



INDIAN SCHOOL AL WADI AL KABIR

Class: X	Department: SCIENCE 2020 – 21 SUBJECT : CHEMISTRY	Date of completion: 29-11-20
Worksheet No: 05 WITH ANSWERS	CHAPTER: CARBON AND ITS COMPOUNDS	Note: A4 FILE FORMAT
Name of the student:	Class & Sec:	Roll No:

OBJECTIVE TYPE QUESTIONS

MULTIPLE CHOICE QUESTIONS

- The property of self-combination of the atoms of the same element to form long chains is known as :-
(a) Protonation (b) carbonation (c) coronation (d) catenation
- A cyclic hydrocarbon having carbon-carbon single bonds as well as carbon-carbon double bonds in its molecule is:-
(a) C_6H_{12} (b) C_6H_{14} (c) C_6H_6 (d) C_6H_{10}
- The pair of elements which exhibits the property of catenation is:-
(a) Sodium and silicon (b) chlorine and carbon (c) carbon and sodium
(d) Silicon and carbon
- Which of the following cannot exhibit isomerism?
(a) C_4H_{10} (b) C_5H_{12} (c) C_3H_8 (d) C_6H_{14}
- The number of carbon atoms present in the molecule of fifth member of the homologous series of alkynes is:-
(a) 4 (b) 5 (c) 6 (d) 7

ASSERTION-REASONING QUESTIONS

For the following questions, two statements are given-one labelled Assertion (A) and the other labelled Reason(R). Select the correct answer to these questions from the options

(i) , (ii), (iii) and (iv) as given below:

(i) Both A and R are true and R is the correct explanation of the Assertion.

(ii) Both A and R are true but R is not the correct explanation of the Assertion.

(iii) A is true but R is false.

(iv) A is false but R is true.

6. Assertion:- Carbon shows maximum catenation property in the periodic table.
Reason:- Carbon has small size and thus forms strong c-c bonds.
7. Assertion:- Most of the carbon compounds are good conductors of electricity.
Reason:- They do not dissociate to form ions and remain as molecules.
8. Assertion:- C_3H_8 and C_4H_{10} are the successive members of alkane homologous series.
Reason:-Successive members in a homologous series differ by CH_3 unit.

ONE MARK QUESTIONS

9. Carbon has four electrons in its valence shell. How does carbon attain stable electronic configuration?
10. State two characteristic features of carbon which give rise to large number of carbon compounds.
11. Write the name and formula of second member of the series of carbon compounds whose general formula is C_nH_{2n} .
12. Write the name and molecular formula of the fourth member of alkane series.
13. Write the molecular formula of an alkyne containing 10 atoms of hydrogen.

THREE MARK QUESTIONS

14. (i) What would be the electron dot structure of carbon dioxide which has the formula CO_2 ?
(ii) What would be the electron dot structure of a molecule of sulphur which is made up of eight atoms of sulphur?(Hint:-The eight atoms of sulphur are joined together in the form of a ring)
15. Explain the nature of the covalent bond using the bond formation in CH_3Cl .
16. Select saturated hydrocarbons from the following:-
 C_3H_6 , C_5H_{10} , C_4H_{10} , C_6H_{14} , C_2H_4

FIVE MARK QUESTIONS

17. Explain why carbon generally forms compounds by covalent bonds.
18. (i) Select alkene and alkyne from the following:-
 C_6H_{12} , C_3H_4 , C_2H_4 , CH_4 , C_4H_8 , C_5H_8
(ii) Atom of an element contains five electrons in its valence shell. This element is major component of air. It exists as a diatomic molecule.
(a) Identify the element.
(b) Show the bond formed between two atoms of this element.
(c) Write the nature of the bond between the two atoms.
19. (i)What are isomers? Draw the structures of two isomers of butane, C_4H_{10}
(ii) Differentiate between alkenes and alkynes.
20. C_3H_6 , C_4H_8 and C_5H_{10} belong to the same homologous series.
(i) Why the melting and boiling points of C_5H_{10} is higher than C_4H_8 ?
(ii) Arrange these hydrocarbons in order of increasing boiling points.

PREVIUOS YEAR BOARD QUESTIONS

21. Give reason why carbon neither forms C^{4+} cations nor C^{4-} anions, but forms covalent compounds which are bad conductors of electricity and have low melting and boiling points.
22. What are covalent compounds? Why are they different from ionic compounds? List their three characteristic properties.
23. Define the term structural isomerism. Explain why propane cannot exhibit this property.
24. Define homologous series of organic compounds. List its two characteristics. Write the name and formula of the first member of the series of alkenes.
25. Write the general formula of (i) alkenes and (ii) alkynes. Draw the structure of first member of each series to show the bonding between the two carbon atoms.

