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Answer Sheet No. _____

Sign. of Candidate _____

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CHEMISTRY SSC-II (2nd Set Solution)

SECTION – A (Marks 12)

Time allowed: 20 Minutes

Section – A is compulsory. All parts of this section are to be answered on this page and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. **Do not use lead pencil.**

Q.1 Fill the relevant bubble for each part. Each part carries one mark.

- (1) The raw material which is used for the production of Na_2CO_3 is:
 A. $\text{NH}_3, \text{CO}_2, \text{Ca}(\text{OH})_2$ ○ B. Lime stone, NH_3 , Brine ●
 C. $\text{NH}_3, \text{CO}_2, \text{H}_2\text{O}$ ○ D. NH_3 , Brine, $\text{Ca}(\text{OH})_2$ ○
- (2) Water can be decomposed with the help of electrolysis. Identify the hydrogen-oxygen ratio by value in water:
 A. 1:1 ○ B. 2:2 ○
 C. 2:1 ● D. 1:2 ○
- (3) The colour of silk clothes fades away due to SO_2 . Identify the source of SO_2 from the following:
 A. Aerosol sprays ○
 B. Industries using fossil fuels ●
 C. Refrigerants ○
 D. Decaying of dead plant material ○
- (4) Phenolphthalein is an indicator which is used in titration. Predict the color in base.
 A. Red ○ B. Yellow ○
 C. Colorless ○ D. Pink ●
- (5) DNA is the nucleic acid responsible for heredity characters. The following components are present in DNA **EXCEPT**:
 A. Nitrogenous base ○ B. Phosphate unit ○
 C. Ribose sugar ● D. Deoxy ribose sugar ○
- (6) Identify the class of compound to which $\text{CH}_3 - \text{CH}_2 - \overset{\text{O}}{\parallel} \text{C} - \text{CH}_3$ belongs to:
 A. Aldehydes ○ B. Ethers ○
 C. Esters ○ D. Ketones ●

- (7) Identify the process that produces alkane from Alkene:

- A. hydration B. dehydration
C. hydrogenation D. dehydrogenation
- (8) Predict the property that organic compounds have
A. Low melting and low boiling points
B. High melting and low boiling points
C. Low melting and high boiling points
D. High melting and low boiling points
- (9) Propose which one of the following gives addition reaction:
A. Methane B. Ethane
C. Propyne D. Propane
- (10) Predict the rate of forward reaction in the beginning of a reversible reaction:
A. Moderate B. Negligible
C. Slow D. Very fast
- (11) Interpret which statement is true about equilibrium state:
A. Forward reaction stops
B. Reverse reaction stops
C. Both reactions stop
D. Both reactions continue simultaneously
- (12) Identify, which one of the following is used for the reduction of Alkyl Halides?
A. Mg/HCl B. Cu/HCl
C. Na/HCl D. Zn/HCl
-

Federal Board SSC-II Examination
Chemistry Model Question Paper
(Curriculum 2006)

Time allowed: 2.40 hours

Total Marks: 53

Note: Answer any eleven parts from Section 'B' and attempt any two questions from Section 'C' on the separately provided answer book. Write your answers neatly and legibly.

SECTION – B (Marks 33)

Q.2 Attempt any **ELEVEN** parts from the following. All parts carry equal marks.
(11 × 3 = 33)

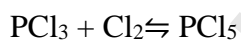
- i. Differentiate between reversible and irreversible reactions with the help of an example.

Ans.

Sr.No	Reversible reaction	Irreversible reaction
1.	The reactions in which products reconverted into reactants is called reversible reaction	The reaction in which reactants converted into products completely or partially is called irreversible reaction
2.	It is represented by double arrow	It is represented by single arrow
3.	It proceeds in both directions	It is unidirectional reaction
4.	An equilibrium is established between reactants and products	Equilibrium is never established.

- ii. The reaction between PCl_3 and Cl_2 produces PCl_5 gas. Derive K_c unit for this reaction with the help of balanced chemical equation.

