide gives SN^2 Mechanism while the 3° Alkyl halide gives SN^1 mechanism

Section "C" (Detail Question Answer)

Note: Attempt 2Part one from organic chemistry, and one from inorganic chemistry (28)

Inorganic Chemistry

Q3(a). describe the extraction of 99.99% copper from roasted pyrite ore.
(b). Complete and balance the following equation

- $K_2Cr_2O_7 + H_2SO_4 \rightarrow$
- $Kl + K_2Cr_2O_7 + H_2SO_4 \rightarrow$
- $NaOh + Cl_2 \rightarrow$
- $Mg + HNO_3 \rightarrow$
- $K_2MnO_4 + Cl_2 \rightarrow$

(c.)What are the types of elements based on electronic configuration on the periodic theory.

Q4(a). Give the industrial prepration of sodium carbonate (NA_2CO_3)by ammonia solvay process

(b). Give the manufacturing of sulphuric acid by the contact process

(c.). Write note on the following

- Tin plating
- Borax

Organic Chemistry

Q5(a) Give the equation of the following:

- Reaction of ethanol with Grignard regent
- Decomposition of acetic acid in the presence of MnO_2
- Reaction of sodium benzoate with soda lime
- Reaction of methanol with caustic soda
- Reaction of chloroethane with sodium ethoxide

(b). Give the preparation of the following:

- 2-Bromo Propane from 1-Bromo propane
- Phenol from benzene
- Benzoic acid from benzene
- Isopropyl alcohol from 1-propanol

(c.). Describe the kekule structure of benzene. Write the objection against it. How was this objection removed by kekule?

Q6(a). What is elimination reaction? Explain mechanism of E_1 and E_2 $reaction$

(b) Write not on any one of the following

- Detergent
- Plastics

(c) Write the I.U.P.A.C name of the following:

- $(C_6H_5)_3\ CBr$
- C_2H_5O CH $(CH_3)_2$
- $H_2C = CH - \underset{\underset{\text{Cl}}{\text{l}}}{CH} - CH_2 - \underset{\underset{CH_3}{\text{l}}}{CH} - C \equiv CH$
- $(CH_3)_2CH - \underset{\underset{\text{O}}{\text{ll}}}{C} - C(CH_3)_3$
- $CH_3 - \underset{\underset{\text{O}}{\text{ll}}}{C} - CH_2 - COOH$

Chemistry: **2015**

Time: 20 min **Max. Marks:17**

(Section "A" Multiple Choice Question)

Q1. Sellect the most appropriate answer for each from the given options:

1- Milk sugar is also called:

a) Glucose
b) Lactose
c) Fructose
d) Maltose

2- The binary compounds of hydrogen with transition metal are called:
a) Ionic hydride
b) Covalent hyride
c) Metalic hydride
d) Polymeric hydride

3- Citrus fruit are important sources of vitamin:
a) B
b) C
c) D
d) E

4- Kipp's apparetus is used to prepare:
a) SO_2
b) H_2S
c) HCL
d) Cl_2

5- Blood cancer is caused by:
a) Methane
b) Ethane
c) Butane
d) Benzene

6- The formula of dolomite is:
a) KCL.MgCL_2
b) $MgSO_4.7H_2O$
c) $MgCO_3.CaCO_3$
d) $MgCO_3$

7-E.D.T.A is this type of ligand:
a) Bidentate.
b) Tetradentate
c) Pentadentate
d) Hexadentate

8- The percentage by weight of ethanol on rectified spirit is :
a) 92-95
b) 70-80
c) 85-90
d) 50-60

9- The ration of electron, proton and neutron in deuterium is:
a) (1:1:0)
b) (1:1:1)
c) (1:1:2)
d) (1:2:1)

10- Aluminum bronze contain :
a) 10% of Al and 90% of Cu
b) 20% of Al and 80% of Cu
c) 30% of Al and 70% of Cu
d) 50% of Al and 50% of Cu

11- The atomic no of an element belonging to group VA and 3^{rd} Period is :

a) 7
b) 13
c) 15
d) 23

12- N_2gas liquefied in this temperature.
a) -273°C
b) -200°C
c) -196°C
d) 118°C

13-Hypo is used as:
a) Fixer
b) Developer
c) Reducer
d) Binder

14-This group is meta directing :
a) –R
b) –Or
c) –COOR
d) –X

15- The formula of valeric acid is:
a) $CH_3(CH_2)_2\ COOH$
b) $CH_3(CH_2)_3\ COOH$
c) $CH_3(CH_2)_4\ COOH$
d) $CH_3(CH_2)_5\ COOH$

16- Glucose and fructose is:
a) Position isomers
b) Chain isomers
c) Functional group isomers
d) Metamers.

17- The functional group is RSH is:
a) Alcohol
b) Carboxylic acid
c) Ether
d) Thioalcohol

SECTION "B" (Short Question Answers)

Time: 2 hour 40 min Marks 68

Note: Attempt 10 Part Question, Select five questions from organic chemistry and, five questions from inorganic chemistry.

Inorganic Chemistry

Q2.

1- Give characteristics valence shell configuration of the following:
- Zero group elements
- Representative elements
- Outer transition element
- Inner transition element

2- Give scientific reason of the following:
a) H exhibits +1 and -1 oxidation states in its compounds.
b) Alkali metal is powerful reducing agent

c) SO_3 is dissolved in H_2SO_4 but not in water.
d) $transition\ element\ shows\ variable\ oxidation\ states$

3- Complete the following I.U.P.A.C names of the following

- AgHO+NH_4OH →
- Zn$(OH)_2 + NaOH$ →

4-(a). Give the geometrical structure of H_2SO_4 and H_2S.
(b) How is H_2S. Gas prepared in the laboratory.
5- Give chemical equation of the following:

- Reaction of Aluminum with conc. H_2SO_4
- Reaction of sodium carbonate with silica
- Reaction of caustic soda with ammonium sulphate
- Reaction of bleaching powder with atmospheric carbondioxide and moisture

6- What are hydrides? How are they classified? Write the prepration and properties of ionic hydrides.
7- How is Blister copper is obtained from matte?
8- Write the name and formula of oxyacids of Boron and gives the effects of change in temperature on them

Organic Chemistry

9- Define the following with Example:

- Octane number
- Catenation
- Functional group
- Metamerism

10- Draw and explain the orbital structure of ethane.
11- Write the nitration reaction with benzene along with its mechanism
12- Write the role of amino acid in human body.
13- What are the organometallic compound.

- Ethane
- Ethyl alcohol
- Vinegar

14- Write equation for the preparation of the following.

- Phenol and chlorobenzene.
- Ethyl ethanoate from ethanol
- Water gas from methane
- Ethene from ethyl bromide

15- Write the classification of organic compound with example.
16- Write the stepwise reaction for the following preparation.

- M-Nitro benzoic acid from benzene
- Glyoxal from benzene.

Section "C" (Detail Question Answer)

Note: Attempt 2Part one from organic chemistry, and one from inorganic chemistry (28)

Inorganic Chemistry

Q3(a) What is meant by Meatllurgy. Describe the extraction of 99.99% pure aluminium from Bauxite ore containing $SiO_2\ and\ Fe_2O_3$ as impurities.
(b) Write note on any 1 of the following:

- Lead Pigments

- Lunar caustics
- Corrosion and its preventations.