EXEMPLAR QUESTIONS

26. (a) What are hydrocarbons? Give examples.
(b) Give the structural differences between saturated and unsaturated hydrocarbons with two examples each.
27. Write the structural formulae of all the isomers of hexane.

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ANSWERS

OBJECTIVE TYPE QUESTIONS

MULTIPLE CHOICE QUESTIONS

Qn.No.	Answers
1	(d) catenation
2	(c) C ₆ H ₆
3	(d) silicon and carbon
4	(c) C ₃ H ₈
5	(c) 6

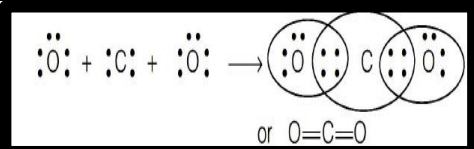
ASSERTION-REASONING QUESTIONS

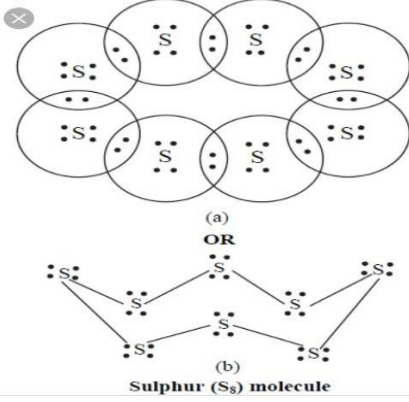
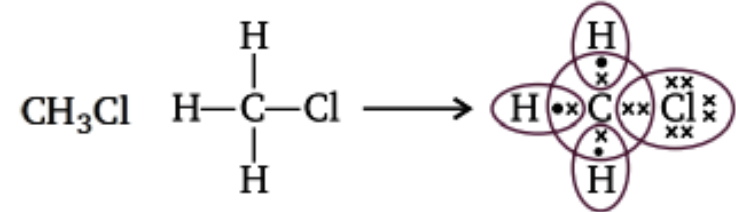
6	(i)Both A and R are true and R is the correct explanation of the Assertion.
7	(iv)A is false but R is true.
8	(iii)A is true but R is false

ONE MARK QUESTIONS

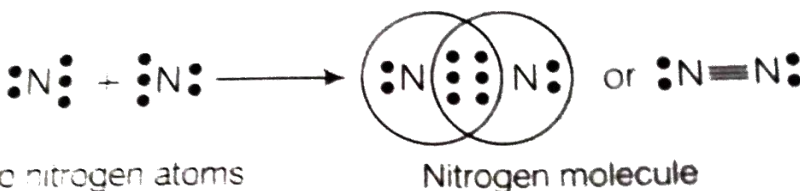
9	By sharing four electrons with other atoms.
10	Catenation and tetravalency.
11	Propene.
12	Butane, C ₄ H ₁₀ .
13	C ₆ H ₁₀

THREE MARK QUESTIONS

14	<p>(i) </p>
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	 <p>(ii) Sulphur (S₈) molecule</p>
15	<p>Carbon has four valence electrons. It shares one electron with chlorine and one electron each with three hydrogen atoms.</p> 
16	C ₆ H ₁₄ and C ₄ H ₁₀ are saturated hydrocarbons.

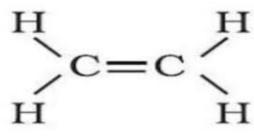
FIVE MARK QUESTIONS

17	<p>Carbon cannot lose four electrons easily because very high energy is required. It cannot gain four electrons easily because 6 protons cannot hold 10 electrons. Carbon can easily share four electrons forming covalent bonds.</p>
18	<p>(i) Alkenes:- C₆H₁₂, C₂H₄, C₄H₈</p> <p>Alkynes:- C₃H₄, C₅H₈</p> <p>(ii) (a) Nitrogen.</p>  <p>(b) Two nitrogen atoms</p> <p>(c) Covalent bond.</p>
19	<p>(i) Isomers are those compounds which have same molecular formula but different structural formulae.</p> <p>Structures of two isomers of butane are:-</p>