Ans.



$$R_f \propto [\text{PCl}_3][\text{Cl}_2]$$

$$R_f = k_f [\text{PCl}_3][\text{Cl}_2]$$

$$R_r \propto [\text{PCl}_5]$$

$$R_r = k_r [\text{PCl}_5]$$

At equilibrium the rate of forward reaction becomes equal to rate of reverse reaction.

So,

$$R_f = R_r$$

Putting the values

$$k_f [\text{PCl}_3][\text{Cl}_2] = k_r [\text{PCl}_5]$$

$$k_f/k_r = [\text{PCl}_5] / [\text{PCl}_3][\text{Cl}_2]$$

$$k_f/k_r = k_c$$

$$k_c = [\text{PCl}_5] / [\text{PCl}_3][\text{Cl}_2]$$

- iii. The process of separating a metal from its ore is called metallurgy. Enlist the names of any three important metallurgical operations.

Ans.

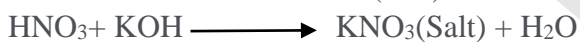
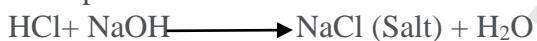
- I. Mining
- II. Crushing and grinding
- III. Concentration unit
 - a. Magnetic separator
 - b. Cyclone separator
 - c. Floatation process
- IV. Extraction
 - a. Roasting
 - b. Smelting
 - c. Bessemerization
- V. Refining
- VI. Distillation.

(Students can write any three of them)

- iv. What is a neutral salt? Describe its formation with the help of a valid chemical equation.

Ans. A salt resulting from the neutralization of an acid by a base and having no acidic or basic character, especially when dissolved in water.

Example:



The compounds like NaCl, KCl, K_2SO_4 ,

- v. Show the structures of Ester and Ether functional groups.

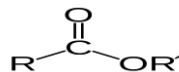
Ans.

Ether:

Ether is a class of organic compounds characterized by an oxygen atom bonded to two alkyl or aryl groups.



Ester: Esters is formed when a carbon-to-oxygen double bond that is also singly bonded to a second oxygen atom O



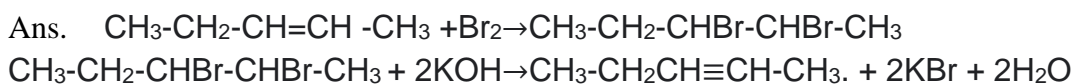
- vi. List three applications of pH in daily life.

Ans.

- I. Existence of living beings. Organisms require a specific pH for their ideal growth and development.
- II. Digestion of food.
- III. Importance in soil.
- IV. Stopping tooth decay.
- V. Remedy for acidic effect of honeybee bite.

(Students can write any other three valid applications also)

vii. Identify X and Y by the chemical equation given below



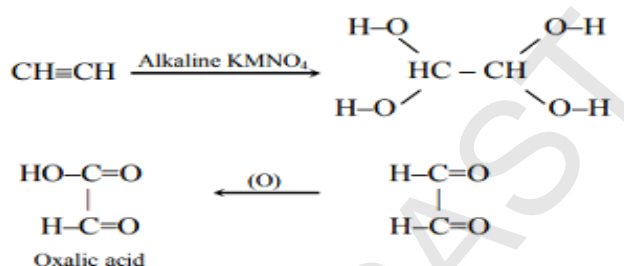
viii. Demonstrate Lowry-Bronsted concept of acids and bases with the help of chemical equation between CH_3COOH and H_2O .

Ans. Acetic acid acts as a Lowry-Bronsted acid, donating a proton to water, which acts as the Lowry-Bronsted base. The products include the acetate ion and hydronium ion.



ix. Demonstrate oxidation of alkynes with KMnO_4 . Write complete reactions.

Ans.



x. Define fractional distillation. Give names of any three fractions of petroleum.

