

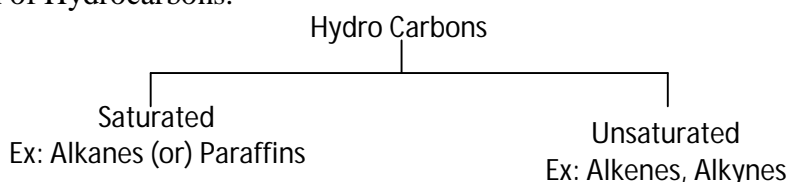
**VISWABHARATI – GUDIVADA
WORK SHEET - 2**

CLASS: X

SUB: CHEMISTRY

CARBON AND ITS COMPOUNDS

- Assertion: Father of Organic Chemistry is F Wohler
Reason: He prepared first organic compound Urea in the laboratory by heating an inorganic salt ammonium Cyanate.
A) both A&R are true and 'R' is the correct explanation of 'a'
B) both A&R are true but 'R' is the correct explanation of 'A'
C) 'A' is correct 'R' is incorrect D) 'a' is incorrect, 'R' is correct
- Versatile nature of Carbon is / are []
A) Tetravalency B) Catenation C) Hybridisation D) both A & B
- Self linking property of carbon is called _____ []
- Hydrocarbons :
Hydro carbons are the compounds of carbon and hydrogen.
- Classification of Hydrocarbons:

**Answer the following:**

- The hydrocarbons containing only c – c single bonds are known as _____
- The hydrocarbons that contain at least one double bond (c = c) or one triple bond (c ≡ c) are known as _____
- Assertion: Alkanes are also called as paraffins
Reason: Alkanes are having little affinity towards the chemical change. []
A) both A&R are true and 'R' is the correct explanation of 'a'
B) both A&R are true but 'R' is the correct explanation of 'A'
C) 'A' is correct 'R' is incorrect D) 'a' is incorrect, 'R' is correct

6.

Hydrogen Carbon	General formula
Alkane	
Alkene	
Alkyne	

- The series of Carbon compounds in which two successive compounds differ by one – CH₂ unit is called Homologous series of organic compounds.
Identify the correct characteristic feature of Homologous series of organic compounds.
A) They have one general formula
B) They differ by one –Cu₂ unit
C) They possess similar chemical properties due to the same functional group.
D) They show a regular gradation in their physical properties.

8. Homologous series of Alkanes

No. of Carbons	Alkane	Alkene	Alkyne
C ₁			
C ₂			
C ₃			
C ₄			
C ₅			

9.

S.No	Hydro Carbon	No. of Carbons	General Formula	MF
1		6	C _n H _{2n+2}	
2	Heptene			
3	Decyne			
4		8	C _n H _{2n}	

- Isomerism** : The phenomenon of a Carbon compounds possessing same molecular formula but different properties and structures. (ISO – same : meros = part)

i) Identify the isomers among the following

- A) CH₃ – CH₂ – CH₂ – CH₃ B) CH₃ – CH₂ – CH₃
- C) CH₃ – $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH} \end{array}$ – CH₃ D) CH₃ – $\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH} \end{array}$ – CH₂ – CH₃

- ii) Write the isomers of C_4H_{10} _____, _____, _____
 iii) Write the isomers of C_5H_{12} _____, _____, _____
 iv) Number of isomers of C_6H_{14} _____

11. (i) IUPAC = International Union of Pure and Applied Chemistry.