(c.) Complete the following equation:

- $K_2Cr_2O_7 + FeSO_4 + H_2SO_4 \rightarrow$
- $Zn + H_2SO_4 \rightarrow$
- P + $HNO_3 \rightarrow$
- AgBr + $Na_2S_2O_3 \rightarrow$
- $Ca_2B_6O_{11} + Na_2CO_3 \rightarrow$

Q4(a) Describe the manufacture of Nitric acid by Ostwald's Process. Draw the flow diagram. Write balance equation for the reaction of dilute and very dilute nitric acid with Zn.

(b). Describe the extraction of the sodium from molten sodium chloride.

(c.) How is chlorine is manufactured by nelson cell? Draw its diagram.

Organic Chemistry

Q5(a). Explain the molecular orbital treatment of benzene. Also draw the resonance structure of benzene.

(b)Define Polymerization. How many types of Polymerization are there? Give the preparation of the following :

- PVC
- Bakelite

(c.). What happens when:

- Acetone is treated with I_2 the presence of sodium carbonate
- Methyl iodide is treated with sodium metal.
- Excess ethanol is treated with conc H_2SO_4
- Solution of sucrose is treated with yeast
- Phenol is treated with Bromine water

Q6(a) What is nucleophile? Explain the mechanical reaction of SN_1& SN_2 reaction with example.

(b). What is fertilizer? Give its types. Explain phosphatic fertilizer.

(c.). Write the IUPAC names of the following

- $(CH_3)_3\ C - CH_2 - CO - CH(CH_3)_2$
- $CH_2 = CH - C \equiv C - CH = CH_2$
- $CH_3 - O - \underset{\displaystyle OC_2H_5}{\underset{|}{CH}} - CH_2 - \underset{\displaystyle OC_6H_5}{\underset{|}{CH_2}}$
- $CH_3 - CH_2 - \overset{\displaystyle O}{\overset{||}{C}} - CH_2 - COOH$
- $CH_3 - (CH_2)_3 - C - O - \overset{\displaystyle O}{\overset{||}{C}} - (CH_3)_3$

Time: 20 min **Max. Marks:17**

(Section "A" Multiple Choice Question)

Q1. Sellect the most appropriate answer for each from the given options:

1- The ration of electron, proton and neutron in Protium is:
   a) (1:1:0)
   b) (1:1:1)
   c) (1:1:2)
   d) (1:2:1)

2- EDAT is:
   a) Bidentate ligand
   b) Monodentate ligand
   c) Chelate
   d) Multidentate ligand

3- Another name of methane is:
   a) Mustard gas
   b) Oil gas
   c) Coal gas
   d) Marsh gas

4- An example of electron deficient hydride id:
   a) BH_3
   b) $NaBH_4$
   c) NaH
   d) CH_4

5- Chemical name of Fruit sugar is:
   a) Sucrose
   b) Glucose
   c) Lactose
   d) Fructose

6- Bond angle and bond distance between the atom in rombic sulphur are:
   a) 2.12°A&105°
   b) 2.12°A&107°
   c) 2.3°A&105°
   d) 2.22°A&108°

7- This is animal starch:
   a) Glycogen
   b) Amylose
   c) Cellulose
   d) Amino acid

8- Density of 98% HNO_3 is:
   a) 1.51g/l
   b) 1.4 g/l
   c) 1.83 g/l
   d) 1.42 g/l

9- The chemical formula of $Al_2O_3.3H_2O$ Stands for
   a) Diasoper
   b) Corundum
   c) Bauxite
   d) Gibbiste

10- This imparts red color to glass:

a) Cr_2O_3
b) CuO
c) CoO
d) ZnO

11- The formula of Caproic acid is:
a) $CH_3(CH_2)_2\ COOH$
b) $CH_3(CH_2)_3\ COOH$
c) $CH_3(CH_2)_4\ COOH$
d) $CH_3(CH_2)_5\ COOH$

12- The no of carbon atom in a monosaccharide is
a) 3-10
b) 2-8
c) 3-9
d) 4-9

13- Fertilizer maintains the range of pH of soil at:
a) 7.0 – 8.0
b) 4.0 – 6.0
c) 1.2- 4.2
d) 12.0- 14.0

14- The first seven groups of periodic table are divided sub-group "A" consisting of:
a) Transition Element
b) Metallic Element
c) Representative Element
d) Complex Element

15- Interstitial hydride are named as:
a) Metallic Hydrides
b) Covalent Hydrides
c) Borderline Hydride
d) Ionic Hydride

16- Saponification result in the formation of:
a) Glass
b) Polymer
c) Fertilizer
d) Soap

17- The boiling point range 40°C 200°C is for this fraction of petroleum:
a) Wax
b) Gasoline
c) Heavy oil
d) Jet fuel

SECTION "B" (Short Question Answers)

Time: 2 hour 40 min Marks 68

Note: Attempt 10 Part Question, Select five questions from organic chemistry and, five questions from inorganic chemistry.

Inorganic Chemistry

Q2.1- What are the demerits of Mendeleev's periodic classification? How was its Modified?
2- Give scientific reason for any four:
a) $NH_3$and H_2O act as ligands but $NH_4{}^+$ and H_2O^+ do not.

b) Graphite conduct electricity, where diamond does not.
c) B_2O_3 conduct while Al_2O_3 is amphoteric.
d) Alkaline earth metal ions are more strongly hydrated than alkali metal ions.
e) Most of the transition element and their compounds are paramagnetic.

3- Describe the manufacture of chlorine gas by CastnerKellener Calls.

4- Give equation of the following

- Chrome yellow with caustic soda.
- Electrolytic oxidation of potassium magnate by water.
- Potassium dichromate with conc H_2SO_4
- Chromium oxide with KOH and Bromine Water.

5(a) Write I.U.P.A.C names of the following:

- $[Fe(NO_2)_6]^{-3}$
- $[Cr(em)_2Cl_2]Cl$

(b) How is Bauxite ore purified by Baeyer's OR Serpeck's Process

6(a) Write the electronic configuration of Zn(Zn=30), Group period and block.
(b) What is water gas? Giver one method of its preparation.

7(a) How does Crystal Field Theory explain the color of complex ions?
(b)W rite the formula of the following:

- Alunite
- Hypo
- Magnesite
- Fluorspar

8.(a) Draw the structure of HNO3 in vapour and solid phases.
(b) What is Aqua Regia? How does gold dissolve in it? Give the reason.

Organic Chemistry

9. (a): Draw & explain the orbital structure of Ethyne.
(b) What is Rancidification? Mentions its causes:

10. Define the following terms:

- Cracking.
- Homologous series.
- Carbohydrates.
- Refining of petroleum

11.(a) Give the mechanism of of Chlorination of Methane in the presence of sunlight.
(b) How is the purity of Fat and Oil are determined?