Ans. Fractional distillation is the separation of a mixture into its component parts, or fractions. Chemical compounds are separated by heating them to a temperature at which one or more fractions of the mixture will vaporize. It uses distillation to fractionate.

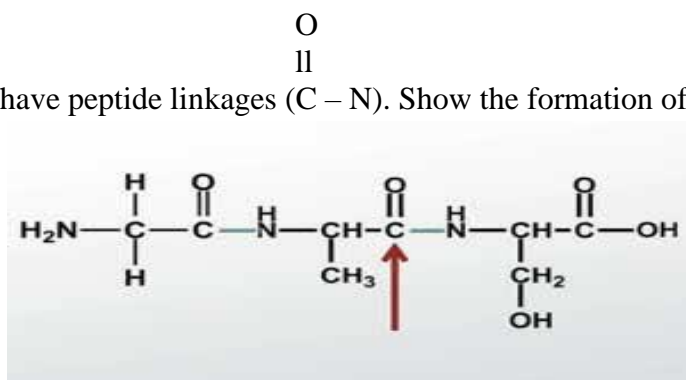
Fractions of petroleum:

- I. Diesel
- II. Kerosine oil
- III. Naphtha
- IV. Petrol
- V. Lubricating oil
- VI. Waxes

(Students can write any three fractions of petroleum)

xi. Proteins have peptide linkages (C – N). Show the formation of tripeptide.

Ans.



- xii. Nucleic acids are found in every living cell and are vital components of all life. Differentiate between DNA and RNA by structures.

Ans.

DNA	VERSUS	RNA
DNA is mostly found in nucleus and nucleoid		RNA is mostly found in the cytoplasm
Stands for deoxyribonucleic acid		Stands for ribonucleic acid
Deoxyribose is the sugar where the bases are A, T, C and G		Ribose is the sugar where the bases are A, U, C and G
A long polymer		Shorter than DNA
A pairs with T and C pairs with G		A pairs with U and C pairs with G
Double-stranded and it exhibits a double-helix structure		Single-strand, sometimes it forms secondary and tertiary structures
Prefers B-form		Prefers A-form
More prone to UV damage		Less prone to UV damage
Carries the genetic information necessary for the development, functioning, and reproduction		Mainly involved in protein synthesis, sometimes it regulates the gene expression

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- xiii. Global warming is due to a disturbance in the natural balance of the concentration of greenhouse gases. Discuss three effects of global warming.

Ans.

1. Changes in temperature cause changes in rainfall. This results in more severe and frequent storms. They cause flooding and landslides.
2. Warmer temperatures over time are changing weather patterns and disrupting the usual balance of nature. This poses many risks to human beings and all other forms of life on Earth.
3. More frequent and severe weather. Higher temperatures are worsening many types of disasters, including storms, heat waves, floods, and droughts.
4. Higher death rates.
5. Dirtier air.
6. Higher wildlife extinction rates.
7. More acidic oceans.
8. Higher sea levels.

(Students can write any other three effects of global warming also)

- xiv. Nitric oxide (NO) and nitrogen dioxide (NO₂) cause air pollution. Enlist three effects of these oxides.

Ans.

1. Excess nitrogen in the atmosphere can produce pollutants such as ammonia and ozone, which can impair our ability to breathe, limit visibility and alter plant growth.
2. When excess nitrogen comes back to earth from the atmosphere, it can harm the health of forests, soils and waterways.
3. It pollutes groundwater, streams, and coastal oceans.

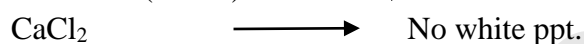
- xv. Hard water hampers cleansing action of soap. Identify the substances that causes hardness in water.

Ans. The calcium in hard water retards the cleaning action of soap. The home owner will use up to twice as much soap or detergents and use hotter water when cleaning with hard water than with soft water. Hard water also combines with soaps to form a curd known as "soap scum".