Root length	C ₁	C ₂	C ₃	C ₄	C ₅	C ₆	C ₇	C ₈	C ₉	C ₁₀
Word root										

(ii) Assertion : - CH_3 , $-C_2H_5$ are considered as alkyl groups

Reason: An alkyl groups obtained from an alkenes by removal of hydrogen. []

A) both A&R are correct and R is the correct explanation of 'A'

B) both A&R are correct and R is the not correct explanation of 'A'

C) 'A' is correct 'R' is incorrect

D) 'A' is incorrect 'R' is correct

12. (i)

Parent alkane	Formulae	Alkyl group	Name
Methane			
Ethane			
Propane			
Butane			
pentane			

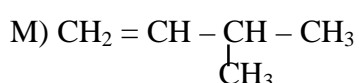
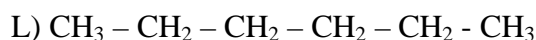
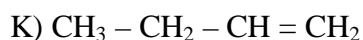
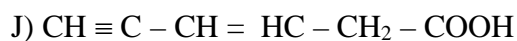
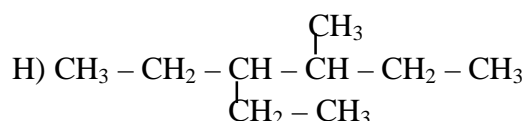
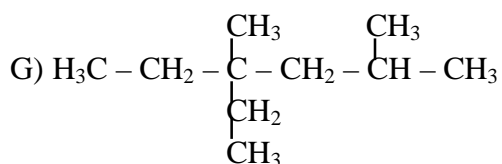
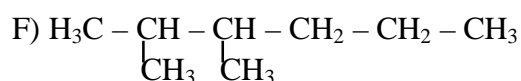
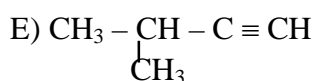
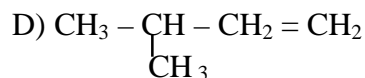
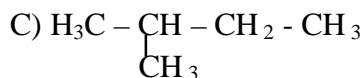
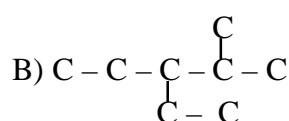
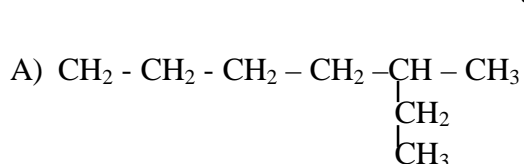
(ii) Primary Suffix :

Class of compounds	1 ^o suffix	General name
C - C		
		Alkane
	- Yne	

(iii) 2^o Suffix:

Sno	Functional group	Structural formula	Simplest structure	Suffix
1	Alcohol	R - OH	$C_2H_5 - OH$	
2	Ether		$CH_3 - O - CH_3$	Alkanes
3	Aldehyde		$CH_3 - CHO$	
4	Ketone		$CH_3 - \overset{O}{\parallel} C - CH_3$	
5		R - COOH	$CH_3 - \overset{O}{\parallel} C - OH$	
6	Ester			
7	Amines			

13. Write the IUPAC names of the following:



14. Write the structures of the following IUPAC names:

- A) 2,2-Dimethyl hexane B) But – 1 – yne C) 3 – Methyl pent – 2 – ene
D) But -1, 2 – diene E) Hept – 2 – en – 4 – yne

15. (i) Combustion Reaction:



(ii) Name the product other than water formed on burning of ethanol in air _____

16. i) Oxidation of alcohols gives _____

ii) How ethanoic acid is obtained from ethanol.

iii) An organic compound 'x' with molecular formula $\text{C}_2\text{H}_6\text{O}$ undergoes oxidation with alkaline KMnO_4 and forms the compound 'Y', that has molecular formula $\text{C}_2\text{H}_4\text{O}_2$

a) Identify 'x' and 'y'

b) What will happen if 'x' is made to react with 'y'

17. i) P : Unsaturated organic compounds undergo addition reactions []

Q : Saturated organic compounds undergo substitution reactions

- A) both P&Q are correct B) P is correct R is incorrect
C) P is incorrect Q is correct D) Both P & Q

ii) Two carbon compounds C_3H_8 & C_3H_6 undergo _____ & _____ reactions

iii) Name the catalyst which is used in Hydrogenation of oils?

iv) What is hydrogenation of oils _____

v) What will happen if Methane react with Cl_2 in the presence of sunlight.

