WORKSHEET 1

CHAPTER 4 – CARBON AND ITS COMPOUNDS

A. Tick (✓) the correct option.

1. Which of the following gases is the major component of biogas?
   a. Methane b. Propane c. Butane d. Ethane
2. The organic compound pentane has how many isomers?
   a. 2 b. 3 c. 4 d. 5
3. The compounds containing –CHO functional group are known as
   a. Ketones b. Aldehydes c. Alcohols d. Carboxylic acids.
4. Which of the following fuels burns without a flame?
   a. LPG b. Kerosene oil c. Wood d. Coal
5. Heating ethanol at 443 K in the presence of concentrated sulphuric acid leads to the formation of which of the following organic compounds?
   a. Ethene b. Ethane c. Ethyne d. Ethanoic acid

B. Fill in the blanks.

1. The chemical formula of chloroform is _____
2. Most carbon compounds are _____ conductors of electricity.
3. The compounds of carbon which contain just carbon and hydrogen bonds are known as _____
4. The atomic masses of propanal and butanal differ by _____
5. A 5–8% solution of acetic acid in water is known as _____

C. State whether the following statements are true or false.

1. Ethylene exists as a liquid at room temperature.
2. Chlorine forms a diatomic molecule.
3. Saturated compounds are more reactive than unsaturated compounds.
4. *n*-Butane and iso-butane are isomers of each other.
5. The general formula of alkenes is C_nH_{2n+2}.

D. Match the following.

1. Graphite	Cyclic compound
2. Benzene	Strong oxidising agent
3. Alkaline $KMnO_4$	Non-metal but conducts electricity
4. Butter	Unsaturated fatty acids
5. Olive oil	Saturated fatty acids

Name: ..... Teacher's signature: .....

Class: ..... X ..... Date: .....

E. Answer the following questions.

Very Short Answer Questions

1. What is meant by a covalent bond? Give examples.
2. Name the properties of carbon because of which it forms a large number of compounds.

Short Answer Questions

1. An organic compound X with the chemical formula C_2H_6O on oxidation gave another compound Y with the chemical formula $C_2H_4O_2$. The compound X is used for sterilisation of skin by doctors, while compound Y is present in vinegar. Name both the compounds. Also give the equation involved in the formation of Y from X.
2. What are addition reactions and substitution reactions? Give one example of each.

Long Answer Questions

1. Define homologous series. Give any five characteristics of a homologous series.
2. List the differences between soaps and synthetic detergents.

ANSWERS

WORKSHEET 1

A. Tick (✓) the correct option.

1. a
2. b
3. c
4. d
5. a

B. Fill in the blanks.

1. $CHCl_3$
2. poor
3. hydrocarbons
4. 14 u
5. vinegar

C. State whether the following statements are true or false.

1. F
2. T
3. F
4. T
5. F

D. Match the following.

1. Graphite	Non-metal but conducts electricity
2. Benzene	Cyclic compound
3. Alkaline $KMnO_4$	Strong oxidising agent
4. Butter	Saturated fatty acids
5. Olive oil	Unsaturated fatty acids

E. Answer the following questions.

Very Short Answer Questions

1. The bond formed by sharing of electrons between atoms is known as covalent bond. For example, bonding in ammonia, fluorine molecule, methane, etc. is covalent in nature.
2. The properties of carbon because of which it forms a large number of compounds are tetravalency and catenation.

Short Answer Questions

1. We are given that compound Y is present in vinegar and its chemical formula is $C_2H_4O_2$. Therefore, the compound is ethanoic acid/acetic acid. Also, it is given that Y is formed by oxidation of X, which is used for sterilisation of skin by doctors. Thus, compound X is ethanol. The chemical equation involved in the conversion of ethanol to ethanoic acid is as follows

$$C_2H_5OH \xrightarrow[\text{Acidified } K_2Cr_2O_7 + \text{Heat}]{\text{Alkaline } KMnO_4 + \text{Heat}} CH_3COOH$$

2. Reactions which involve the addition of two reactants to form a single product are called addition reactions. For example, unsaturated hydrocarbons such as ethene, propene, etc. undergo addition reaction with hydrogen in the presence of nickel or palladium catalyst at 150–200°C to form saturated hydrocarbons.

   Substitution reactions are the reactions in which one type of atom or a group of atoms takes the place of another. Chlorination of methane in the presence of sunlight is an example of substitution reaction.

Long Answer Questions

1. A homologous series is a family or a group of organic compounds which possess the same functional group. The members of a homologous series show similar chemical properties and a gradation in physical properties. The characteristics of a homologous series are:
   a. The members of a homologous series are represented by the same general formula.
   b. Each successive homologue of a homologous series differs in the molecular formula by a $–CH_2$ group.
   c. The relative molecular mass of two immediate members differs by 14 u.
   d. Members of a homologous series show similar chemical properties.
   e. Members of a homologous series show a gradual variation in physical properties such as boiling point, melting point, solubility, etc.
2. The differences between soap and synthetic detergents are as follows:

Soap	Synthetic detergent
Soaps are sodium or potassium salts of long chain fatty acids containing 15-18 carbon atoms. The anionic group in soap is $—COO^-$	Detergents are sulphonate, sulphate or ammonium salts of long chain hydrocarbons containing 12-18 carbon atoms. The anionic group in synthetic detergents is $—OSO_3^-$ or $—SO_3^-$
Soaps are obtained from vegetable oils and animal fats.	Synthetic detergents are obtained from coal tar and petroleum.
Soaps are biodegradable.	Synthetic detergents are non-biodegradable.
Soaps do not form lather readily in hard water.	Synthetic detergents form lather readily in hard water.
Soaps exhibit weak cleansing action.	Synthetic detergents exhibit strong cleansing action.
Scums are separated during use.	No scum is separated during use.
Soaps cannot be used in hard water.	They can be used even in hard water.