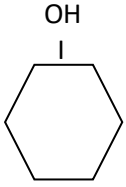
12. Give the equation for the following reaction:

- Ethanol with Grignard's Reaction.
- Methanol with Steam
- Glucose with Tollen's Reagent *
- Acetyl Chloride with Sodium Ethanoate.

13.(a) What are Monohydric alcohols? How are they classified?
(b): How is wood spirit manufactured from Water gas?

14. What is Synthetic Fibre? Explain the Nylon & Polyster.

15.(a) How is Be3nzene prepared commercially from Petroleum?
(b)Complete the following reaction:

- 

$+ H_2$ Catalyst $\rightarrow$

- $H-\overset{\overset{O}{\|}}{C}-H$ Polymerizatium $\rightarrow$

16.): Differentiate b/w the following:
- Saturated & unsaturated Hydrocarbon.
- Reducing & Non-reducing sugar

Section "C" (Detail Question Answer)

Note: Attempt 2Part one from organic chemistry, and one from inorganic chemistry (28)

Inorganic Chemistry

Q3.(a) How is Soda ash manufactured by Ammonia Solvay Process?
(b)Describe extraction of pure copper from roaster pyrite ore.
(c) Complete the following equations:
- $CaOCl_2 + CO_2 + H_2O \rightarrow$
- $P + HNO_3 \rightarrow$
- $Zn + HNO_3 \rightarrow v.dilute$
- $H_2S + H_2SO_4 \rightarrow$
- $AgBr + Na_2S_2O_3 \rightarrow$

Q4.(a) hydrogen is misfit in group IA and VIIA of the periodic table.
(b) Describe the manufacture of Sulphuric Acid by Contact process. Draw the flow diagram.
(c) Write notes on any TWO of the following:
- Borax
- Atomic hydrogen
- Blue vitriol

Organic Chemistry

Q5.(a) Describe the Kekule structure of Benzene. Write the objection against it. How was the objection removed by Kekule.
(b) What are Elimination reaction? Write Bimolecular Elimination Reaction with its mechanism.
(c) Give equation for the following:
- Toluene with $KMnO_4$
- Acetylene with cold $KMnO_4$
- 2-propanone with Methyl Magnesium Chloride.
- Phenol with Dilute HNO_3
- Ethanal with Sodium &Ethanol.

Q6.(a) What is fermentation? How is ethyl alcohol obtained by fermentation of
- starch
- Molasses

(b) Why does Benzene give Electrophilic Substitution reactions. Explain the mechanism of Friedel-craft's Acylation.

OR

write a note on any two of the following:
- Glass

- Detergents
- Amino acids

(c) Write IUPAC names of the following:

- $CH_2 - C - CH \equiv CH$

  |

  CH_3

- O

  ||

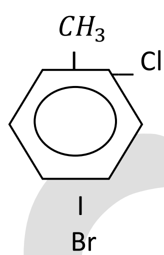
  $CH_3 - C - O - C(CH_3)_3$

- $CH_3 - CH = CH - CH - CH - CH_3$

  | |

  OH CH_3

- $CH_3 - CH_2 - O - C(CH_3)_3$

- 

Chemistry: **2013**

Time: 20 min **Max. Marks:17**

(Section "A" Multiple Choice Question)

Q1. Select the most appropriate answer for each from the given options:

1- The formula of hypocholorous acid is:
   a) HOCL
   b) $HCIO_2$
   c) $HCIO_3$
   d) $HCIO_4$

2- The metal ions heaving the heist no of unpaired electron is:
   a) Mn^{+2}
   b) Fe^{+2}
   c) Co^{+2}
   d) Ni^{+2}

3- The chemical name of laughing gas is:
   a) Nitric oxide
   b) Nitrous oxide
   c) Nitrogen trioxide
   d) Nitrogen pent oxide

4-This has the minimum hydration energy:

a) Na^+
b) K^+
c) Rb^+
d) Cs^+

5- Cycloalkanes hae the general formula:
a) C_nH_{2n+2}
b) C_nH_{2n}
c) C_nH_{2n-2}
d) C_nH_{2n+4}

6- Glycogen is a:
a) Monosaccharide
b) Oligosaccharide
c) Polysaccharide
d) Disaccharide

7- This gas was used in First World War:
a) Phosgene gas
b) Mustard gas
c) Coal gas
d) Ammonia gas

8- The hybridization in the carbon atom of carbonyl group is:
a) sp
b) sp^2
c) sp^3
d) d^2sp^3

9- All note gas fulfill the octate rule except:
a) Kr
b) Ne
c) He
d) Ar

10- The electronic no of an element belonging to VA and third period is:
a) 7
b) 13
c) 15
d) 23

11- Element of group IB are called:
a) Normal element
b) Rare earth metals
c) Coinage metals
d) Alkali metals

12- Hydride ion and helium atom have the same:
a) No of electron
b) No of proton
c) No of neutron
d) Valency

13- The no of neutron in the Protium is:
a) 0
b) 1
c) 2
d) 3

14- The element having the symbol “Ga” belong to this family:

a) Carbon
b) Nitrogen
c) Boron
d) Beryllium

15- On burning in excess of Oxygen, Sodium Forms is:
a) Superoxide
b) Peroxide
c) Dioxide
d) Monoxide

16- A mixture of Aluminum nitrate and aluminum powder is called:
a) Duralumin
b) Ammonal
c) Carnallite
d) Alum

17- $Ca_2B_6O_{11}.5H_2O$ is the chemical formula of:
a) Cryolite
b) Colemanite
c) Bauxite
d) Borax

SECTION "B" (Short Question Answers)

Time: 2 hour 40 min Marks 68

Note: Attempt 10 Part Question, Select five questions from organic chemistry and, five questions from inorganic chemistry.

Inorganic Chemistry

Q2.

1.(a) Give the valence shell electronic configuration of the following group:
- IIA an IB
- IVB and VIB

(b) Define the following with example:
- Dobereiner's triads
- Newlands law of octaves

2.(a) Differentiate between the natural isotopes of hydrogen.
(b) Interstitial hydrides are not true chemical compounds comment.

3.Give equation of the following :
- Reaction of Feric oxide with aluminum
- Reaction of Litharge with Sodium chloride
- Reaction of Benzene with sulphuric acid
- Reaction of sodium dichloride with potassium chloride

4. What is allotropy? Describe amorphous from of Sulphur. Give reasons for its softness and elasticity.0

5.Give Reason:
- The elements of a group in the periodic table have the same valence shell electronic configuration
- Alkali metals cannot be used in voltaic cell.
- In d block elements, 4s orbital's are filled prior to 3rd orbitals but 4s electrons are lost in first in ionization.
- Ligands are generally called Lewis bases.

6.Explain the extraction of sodium metal by the electrolysis of molten sodium chloride.

7.(a) Write the I.U.P.A.C names of the following:

- $Na_4[Cr(SCN)_4(NH_3)_2]$
- $Na_2[Fe(CN)_5NO$

(b) Write the chemical formula of the following:

- Tincal
- Lead sesquioxide
- Stibnite
- carnallite

8.How is Soda ash manufactured by Ammonia Solvay Process?

Organic chemistry:

9. Describe the natural sources of organic compound.

10.(a) Define the following ,giving example:

- Isomers.
- Polymers.