_____, _____, _____, _____

18. i) How ethanol or ethyl alcohol is formed

ii) What happens when a small piece of Sodium is dropped into ethanol _____

iii) Name the compound formed by heating ethanol with excess of cone H_2SO_4

iv) 10% ethanol in gasoline is called? (v) 100% of ethanol is called?

19. An organic compound with molecular formula $\text{C}_2\text{H}_4\text{O}_2$ produces brisk effervescence on addition of Sodium Carbonate or bicarbonate. Answer the following:

- A) Identify the compound B) Write the chemical equation for the above reaction.
C) Name the gas evolved D) How will you feel the gas evolved?
E) Two important uses of the above compound?

20. 5 to 10% of Acetic acid is called _____

21. What is esterification reaction _____

22. The general formula of soap is []

- A) RCOONa B) RCOOK C) RCOOH D) Both A & B

23. Match the following:

- A) palmitic acid [] i) $\text{C}_{17}\text{H}_{35}\text{COOH}$
B) stearic acid [] ii) $\text{C}_{15}\text{H}_{31}\text{COOH}$
C) Oleic acid [] iii) $\text{C}_{17}\text{H}_{33}\text{COOH}$

24. A spherical aggregate of soap molecules in water is called micelle

Match the following:

- A) Hydrophobic end (or) Non polar end [] Directed out wards into water
B) Hydrophilic (or) polar end [] Directed inwards into the greasy matter

25. Draw the general structure of soap molecule

26. Draw the neat sketch of Micelle. Define True solution.

27. Allotropy: Occurrence of same element in two (or) more different forms []

P: All allotropes have similar chemical properties

Q: All allotropes have similar physical properties

A) P true Q false B) both P,Q true C) P false Q true D) both P,Q false

28. Matching:

- | | | |
|---------------------|-----------|--|
| 1) Ethanol | [] | A) CH_3COONa |
| 2) Ethanoic acid | [] | B) $\text{C}_2\text{H}_5\text{ONa}$ |
| 3) Sodium acetate | [] | C) $\text{CH}_3\text{CH}_2\text{OH}$ |
| 4) Sodium Ethoxide | [] | D) $\text{C}_{17}\text{H}_{35}\text{COONa}$ |
| 5) Sodium Sterate | [] | E) CH_3COOH |
| 6) Urea | [] | F) $\text{CH}_2\text{OH} - \text{CHOH} - \text{CH}_2\text{OH}$ |
| 7) Ammonium cyanate | [] | G) NH_2CONH_2 |
| 8) Glycerol | [] | H) NH_4CNO |

29. Diamond, Graphite, Gas carbon, lamp black, C_6O , Non Tubes, Sugar Charcoal, Animal Charcoal, Grapheme

Crystalline form : _____

Amorphous form : _____

30. Write the reaction of CH_3COOH with

(a) Na : _____

(b) Na_2CO_3 : _____

(c) NaOH : _____

(d) NaHCO_3 : _____

31. Medicinal use of C_{60} _____

32. Why diamond is hard _____

33. Why graphite conduct electricity _____

34. Why cooking vessels get black end on a gas stove _____

35. (i) aromatic compounds burn with _____ flame.

(ii) saturated hydro carbon burn with _____ flame.

(iii) Unsaturated hydrocarbon burn with _____ flame.

36. Functional Group Name

a) R – OH _____

b) R – COOH _____

c) R – CHO _____

d) R – NH_2 _____

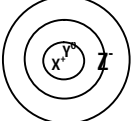
e) R – O – R _____

f) $\text{R} - \overset{\text{O}}{\parallel}{\text{C}} - \text{R}^1$ _____

g) $\text{R} - \overset{\text{O}}{\parallel}{\text{C}} - \text{O} - \text{R}$ _____

STRUCTURE OF ATOM

1. What are the sub atomic particles:

2.  What is X⁺ _____
 What is Y⁰ _____
 What is Z _____

3. Velocity of the light is _____

4. What are the characteristics of the Electromagnetic wave?

5. What is Electromagnetic spectrum?

6. The range of wave lengths covering red colour to violet colour is called _____

7. _____ light is sensitive to the human eye? []