SECTION – C (Marks 20)

Note: Attempt any **TWO** questions. All questions carry equal marks. (2 × 10 = 20)

- Q.3** a. A student collected two samples A and B of hard water from different areas of Rawalpindi. Sample A on boiling gives white precipitate while sample B does not give white precipitate. Identify A and B by chemical reactions. (04)



$\text{Ca}(\text{HCO}_3)_2$ causes temporary hardness so on heating white ppt of CaCO_3 are formed.

Sample B contains CaCl_2 which causes permanent hardness, so it will not give white ppt on heating.

- b. H_3PO_4 donates three hydrogen ions. Reaction of KOH with H_3PO_4 gives three salts. KH_2PO_4 , K_2HPO_4 and K_3HPO_4 . Identify the nature of each salt and write reaction for the formation of each. (06)

Ans.



KH_2PO_4 , K_2HPO_4 have acidic nature while K_3PO_4 is neutral.

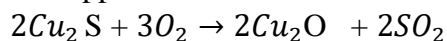
- Q.4** a. Propose the steps involved in the extraction of Copper metal by reactions. (05)

Ans.

By Bessemerization:

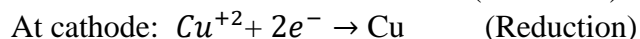
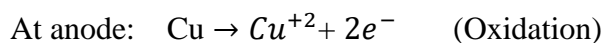
As the mineral has been freed of gangue the concentrated is passed through some chemical process to extract pure metal. In the extraction of copper metal by reduction the Bessemer converter is used. The concentrated cuprous sulphide is roasted in the presence of air and formed cuprous oxide. Cuprous oxide then reduces into copper metal. The copper obtained is called

blister copper because SO_2 produced during this reaction gets trapped inside its surface causing blisters to appear on the surface of copper metal.



By Electrolytic refining of copper:

On passing electric current through the acidified copper sulphate solution, impure copper dissolves forming Cu^{+2} ions. These ions gain electrons at cathode and form Cu atoms, which are deposited on the cathode. In this way pure copper is collected at cathode.



b. Write down five properties of organic compounds. (05)

Ans.

1. Mainly carbon, hydrogen is the main constituent of organic compound. Other elements like nitrogen, sulphur, oxygen and halogens are present in many organic compounds.
2. Organic compounds are soluble in organic solvents.
3. Organic compounds are generally covalent in nature.
4. Organic compounds are volatile. So, they have low melting and boiling points.

Q.5 a. Enlist the diseases caused by the deficiency of vitamin A and D. (04)

Ans. **“Deficiency diseases are diseases that are caused by the lack of certain essential nutrients, especially vitamins and minerals, in one’s diet over a prolonged period of time.”**

Vitamin A:

Vitamin A is a fat-soluble vitamin. Deficiency of vitamin A leads to night blindness and skin problems such as dryness, itching, and scaling.

Vitamin D:

Vitamin D deficiency causes rickets, which leads to the weakening of bones, especially near the joints. It can also lead to the decaying of teeth and osteomalacia.

b. Enlist the names of layers of atmosphere and explain two layers which are nearest to the Earth. (06)

Ans. The atmosphere is divided into four layers. And the nearest layers to the earth surface are troposphere and stratosphere.

- 1) Troposphere
- 2) Stratosphere
- 3) Mesosphere
- 4) Thermosphere

1) Troposphere:

The layer of the atmosphere closest to the Earth is the troposphere. It begins at the surface of the Earth and extends to about 12 km above the Earth’s surface. It is the layer of atmosphere in which we live. Weather occurs in this layer. The temperature of the troposphere decreases with height. On average, for every 1 km increase in altitude, the air gets about 6.5 °C cooler.

2) Stratosphere:

The second layer as one moves upward from the Earth’s Surface is called stratosphere. The layer extends from top of the troposphere to about 50 km above the Earth’s surface. This layer contains maximum amount of ozone and little amount of water vapour. Ozone saves us from harmful effects of incoming ultraviolet radiations from the sun. In the stratosphere, temperature varies from -55 C to -5 C.

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