(b) Acetylene shows acidic properties. Give two reaction to justify the statement.

11 (a) Which Alkane is obtained by the reaction of metallic sodium with the following compounds?

- 2-Bromo –Propane.
- 2-Bromo -2-methyl propane.

(b) Write the equation for the reactions of Alcoholic KOH with:

- 2-Bromo –Propane.
- 2-Bromo -2-methyl propane.

12. Name the following IUPAC names

- $(CH_3)_2C.Br.CHO$
- $CH_3 - C(CH_3)_2COCH(CH_3)_2$
- $(CH_3)_2C.OH$
- $(CH_3)_2COCH(CH_3)_2$

13.Outline the step wise reaction mechanism of the following:

- SN^2 reaction between bromo methane and NaOH.
- SN^1 reaction between 2- chloro – 2-methyl propane and NaCN.

14. How will you prepare the following?

- Carbolic acid from Benzene.
- Acetaldehyde from Acetylene.
- Acetal from Methanal.
- An oxime from Formaldehyde.

15. (a) Give the Biological importance of Carbohyderates.

(b) Explain sponification of oils and fats with the help with the help of chemical equation and writes the names of the product formed

16.(a) Give two reactions in which Benzene ring is not retained.

(b) Give two preparation of Dimethyl Ketone.

Section "C" (Detail Question Answer)

Note: Attempt 2Part one from organic chemistry, and one from inorganic chemistry (28)

Inorganic Chemistry

Q3.(a)What is Metallurgy? Explain extraction of 99.99% pure Aluminum fro Bauxite ore containing silica as impurity

(b) Complete the following equations:

- $FeO.Cr_2O_3 + K_2CO_3 + O_2 \rightarrow$
- $K_2MnO_4 + Cl_2 \rightarrow$

- $CuSO_4$ + Kl →
- Zn+H_2SO_4→90°
- $MgCO_3$ + H_2SO_4 →

(c) Give oxidizing reactions $H_2SO_4$with metals and non-metals.

Q4. (a) Explain manufacture of stable ox acid of Nitrogen by ostwal'd method.
Write balanced equations for the reaction of HNO_3 with Cu and C. Q.

(b) Write short note on:

- Paints
- Plastic
- Photography
- Lead Pigments
- Boric acid

(c) What is corrosion? Write its causes. Give different methods for the prevention of metals from corrosion.

Organic chemistry

Q5. (a) Explain the molecular orbital treatment of benzene. Also draw the resonance structure of benzene.

(b) Prepare the following compounds from CH_3Br:

- Methanol.
- Methyl ethanoate.
- Methoxy ethane.
- Amino methane.
- Methyl mercaptan

(c). Draw the molecular structure of Ethane & Discuss its orbital structure.

Q16.(a) What are Vitamins? How are they classified/ Write their names and sources .Also name the diseases caused by their deficiency.

(b) Prepare the following:

- Ethyl alcohol from Molasses.
- M-nitro benzoic acid from benzene

(c) Distinguish between

- Hexane & Benzene.
- Aldehydes & Ketone.

(d) Give structural formula of the following:

- Catechol
- Divinyl acetylene
- Glyoxal
- Picric acid

Chemistry: 2012

Time: 20 min **Max. Marks:17**

(Section "A" Multiple Choice Question)

Q1. Sellect the most appropriate answer for each from the given options:

1- The process of converting iron sheets by a layer of zinc is known as

a. Tempring
b. Tin Plating
c. Galvanizing
d. Annealing

2- The functional group present is cresol is:
   a. Phenolic,-OH
   b. Carboxylic,-COOH
   c. Alcoholic,-OH
   d. Aldehydic,-OH
3- Milk sugar is also called:
   a. Glucose
   b. Fructose
   c. Lactose
   d. Sucrose
4- Dimithyl ether and ethyl alcohol are:
   a. Metamers
   b. Fuctional group isomers
   c. Position isomers
   d. Cis-trans isomers
5- The functional group is present in oil and fats:
   a. Carboxylic
   b. Alcoholic group
   c. Aldehydic group
   d. Ester group
6- the number elements in each lanthanide and actinideseries is:
   a. 2
   b. 14
   c. 18
   d. 32
7- Water gas is produced by passing steam over red hot coke at:
   a. 800°C
   b. 900°C
   c. 600°C
   d. 1000°C
8- This meal forms superoxide:
   a. Li
   b. Be
   c. K
   d. Mg
9- Tnical is a mineral of:
   a. Al
   b. Si
   c. B
   d. C
10- Kipp's apparatus is used to prepare:
   1. HCl
   2. Cl_2
   3. H_2S
   4. SO_2
11- This gas is produced by treating ethane with sulphur monochloride:
   a. Tear gas
   b. Mustard gas
   c. Laughing gas
   d. Marsh gas
12- This gas is used in welding:

a. Methane
b. Ethyne
c. Ethane
d. Ethane

13- Grignard's reagent reacts with ketone to give:
a. 1°-alcohol
b. 2°-alcohol
c. 3°-alcohol
d. Phenol

14- Cholestrol, cholic acid and progesterone are:
a. Amino acid
b. Steroids
c. Enzymes

15- In tollen's test , the end product is:
a. White ppt
b. Red ppt
c. Yellow ppt
d. Silver ppt

16- NaOH is named as caustic soda because:
a. It is used in soda water
b. It corrodes organic tissues
c. It react with chlorine gas
d. It reacts with fats to form soap

17- Brine is concentrated aqueous solution of :
a. Sodium carbonate
b. Sodium sulphate
c. Alum
d. Sodium chloride

SECTION "B" (Short Question Answers)

Time: 2 hour 40 min Marks 68

Note: Attempt 10 Part Question, Select five questions from organic chemistry and, five questions from inorganic chemistry.

Inorganic Chemistry

Q2.

1. State the Modern Periodic Law. Explain how it removed the defects of Mendeleev's system of classification.

2. (a) Write the valence shell configuration of the following groups
- IA & AB
- VA &VB.

(b) What is Aqua Regia? How does gold dissolve in it? Give equations of the reaction

3. Give the reason of the following.
- Ionic hydrides are called true hydrides
- Lithium and Beryllium markedly differ from each other members of their respective groups.

- Plaster of Paris is used in making plaster coats and moulds.
- Why is the electronic configuration of Chronium (Cr) $4s^1, 3d^5$ instead of $4s^2, 3d^4$ while that of copper (Cu) is $4s^1, 3d^{10}$ instead of $4s^2, 3d^9$?

4. Give equations of the reaction.
   - Zinc is treated with 90% conc. H_2SO_4
   - Action heat on K_2MnO_4
   - Aluminum reacts with aqueous Sodium Hydroxide
   - Lunar caustic is heated at 450 0 C.

5. (a) Write a note on any one:
   - Detergent
   - Tin Plating

(b) Write I.U.P.A.C names of the following:
   - $[Cr(en)_2Cl_2]Cl$
   - $[Fe(NO_2)_6]^{-3}$

6. Describe the preparation of Chlorine gas Castner Kellner cell OR Nelson Cell.
7. Write the following equations and give I.U.P.A.C names of the complexes found.
   - $CuSO_4 + NH_3$ excess →
   - $AgNO_3 + NH_3\ excess\ \rightarrow$

8. (a) What is Blue Vitriol? Give two equations for its preparation.
(b) What are outer and inner Transition elements and how many series of each of them are present in periodic Table? Also write the names of the inner transition series.