- A) x-ray B) γ -ray C) IR D) visible

8. **Assertion:** The range of wavelengths covering red colour light to violet colour is called the visible spectrum

Reason: The range of visible light is 700 to 400nm

- A) Both A&R are correct and R is the correct explanation of A
 B) Both A&R are correct and R is the incorrect explanation of A
 C) 'A' is correct and 'R' is incorrect
 D) 'A' is incorrect and 'R' is correct

9. Match the following

i) **Electromagnetic spectrum**

- A) Radio waves [] i) High λ , Low E
 B) Cosmic rays [] ii) High E, Low λ

ii) **Visible spectrum**

- A) Red light [] i) Low λ , High E
 B) Violet light [] ii) Low E, High λ

10. **Assertion (A)** : If you heat an iron rod it emits red colour light

Reason (R) : Because red colour has high λ and low energy

- A) Both A&R are correct and R is the correct explanation of A
 B) Both A&R are correct and R is the incorrect explanation of A
 C) 'A' is correct and 'R' is incorrect
 D) 'A' is incorrect and 'R' is correct

11. Fill the following table

Parametre	Units
Wave length	
frequency	

12. What is the value of Plank's constant? []

- A) 6.625×10^{-27} J.Sec B) 6.625×10^{-27} erg.sec C) 6.625×10^{-34} J.sec D) both B & C

13. P: Absorption Spectrum: Dark lines on bright background

Q: Emission Spectrum : Bright lines on Dark background

- A) 'P' is true 'Q' is false B) P&Q are false
 C) 'P' & 'Q' both are true D) 'P' is false 'Q' is true

14. Match the following:

Chemical

Flame colour

- A) CuCl₂ [] i) yellow colour
 B) SrCl₂ [] ii) green colour
 C) Sodium vapours [] iii) crimson red colour

15. The lowest and highest energy state of the e⁻ is called?

16. Among K, L, M, N shells, which one is highest energetic shell or highest energetic stationary orbit?

17. How energy of orbit is changed when distance from nucleus increases?

18. Match the following:

- A) Bohr [] i) Elliptical orbits
 B) Somerfeld [] ii) Splitting of spectral lines in the presence of **Magnetic field**
 C) Stark effect [] iii) circular orbits
 D) Zeeman effect [] iv) splitting of spectral lines in the presence of **Electric field.**

19. How many elliptical orbits are added to Bohr's 4th orbit?

20. According to Max Planck, the energy is always emitted in multiple of _____

21. Match the following

- | | | |
|---------------------|---------|-----------------------|
| 1) Gamma rays | [] | A) 10^{-9} m (1 nm) |
| 2) Radio waves | [] | B) longer λ |
| 3) x-rays | [] | C) 400 – 700 nm |
| 4) visible spectrum | [] | D) shorter λ |

22. Just like finger prints are used to identify people, _____ spectrum can be used to identify unknown atoms.

23. Atomic spectra is also called _____

24. Molecule spectra is also called _____

25. The wave length of a radio wave is 1.0 m. find its frequency?

Electronic Configuration

1. The filling of electrons into the orbitals of different atoms takes place according to the _____, _____, _____ principles.

2. No two electrons of the same atom can have all 4 quantum numbers the same. This statement emerges from _____ []

- A) Aufbau B) Pauli's C) Hund's D) all of these

3. An orbital can hold only two electrons and they must have opposite spins. This statement emerges from

- A) Aufbau B) Pauli's C) Hund's D) all of these []

4. The German word "Aufbau" means _____

5. A new electron enters the orbital when _____ []

- A) $(n+l)$ is minimum B) $(n+l)$ is maximum C) $(n+m)$ is minimum D) $(n+m)$ is maximum