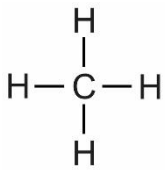
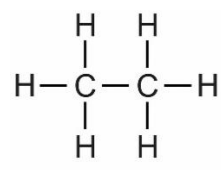
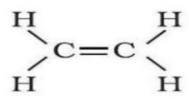
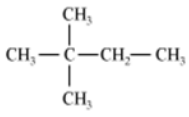
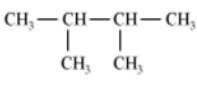
	<p style="text-align: center;">Butane</p> <pre> H H H H H - C - C - C - C - H H H H H </pre> <p style="text-align: center;">Isobutane</p> <pre> H H H H - C - C - C - H H H H - C - H H </pre> <p>(ii) Alkenes are unsaturated hydrocarbons with carbon-carbon double bonds. The general formula is C_nH_{2n} Alkynes are unsaturated hydrocarbons with carbon-carbon triple bonds. The general formula is C_nH_{2n-2}.</p>
20	<p>(i) It is because C_5H_{10} has higher molecular weight, more force of attraction and higher boiling points and melting points. (ii) $C_3H_6 < C_4H_8 < C_5H_{10}$</p>

PREVIUOS YEAR BOARD QUESTIONS

21	<p>Carbon cannot lose 4 electrons to form C^{4+} ions as very high energy is required to remove 4 electrons. Carbon cannot gain four electrons to form C^{4-} ions as 6 protons cannot hold 10 electrons. Carbon can share 4 electrons to form covalent compounds. Carbon compounds do not conduct electricity as they do not form ions. They have low melting and boiling points due to weak force of attraction between molecules.</p>
22	<p>Those compounds which are formed by sharing of electrons are called covalent compounds. They differ from ionic compounds because they do not have ions. Ionic compounds are formed by the transfer of electrons. Properties of covalent compounds:-</p> <ol style="list-style-type: none"> 1. They have low melting and boiling points. 2. They do not conduct electricity in molten state or in aqueous solution. 3. They are mostly insoluble in water but soluble in organic solvents.
23	<p>The phenomenon in which compounds have same molecular formula but different structures is called structural isomerism. Lower alkanes (First three members) till propane do not show isomerism. They cannot have branched chain structure to exhibit isomerism.</p>
24	<p>The series of organic compounds having similar chemical properties and similar structure is called homologous series. Each member differs from successive member by $-CH_2$ group. The difference in molecular mass between two successive members is 14u.</p> <p>(i) It has same general formula, from which all members can be derived.</p>

	(ii) They have similar chemical properties. Ethene, (C ₂ H ₄), CH ₂ =CH ₂ is the first member of alkene series.
25	(i) Alkenes-C _n H _{2n} and (ii) Alkynes-C _n H _{2n-2} First member of alkene is ethene (C ₂ H ₄) and alkyne is ethyne (C ₂ H ₂) <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p><i>Ethene</i></p> </div> <div style="text-align: center;"> <p>Ethyne C₂H₂</p> <p>H-C≡C-H</p> </div> </div>

EXEMPLAR QUESTIONS

26	<p>(a) Hydrocarbons are the compounds made up of carbon and hydrogen atoms only. Eg:- methane, ethane, ethene etc.</p> <p>(b) Saturated hydrocarbons contain single covalent bonds only. Eg:- methane and ethane are saturated hydrocarbons.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>METHANE</p> </div> <div style="text-align: center;">  <p>ETHANE</p> </div> </div> <p>Unsaturated hydrocarbons contain double or triple covalent bonds. Eg:- ethene and ethyne</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p><i>Ethene</i></p> </div> <div style="text-align: center;"> <p>Ethyne C₂H₂</p> <p>H-C≡C-H</p> </div> </div>
27	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>CH₃-CH₂-CH₂-CH₂-CH₂-CH₃</p> <p>Hexane</p> <p>1</p> </div> <div style="text-align: center;"> <p>CH₃-CH(CH₃)-CH₂-CH₂-CH₃</p> <p>2 - methyl pentane</p> <p>2</p> </div> <div style="text-align: center;"> <p>CH₃-CH₂-CH(CH₃)-CH₂-CH₃</p> <p>3 - methyl pentane</p> <p>3</p> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">  <p>2,2 - Dimethyl butane</p> <p>4</p> </div> <div style="text-align: center;">  <p>2,3 - Dimethyl butane</p> <p>5</p> </div> </div>

Prepared by : Ms. Asha John

Checked by : HOD - SCIENCE