Organic Chemistry

9. Define
   - Polymerization.
   - Zwitter iron
   - Catenation.
   - Metamerism.

10.Write equation only for the following conversion:
   - Benzene to nitro-Benzene
   - ethanol to ethanoic acid

11. Give the reaction of Benzene with Chlorine.
   - in the presence of lewis acid catalyst
   - in presence of sun light

(b) Write the structural formula for the following:
   - divinely acetylene
   - hydro quinine
   - dethyl ter-butyl ether
   - 2_brombutarial

12. Define any classify vitamins. Explain vitamin B-complex and vitamin C
13. (a)Draw and explain the orbital structure of Ethyne.
    b):Give chemical test to distinguish between
   - Ethene and Ethyne
   - Aldehyde and Ketone.

14. Differentiate between the following:
   - saturated & unsaturated Hydrocarbon.
   - Aliphatic & Aromatic Hydrocarbon

15. Write the equation for the following reaction:
   - Reaction of sodium benzonate with soda-lime.
   - Reaction of acetone with acidified k2Cr2O7.
   - Reaction of sodamide with chloroethane.
   - Reaction of phenol with concHNO3.

16.(a) How does a chlorine react with Methane in the presence of sun light?

(b) What are alkyl halides? Classify them with one example of each.

Section "C" (Detail Question Answer)

Note: Attempt 2Part one from organic chemistry, and one from inorganic chemistry (28)

Inorganic Chemistry

Q.3.(a)What are binary compounds of Hydrogen? Classify them. Explain covalent and polymeric hydrides.

(b) Describe the manufactures of sulphuric acid by contact process. Draw the flow diagram.

(c) Define Alum and write chemical formulae of three alums.

Q4. (a) How is pure copper obtained from roasted pyrite ore?

(b). Complete the following equations:

- $CaSO_2 + 2H_2O \rightarrow$
- $Ca_2B_6O_{11} + Na_2CO_3 \rightarrow$
- Zn + HNO_3 cold dilute→
- Cl_2+NaOH cold dilute→

(c).write the chemical formula of the following

- Gypsum
- Suhaga
- Sandhur
- Litharge
- Lunar caustic
- Bleaching powder
- Organic Chemistry

Organic Chemistry

Q5.(a) : what is fermentation? How is ethyl alcohol obtained by fermentation of starch?

(b) What happens when :

- Ethyne is reacted with iodine in the presence of sunlight.
- Methane is treated with phenyl hydrazine.
- phenol is treated with bromine water.
- phenol is treated with red hot zinc dust.

(c) What is orientation in Benzene? Explain the orientation in monosubstitude benzene. Name 3 each of ortho , para & meta directing Groups.

Q6.(a) Explain electrophilic substitution in Benzene with reference to:

- Friedel-Craft's acylation
- Sulphonation reaction.

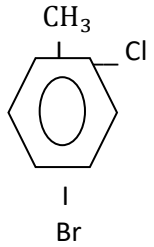
(b). Outline the step wise reaction mechanism of the following:

- SN^1 reaction between NaCN and 2-Chloro-2 methyl propane.

(c). Write the IUPAc names of the following organic compound

- $CH_2 - C(CH_3) - CH \equiv CH$
- $CH_3 - C(=O) - O - CH_3$
- $CH_3 - CH = CH - CH_2 - COOH$
- $CH_3 - CH = CH - CH - CH - CH_3$

I I
OH CH

- 

- $CH_3 - CO - CH_2 - CH - CH_3$
  CH_3

- $CH_3 - CH_2 - O - CH$
  CH_3

Chemistry: **2011**

Time: 20 min **Max. Marks:17**

(Section "A" Multiple Choice Question)

Q1. Sellect the most appropriate answer for each from the given options:

1- Ethylene is used as in:
   a. Anaesthestic
   b. Ripening of fruits
   c. Preparing mustard gas
   d. All of these

2- All noble gas fulfill the octet rule except:
   a. Ne
   b. Ar
   c. He
   d. Xe

3- The element of same group have the:
   a. Same number of electron
   b. Same number of valence electrons
   c. Same number of protons
   d. Same valence shells

4- Hydrogen shows the oxidation state(s)
   a. Zero only
   b. -1 only
   c. +1 only
   d. All of these

5- Elements belonging to the same group in the periodic:
   a. Ca and Na
   b. Ca and Be
   c. Ca and Li
   d. Ca and K

6- Molecular formula of tincal is:
   a. H_2BO_3
   b. $Na_2B_4O_7.10H_2O$
   c. $H_2B_4O_7$
   d. $Na_2B_4O_7.7H_2O$
7- The substance which contains two or more metals is called
   a. Polymer
   b. Homologous
   c. Alloy
   d. Allotrope
8- The compound 1- butane and 2-butene are:
   a. Position isomers
   b. Chain isomers
   c. Functional group isomers
   d. Metamers
9- Molecular formula of chloroform is:
   a. CH_3Cl
   b. $CHCl_3$
   c. C
   d. CCl_4
10- General formula of Alkyl hydride is:
   a. $C_nH_{2n}X$
   b. $C_nH_{2n-2}X$
   c. $C_nH_{2n+1}X$
   d. C_nH_nX
11- Blood cancer is caused by:
   a. Methane
   b. Butane
   c. Benzene
   d. Ethane
12- The carbon atom having a +charge is called:
   a. Hydroxide ion
   b. Halid ion
   c. Carbonium ion
   d. Carbonion
13- Methylated spirit is a mixture of:
   a. $Ca_3OH\ and\ CH_3l$
   b. $Ca_3OH\ and\ CH_4$
   c. $Ca_3OH\ and\ C_2H_5OH$
   d. $Ca_3OH\ and\ HCl$
14- Carbon atom of carbonyl group is hybridized as:
   a. sp
   b. sp^2
   c. sp^3
   d. dsp^2
15- Tollen's reagent is:
   a. Ammoniacal cuprous oxide
   b. Ammoniacal cuprous chloride
   c. Ammoniacal silver bromide
   d. Ammoniacal silver nitrate

16- Fruity smell is produced when C_2H_5OH is reacted with:

a. CH_3COCH_3
b. PCl_3
c. PCl_5
d. CH_3COOH

17- The sweetest sugar is:

a. Fructosc
b. Glucose
c. Sucrose
d. Lactose

SECTION "B" (Short Question Answers)

Time: 2 hour 40 min Marks 68

Note: Attempt 10 Part Question, Select five questions from organic chemistry and, five questions from inorganic chemistry.

Inorganic Chemistry

Q2.

1. (a) Write the electronic configuration group, period and block of elements with atomic number 24 and 29.