6. Electrons assigned to orbitals in order of increasing value of _____ .

7. According to Aufbau principle, the correct order of 3d, 4s and 4p – orbitals is _____ []

- A) $4p < 3d < 4s$ B) $4s < 4p < 3d$ C) $4s < 3d < 4p$ D) $3d < 4s < 4p$

8. Which of the following may represent the ground state of Nitrogen atom? []

- A) $\uparrow\downarrow$ $\uparrow\downarrow$ $\uparrow\uparrow\uparrow$ B) $\uparrow\downarrow$ $\uparrow\downarrow$ $\uparrow\downarrow\uparrow$

- C) $\uparrow\downarrow$ $\uparrow\downarrow$ $\uparrow\uparrow\uparrow$ D) $\uparrow\uparrow$ $\uparrow\uparrow$ $\uparrow\uparrow\uparrow$

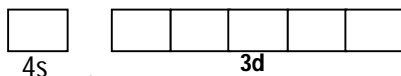
9. If the electronic configuration of oxygen atom is written as $1s^2, \uparrow\downarrow \uparrow\downarrow \square$; it would violate which principle? _____

10. The orbital diagram in which "aufbau principle" is violated, is _____ []

- A) $\overset{2s}{\uparrow\downarrow}$ $\overset{2p}{\uparrow\downarrow\uparrow}$ B) $\overset{2s}{\uparrow}$ $\overset{2p}{\uparrow\downarrow\uparrow\uparrow}$ C) $\overset{2s}{\uparrow\downarrow}$ $\overset{2p}{\uparrow\uparrow\uparrow}$ D) $\overset{2s}{\uparrow\downarrow}$ $\overset{2p}{\uparrow\downarrow\uparrow\uparrow}$

11. If the electronic configuration of Oxygen had $1s^8$, it would have energy lower than that of the normal ground state configuration $1s^2 2s^2 2p^4$ because the electrons would be closer to the nucleus. Yet $1s^8$ is not observed because it violates?

12. "X" has valence electronic configuration $4s^2 3d^5$ distribute the valence electrons in the given below orbitals based on Hund's rule.



13. For Carbon atom ($z = 6$), where does the 6th electron go? _____

14. Orbitals having same energy are called _____

15. After filling the 3d orbital, the electron enters into _____ orbital.

16. The correct ground state electronic configuration of chromium atom is _____

17. P: Electronic configuration of Sodium is $1s^2 2s^2 2p^6 3s^1$

Q: Electronic configuration of Sodium is (Ne) $3s^1$

- A) 'P' is false, 'Q' is True B) 'P' is true, 'Q' is false

- C) P,Q both are true D) both P,Q are false

18. R: According to Pauli's exclusion principle no two electrons of the same atom can have all 4 quantum numbers the same.

S: According to Pauli's an orbital can hold only two electrons and they must have opposite spins.

- A) 'R' is true, 'S' is false B) 'R' is false, 'S' is true

- C) both P&Q are true D) both P&Q are false

19. P: Electronic configuration of "Cr" is $[\text{Ar}]4s^1 3d^5$

Q: Electronic configuration of "Cu" is $[\text{Ar}]4s^1 3d^{10}$

- A) P,O,S true B) both P,Q are true C) both p,q are false D) P is false, Q is true

20. Match the following:

Sub Shell		No. of degenerated orbitals
1) s	[]	A) 5
2) p	[]	B) 7
3) d	[]	C) 1
4) f	[]	D) 3

21. Match the following:

Orbital		shape
1) s	[]	A) dumbbell
2) p	[]	B) spherical
3) d	[]	C) double dumbbell

22. Match the following:

Element		Electronic Configuration
1) Chromium	[]	A) [Ar] $4s^1 3d^{10}$
2) Nickel	[]	B) [Ar] $4s^1 3d^5$
3) Copper	[]	C) [Ar] $4s^2 3d^5$
4) Manganese	[]	D) [Ar] $4s^2 3d^5$
5) Iron	[]	E) [Ar] $4s^2 3d^6$