(b) Define

- Periodicity of elements
- Electron population

2. Define and classify binary compounds of hydrogen. Explain ionic hydrides giving two preparation and two reactions.

3. How is caustic soda prepared by Castner Kellner's Cell? Give advantages and disadvantages of the process.

4. (a) Discuss any two of the following properties of Transition metals:

- Magnetic property
- Formation of Coloured compounds
- Formation of complexes

(b) What is Lunar caustic? Give the equation of the prepration?

5. Give reason:

- Alkaline earth metal irons are more strongly reactive than alkali metal ions.
- Atomic hydrogen is more reactive than molecular hydrogen.
- Most of the transition elements and their compounds are paramagnetic.
- H_2O and NH_3 acts as a ligands but $H_3O^+$and $NH_4{}^+$ + do not.

6. Give the equation of the reaction:

- Reaction of Na_2NO_3 with silica
- Reaction between Sodium and Oxygen
- Action of heat on blue Vitriol
- Reaction between $K_2Cr_2O_7$ and KOH

7. (a)Give the equation for the preparation of:

- Bleaching Powder.
- Boric acid

(b) Give points of resemblance of hydrogen with IA and VIIA group of periodic table

8. Name the complexes by I.U.P.A.C system:

- $[Ni(CO)_4]$
- $N H_4[Cr(NCS)_4(NH_3)_2]$
- $[Cr(NH_3)_6]^{+3}$

- $[Fe(CN)_6]^{-3}$

Organic Chemistry

9. a)Draw and explain the orbital structure of Ethene.
   b): Distinguish by simple chemical tests
   - Alkene & Alkyne.
   - Aldehyde and ketone
10. Define isomers give with its example?
11. Give the equations for the preparation of:
   - Ethene from Ethyl Alcohol.
   - Benzene from Toluene.
   - Oxalic acid from Ethyne.
   - Acetaldehyde from Acetylene.
12. How is Grignard's reagent prepared? How can the following be prepared from Grignard's reagent?
   - Acetic acid.
   - Ethyl alcohol
   - Propane
13. (a)Define the functional group. Name the functional group in the following compound
   - C_2H_5COCL
   - CH_3CONH_2

   (b) Give electronic structure of:
   - Acetone.
   - Silver acetylide.
14. Define any classify vitamins. Explain vitamin B-complex and vitamin C
15. (a) What are phenols? Classify them:0

    (b) State Markownikoffs rule. Write the equation for the reaction between Vinyl bromide & hydrogen bromide.
16. Write a note on any two of the following:
   - Glass
   - Detergents
   - Plastic.

Section "C" (Detail Question Answer)

Note: Attempt 2Part one from organic chemistry, and one from inorganic chemistry (28)

Inorganic Chemistry

Q3(a) Give the advantages and defects of Mendeleev's periodic table. Explain how modern periodic table is divided into blocks. Also write general electronic configuration of each block.

(b) Give the structure and preparation of HNO_3 with flow diagram by Ostwald's Process. Write balanced equations for the reaction of concentrated and dilute HNO_3 with Cu.

Q.4 (a) Give the diagram of the extraction of pure Aluminum from aluminum oxide. What are the Ammonal and Aluminum bronze? Mention their uses.

(b) Write notes on any two of the following:
- Lead pigments
- Allotropic forms of Carbon
- Corrosion and its prevention.

Organic Chemistry

Q5(a) Give the equations for the preparation of giving organic compounds

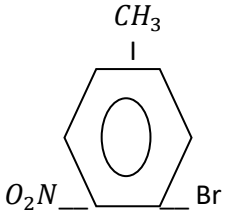
1. Ethyne from ethane.
2. diethyl ether from ethanol
3. methanol from water gas.
4. methanol from methanol
5. acetone from acetic acid.
6. ethanoic acid from ethanol.
7. ethanol from glucose.

(b):Give the equations for the following reactions.

1. cannizzaro reaction
2. polymerization for aceidehyde.
3. Reduction of acetone.
4. oxidation of benzene.
5. Esterification.
6. combustion of ethane.
7. hydrolysis of ethyl acetate in basic medium.

Q6 (a): Explain the structure of Benzene by molecular orbital treatment along with orbital structures. Benzene acts as a saturated and unsaturated compound. Justify this statement by equation.

(b) Write the I.U.P.A..C name of the following organic compound:

- $CH_3 - CH_2 - CH = CH - COOH$
- $CH_2 = CH - C \equiv C - CH = CH_2$
- $CH_3 - \overset{\overset{O}{\|}}{C} - O - C_6H_5$
- $CH_3 - O - CH_2 - \overset{\overset{OCH_3}{|}}{CH} - CH_2 - OC_2H_5$
- $(CH_3)_2CH - \overset{\overset{O}{\|}}{C} - CH - (C_2H_5)_2$
- $H - \overset{\overset{O}{\|}}{C} - (C_2H_5)_2 - \overset{\overset{O}{\|}}{C} - H$
- 

Chemistry: **2017**

Time: 20 min **Max. Marks:17**

(Section "A" Multiple Choice Question)

Q1. Sellect the most appropriate answer for each from the given options:

1- The human body store a part of glucose in liver in the form of :
   a. Glycogen
   b. Amylase
   c. Amylopectin
   d. Cellulose

2- The no of valance electron in the element of IIA group is:
   a. 1
   b. 2
   c. 3
   d. 5

3- The crystalline solid that contain water molecule in there crystals are called:
   a. Hydrates
   b. Hydrides
   c. Hydrolyzed
   d. Electrolytes

4- Bauxite is an ore used for the extraction of :
   a. Borax
   b. Boric acid
   c. Iron
   d. Aluminums

5- In $K_2Cr_2O_7$ oxidation no or cr is:
   a. +7
   b. +6
   c. +5
   d. +4

6- Ammonal is the mixture of:
   a. Aluminum powder and Aluminum nitrate
   b. Aluminum powder and Aluminum sulphate
   c. Aluminum powder and sodium nitrate
   d. Aluminum powder and potassium sulphate

7- The harmful and undesirable reaction of metal, when expose to atmosphere or any chemical agent is known as:
   a. Allotropy
   b. Corrosion
   c. Electroplating
   d. Cracking

8- Sodium react with water more vigorously than lithium because it:
   a. Has higher atomic weight
   b. Is more electronegative
   c. Is more electropositive
   d. Is a metal

9- The metal present in Grignard's reagent is:
   a. Mg
   b. Mn
   c. Fe

d. Cu

10- The chlorination of methane is an example of:
   a. Addition reaction
   b. Subtraction reaction
   c. Elimination reaction
   d. Oxidation reaction

11- Catenation is a process in which carbon show the properties of:
   a. Making single bond
   b. Making long chain or ring of carbon atom
   c. Hybridization
   d. Isomerism

12- It is not a nucleophil:

   a. OH^- b. NH c. BF_3 d. CN^-

13- The general formula of aldehyde is:
   a. R-OH
   b. –COOH
   c. RCOR
   d. R-CHO

14- The ethyl chloride reacts with alcohol KOH to give:
   a. Ethyl alcohol
   b. Ethane
   c. Butane
   d. Ethane

15- Markownikoff'srule will be applicable in th addition of HBr on:
   a. $CH_2 = CH_2$
   b. $CH \equiv$CH
   c. $CH_2 = CHBr$
   d. None of them

16- General formula of Alkene hydride is:
   a. $C_nH_{2n}X$
   b. $C_nH_{2n-2}X$
   c. $C_nH_{2n+1}X$
   d. C_nH_nX

17- This vitamin is water soluable:
   a. Vitamin A
   b. Vitamin B
   c. Vitamin C
   d. Vitamin D

SECTION "B" (Short Question Answers)

Time: 2 hour 40 min Marks 68

Note: Attempt 10 Part Question, Select five questions from organic chemistry and, five questions from inorganic chemistry.

Inorganic Chemistry

Q2.

1. (a) Explain that the position of hydrogen is misfit in Group IA of the periodic Table.
   (b) What is water gas? Give one method of its preparation.

2. Write the names and formulae of any four ores of aluminum. Give the refining of aluminum by Hoop's electrolytic method.

3. (a) Write the chemical formulae of the following:

- Potash Alum
- Baking soda
- Plaster of paris
- Oleum

(b) Write down the I.U.P.A.C name of the following:

- $K_3[Fe(CN)_6]$
- $[Co(NH_2 - CH_2 - CH_2 - H_2)_3]\,Cl_3$

4. Give reasons:

- Ionization potential increases with the increases in atomic number in the Period but decreases in a Group from up to down.
- The viscosity and boiling point of $H_2SO_4$are high.
- Why is heavy water heavy?
- Nascent hydrogen is more reactive than molecular hydrogen.

5. (a) Give the composition and uses of two alloys of aluminum.

(b) Compare four properties each of diamond and graphite.

6. Define ligands. Give the classification of ligands based upon the number of coordinating atoms with examples.

7. Complete the following reactions:

- $Na_2B_4O_7 \,.\, 7H_2O \rightarrow$
- $4Zn + 10\, HNO_3$ (dilute) $\rightarrow$
- $HCOOH + H_2SO_4$ (cons) $\rightarrow$
- $K_2Cr_2O_7 + 2\, H_2SO_4 \rightarrow$

8. (a) Write short note on any one of the following:

- Photography
- Silvering of a mirror

(b) Write the electronic configuration of Zn (Atomic number =30) and write its group, period and block.

Organic Chemistry

9. (a)Define following with examples:

- Polymerization.
- Homologous series

(b) Draw the orbital structure of Ethyne molecule. Briefly explain the nature of hybridization in carbon and their bonds.

10. Give the equations for the preparation of

- Ethane from methyl iodide.
- Benzene fromphenol.
- Ethene from ethyl Alcohol.
- Ethyne from calcium carbide.

11.(a) Explain the nitration reaction in benzene along with its mechanism.

(b) Explain the acidity of Ethyne with the help of two chemical reactions

12.(a) What is meant by an Elimination reaction? Explain the mechanism of uni –molecular elimination reaction (E^1).

(b) Explain sponification of oils and fats with the help with the help of chemical equation and writes the names of the product formed.

13Write the IUPAC name of the following:

- $CH_2 - CH = CH - CH_2OH$
- $HOOC - CH_2 - CH_2 - COOH$

- $HC \equiv C - CH_2 - CH_2 - CH = CH_2$
- $CH_3 - C - O - CH(CH_3)_2$
  II
  O

14. What Happens When The Following Actions Takes Place?
- Methanol is reacted with toll en's reagents.
- Acetone is heated with iodine and Na_2CO_3
- Hydrolysis of ethyl acetate in basic medium.
- Acetic acid is heated with C_2H_5OH in presence of conc. H_2SO_4

15. What are fertilizers? Name two nitrogenous and phosphate fertilizers along with their methods of preparation.

16. :Write the chemical equation to show what product will be formed when CH_3MgCI reacts with. CO_2
- acetone.
- Methyl chloride.
- water.

Section "C" (Detail Question Answer)

Note: Attempt 2Part one from organic chemistry, and one from inorganic chemistry (28)

Inorganic Chemistry

Q3(a) How is Sodium Carbonate prepared by Ammonia-Solvay Process? Draw the flow diagram.

(b) Write down any five Industrial preparation of hydrogen gas.

(c) Write the chemistry of boric acid.

Q.4 (a) Describe the manufacturing of sulphuric acid by Contact Process. Write the conditions for getting a good yield of SO_3. Draw the diagram.

(b) How is copper obtained from matt? Explain the methods of its refining by electrolysis. Draw the diagrams.

(c) What is Aqua Regia? How does it dissolve gold? Explain with equations.

Organic Chemistry

Q5(a) Give the Kekule's structure of benzene & write the objections against it. How was this objection removed by Kekule?

(b) What are vitamins an how they classified? Write its names, sources and the diseases caused by their deficiency.

(c.) Prepare phenol by Down's process.

Q 6(a) complete the reactions:
- $HC \equiv CH + 4[0] \xrightarrow{\text{hot } KMnO_4}$
- $NaOH + CH_3COONa \xrightarrow{CaO}$
- $(CH_3COO)_2Ca \xrightarrow{\text{dry distillation}}$
- $2HCHO + NaOH \rightarrow$
- $2CH_3 - CH_2 - CI + Ag2O \xrightarrow{\text{heat}}$

(b) what is fermentation? How is ethyl alcohol obtained by fermentation of starch? Explain How ethyl alcohol is made unfit for drinking

(c) Explain the mechanism of SN^1 reaction SN^2 reaction with examples

Time: 20 min **Max. Marks:17**

Section "A"

Note Answer 5 question from all, Attempt at least two questions from each Section. All part of questions must be answered in sequence. Draw diagram where necessary

Q.1 (a) (a) Explain any two of the following:

- Isotopes of Hydrogen.
- Polymeric and Metallic Hydrides
- Preparation of Atomic Hydrogen

(b) Discuss the long form of periodic table on the basis of electronic configuration.

(c) Write down the block, period and group of the following elements also Write their electronic configuration:

(i) Ar (18) (ii) P (15) (iii) Br (35)

Q.2 (a) How is Sodium manufactured by Dawn's Process?

(b) Discuss the trends in p-block elements with respect to:

- Ionization energy
- Electronegativity
- Hydration energy
- Melting point

(c) Write down the chemical formulae of the following:

- Epsom
- Gypsum
- Washing Soda
- Blue vitriol
- Oil of Vitriol
- Phitkari

(d) Complete and balance the following reactions:

- 2CaSO_4.2H_2O $\xrightarrow{100^\circ C}$
- H_3BO_3 $\xrightarrow{100^\circ C}$
- Al_2O_3.nH_2O +3C+N_2 →
- 2Al + 2NaOH + 2H_2O →

Q.3 (a) How is HNO_3. acid manufactured by Ostwald's method? Draw the diagram.

(b) Give reasons for any three of the following:

- Sulphuric acid is a sulphonating agent.
- Nitric acid is an oxidizing agent.
- Graphite is a weak conductor of electricity

(c) Write short note on:

- Silvering of a mirror
- Lead Pigment
- Corrosion
- Borax

(d) Write a brief account and uses of the bleaching powder

Q4.(a) Define mineral and ore. How is copper extracted from its sulphide ore?