Quantum Numbers

1. Fill the following table:

Quantum number	Principal	Azimuthal / Angular momentum	Magnetic	Spin
Proposed by				
Denoted by				
Indicates				
Values				
Max & Minimum values				

2. Match the following:

		Maximum no. of electrons
1) Shell	[]	A) $2(2l+1)$
2) Sub shell	[]	B) $2n^2$
3) Orbital	[]	C) 2

3. Match the following:

Shell		Maximum no. of electrons
1) K-shell	[]	A) 8
2) L – shell	[]	B) 18
3) M – shell	[]	C) 32
4) N – shell	[]	D) 2

4. Match the following:

Sub shell		Maximum no. of electrons
1) s-orbital	[]	A) 14
2) p-orbital	[]	B) 10
3) d-orbital	[]	C) 6
4) f-orbital	[]	D) 2

5. If principle shell number is “n” then match the following:

1) number of subshells	[]	A) $2n^2$
2) number of orbitals	[]	B) n
3) number of electrons	[]	C) n^2

6. What is the relation between principal quantum number (n) and Azimuthal Quantum number (l)

A) $l = 1$ to n	B) $l = 0$ to (n-1)	C) $l = 0$ to (n+1)	D) all the above	[]
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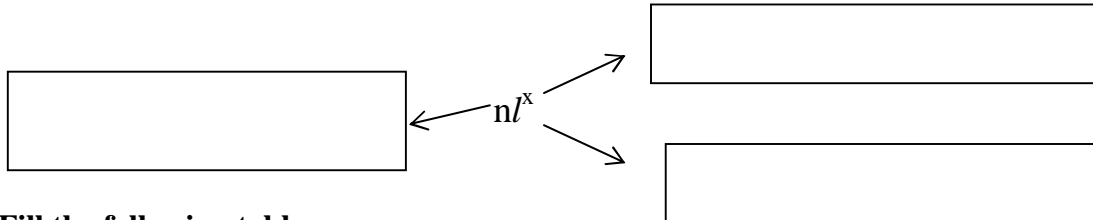
7. What is the relation between Azimuthal quantum number (l) and Magnetic quantum number $m(l)$
 A) $m_l = -l$ to $+l$ including zero B) $m_l = -l$ to $+l$ without zero
 C) $m_l = 0$ to $(n-1)$ D) none of these
8. What are upper & lower limits of “ m ” for $l = 4$? _____

Subshell	No. of orbitals	Maximum no. of electrons
$s(l = 0)$		
$p(l = 1)$		
$d(l = 2)$		
$f(l = 3)$		

9. Fill the following table:

n	l	m_l	Sub-shell notation	No. of orbitals	Maximum no. of electrons
1					
2					
3					
4					

- 10.



11. Fill the following table:

Orbital	n	l	m_l	m_s
$1s^1$				
$2p^1$				
$3d^1$				
$4f^1$				

12. Quantum numbers set of a valence electron in a neutral atom is $n = 3, l = 0, m_l = 0, m_s = +\frac{1}{2}$.

Write the name of the element? _____

13. The impossible set of quantum numbers is []

A) $n=2, l=0, m_l=0, m_s=+\frac{1}{2}$ B) $n=2, l=1, m_l=0, m_s=-\frac{1}{2}$
 C) $n=2, l=0, m_l=1, m_s=-\frac{1}{2}$ D) $n=3, l=1, m_l=-1, m_s=-\frac{1}{2}$

14. Which of the following set of quantum numbers are not possible? []

A) $n=2, l=0, m_l=-1, m_s=-\frac{1}{2}$ B) $n=3, l=2, m_l=+2, m_s=+\frac{1}{2}$
 C) $n=2, l=0, m_l=0, m_s=+\frac{1}{2}$ D) $n=3, l=2, m_l=-2, m_s=+\frac{1}{2}$

15. Write the 4 quantum numbers for the differentiating electron of

Element	n	l	m_l	m_s
Sodium				
Potassium				
Aluminium				
magnesium				