(b) Define the following properties of transition element

- Variable oxidation states
- Color of complexes

(c)Give IUPAC name of the following:

- $Na_3[Co(NO_2)_6]$
- $Ni(CO)_4$
- $K_3(Cr(H_2O)Cl_5$
- $K_4[Fe(CN)_6]$

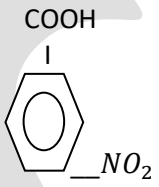
(d) How is lunar caustic prepared. Give its uses.

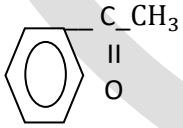
Section "B"

Q. 5(a): Define following:

- Isomerism.
- Homologous series

(b)Write down any 4 compound according to I.U.P.A.C system:

- $H_3C-\underset{\displaystyle CH_3}{\underset{|}{CH}}-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CHO$
- COOH
  |
  COOH
- $CH_3-\underset{\displaystyle CH_3}{\underset{|}{C}}=CH-CH_3$
- 

- 

(c) Write down the structural formula of any four:

- 2, 3 dimethyl 3 pentanol
- Resorcinol
- Alpha- napthol
- 3 ethoxy hexane
- Ethyl ethanoate

(d):What is a nucleophilic substitution ? give an example.

Q. 6(a)Fill in the blanks:

- Ethers are ____ derivatives of water
- Ethanol is prepared by the formation of _____
- Ethanol is an effective _____
- Phenols are aromatic compound containing ___group directly attached to the carbon atom of benzene

- 1, 2, 3 propanetriol is also called_____

(b): Define the following with examples and give two chemical tests to identify them: A: Saturated compounds B: Unsaturated compounds.

(c): What are alkyl halides? how are they Classified?

(d): differentiate b/w a reducing sugar and a non reducing sugar.

Q7(a) Write a short note on any two of the following:

- phosphatic fertilizers
- Detergents
- Paints

(b) What are lipids? Classify and characterize each class

(c) Differentiate between oil and fats.

(d) what are enzymes?

Q8(a): Starting from Benzene ,how will you prepare the following?

- p-nitrobenzoic acid.
- benzoic acid
- m-Nitrotoluene.
- Acetophenone.

(b): Complete the following reactions:

- $CH_3COOC_2H_5$ + NaOH (10%) _____
- C_2H_5OH + $SOCl_3$ _____
- $3CH_3 - CH_2 - OH + PCl_5$ _____
- $2C_2H_5Cl + 2Na$ _____
- $CH_3MgBr + H_2O$ _____

(c): Draw the structures of benzene as suggested by:

(i) Kekule. (ii) Armstrong. (iii): Bayer

(d) what are vitamins? and discuss the diseases caused by the deficiency of vitamin D.

Chemistry: 2008

Time: 3 hour **Max. Marks:75**

Section "A"

Note Answer 5 question from all, Attempt at least two questions from each Section. All part of questions must be answered in sequence. Draw diagram where necessary

Q1(a) Give the valence shell configuration of the following:

(i) Representative elements (ii) Inner Transition elements

(b)Discuss the position of hydrogen is the periodic table

(c)What is meant by the binary components of Hydrogen? Give chemical reaction of ionic and covalent hydride

(d) Why was Mendeleev's law modified? Give at least two reasons

Q.2 (a) Define Allotropy and describe the structure of diamond.

(b) What is Aqua Regia? How does gold dissolve in it? Give the reasons.

(c) What will be the action of heat on? Give the chemical equation only.

- CH_4
- $H_2B_4O_7$.
- $MgCO_3$

(d) Answer the following in the manufacture of Soda Ash by Ammonia Solvay Process.

- Name three raw materials

- Give the details of the various steps
- How is ammonia recovered from the solution of ammonium chloride?
- Draw the flow sheet

Q.3 (a)

- Name four ores of Aluminum.
- How is bauxite ore purified by Serpek's Process?
- Mention the refining of aluminum by Hoop's method.

(b) Draw the structure of HNO_3 in vapor phase and solid phase with bound lengths and bond angles.

(c) Write down the auto-oxidation reduction of chlorine.

(d) Write the chemical formulae of the following:

- Bleaching powder
- Gypsum
- Tincal
- Lead sesquioxide
- Carnalite
- Potash iodate

Q.4 (a) Give the I.U.P.A.C names:

- $[Cr(en_2)]^{2+}$
- $Ni(CO)_4$
- $[Zn(NH_3)_4]SO_4$
- $Na_3[Co(NO_2)_6]$

(b) Give scientific reasons for the following:

- Atomic radii increase down the group in the p-block elements.
- The metallic character of elements increase down the group.
- Why are the melting and boiling point of transition element is high?

(c) How nitric acid is prepared commercially by Ostwald's Process?

(d)Complete the following equation:

- $K_2Cr_2O_7 + H_2O_{(conc)} \rightarrow$
- $C_{12}H_{22}O_{11} + H_2SO_{4\ (conc)} \rightarrow$
- $Al_2O_3nH_7O + NaOH \rightarrow$

Section "B"

Q. 5(a) What objection is raised on Kekule's structure of benzene and how is it defended.

(b) Write the organometallic compounds? How will you prepare the following from Grignard reagent. Write the mechanism.

1- Ethane. 2- Teritary butyl alcohol.

(c) What is electrophilic substitution reaction? Give an example of halogenations of benzene with full mechanism in the presence of a catalyst.

(d)Write a short note on ether.

Q6 (a)Write structured formula of following? Give there I.U.P.A.C names:

- Vinyl bromide
- Carbolic acid
- Valeric acid
- Diethyl ether

(b) Write the equation for the preparations of the following:

- Acetamide from acetyl chloride.
- Ethane from methyl iodide in the presence of Sodium metal.

- Ethene from Vicinal Di chloroethane.
- Mustard gas from Ethene.

(c) Outline the step wise reaction mechanism of the SN^1 reaction between 2- chloro – 2-methyl propane and NaCN.

(d): Give the reason off the following:

- 2 o alkyl halides give SN^1 mechanism in presence of polar solvent.
- E_2 reaction is of 2nd order.
- Alkyl halides behaves as a nucleophiles in Grignard' reagent.
- Why is ethyl acetate used as a plasticizer?

Q7(a) What are alcohols? Classify monohydric alcohols.

(b) How is methyl alcohol is prepared from water gas?

(c) 1.write down at least two methods of preparation of acetone and its two chemical reactions.

2. What is the main constituent of vinegar? Give its reaction with ethanol

(d) What is the role of amino acids in human body

Q8(a) What are enzymes? Explain the effect of various factors which influence the rate of enzymes.

(b) Write a note on any one of the following:

- Detergents
- Plastic

(c) Which reagents should be used to change methyl iodide into following?Write chemical equations:

(d) Complete the following equations:

- 3CH $\equiv CH \xrightarrow[organo\ nichel]{red\ hot\ tube}$
- $ClCH_2 - CH_2 - Cl + KOH \xrightarrow[\Delta]{C_2H_5OH}$
- $H_2C = CH_2 + Br_2 \xrightarrow{CCl_4}$
-  + dil $HNO_3 \xrightarrow{25^{\circ}C}$