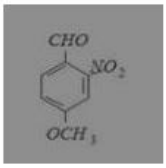
	INDIAN SCHOOL AL WADI AL KABIR	
Class XI	**Department of Science 2020-2021** **SUBJECT : CHEMISTRY**	**Date of Submission: iii week of Feb.**
Work sheet No.:12 with answers	**Chapter: ORGANIC CHEMISTRY -SOME BASIC PRINCIPLES TECHNIQUES**	**Note: A4 File format**
Name of the student:	**Class & Section:**	**Roll No.**

Objective type Questions (1 mark)

1. The kind of delocalization involving sigma bond in conjugation with pi electrons are called:
   a. Inductive effect b. Hyperconjugation effect
   c. Electrometric effect d. Mesomeric effect
2. Which of the following can act as an electrophile?
   a. CN^- b. OH^- c. H_2O d. BF_3
3. The type of isomerism not found in alkenes is:
   a. Chain isomerism b. Geometrical isomerism c. Metamerism d. Position isomerism
4. The correct decreasing order of priority for the functional groups of organic compounds in the IUPAC system of nomenclature is:
   a. $-COOH, -SO_3H, -CONH_2, -CHO$
   b. $-SO_3H, -COOH, -CONH_2, -CHO$
   c. $-CHO, -COOH, -SO_3H, -CONH_2$
   d. $-CONH_2, -CHO, -SO_3H, -COOH$
5. The displacement of electrons in a multiple bond in the presence of attacking reagent is called
   (a) Inductive effect
   (b) Electromeric effect
   (c) Resonance
   (d) Hyper conjugation.
6. Which of the following cannot be represented by resonance structures?
   (a) Dimethyl ether
   (b) Nitrate anion
   (c) Carboxylate anion
   (d) Toluene

7. What is the correct IUPAC name of



(a) 4-methoxy-2-nitrobenzaldehyde
(b) 4-formyl-3-nitro anisole
(c) 4-methoxy-6-nitrobenzaldehyde
(d) 2-formyl-5-methoxy nitrobenzene

Assertion- Reasoning Questions

(A) Both assertion and reason are correct statements, and reason is the correct explanation of the assertion.
(B) Both assertion and reason are correct statements, but reason is not the correct explanation of the assertion.
(C) Assertion is correct, but reason is wrong statement.
(D) Assertion is wrong, but reason is correct statement.
(E) Both Assertion and reason are wrong statements

8**. Assertion (A):** But-1-ene and 2-Methylprop-1-ene are position isomers.
Reason (R): Position isomers have same molecular formula but different arrangement of carbon atoms.

9.**Assertion:** Tertiary carbocations are generally formed more easily than primary carbocations.
Reason: Hyperconjugation as well as inductive effect due to additional alkyl groups stabilize tertiary carbocations.

10**. Assertion**: Carbocations are planar in nature.
Reason: Carbocations are sp^2 Hybridised.

11. **Assertion:** IUPAC name of compound CH3CH=CH–CHO is But-2-enal.
Reason: Functional group gets preference over multiple in IUPAC name of a compound.

Two marks Questions

12. Draw the structural formulae of the following compounds:
(i) Ethoxy propane
(ii) 3,4,4,5 -Tetramethyl heptane
(iii) sec-butyl alcohol
(iv) But-2-enoic acid

13. Write bond-line formulas for: (a) Isopropyl alcohol
(b) 2,3-Dimethylbutanal
(c) Heptan-4-one.

14. What is metamerism? Give example.

15. How are free radicals formed?

16. Give two examples each of the groups exerting –I and + I effect when attached to a chain

of carbon atoms

17. A tertiary butyl carbocation is more stable than isobutyl carbocation. Justify.
18. What do you understand by +R and –R effect?

Three marks Questions

19. Write resonance structures of CH_2=CH–CHO. Indicate relative stability of the contributing structures.
20. Inductive effect is of permanent nature while electromeric effect is only temporary. Explain.
21. Giving justification, categorise the following molecules or ions as nucleophile or electrophile:

HS^-, BF_3, $C_2H_5O^-$, $(CH_3)_3N$:, Cl^-, $CH_3C^+ = O$

22. Using curved – arrow notation, show the formation of reactive intermediates when the following covalent bond undergo heterolysis cleavage.

(a) $CH_3 – SCH_3$, (b) $CH_3 – CN$, (c) $CH_3 – Cu$

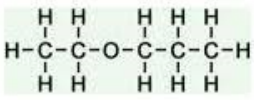
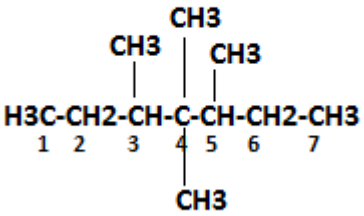
23. What are electrophiles and nucleophiles? Explain with two examples each.
24. Write the structural formula of
    (i) 2,3-dimethylbutane
    (ii) 2-methylpentane
    (iii) 2,2,4-trimethylpentane
25. Find the error and write the correct IUPAC names of
    (i) 1,6-Hexadiene
    (ii) 2-Ethyl-2-pentene

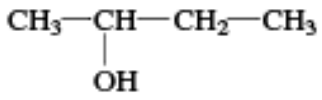
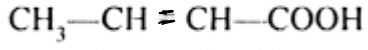
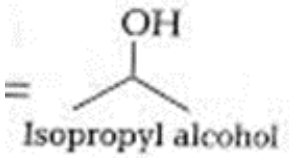
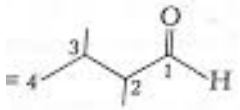
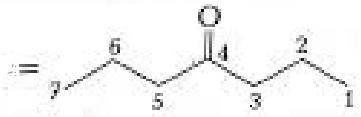
Five marks Questions

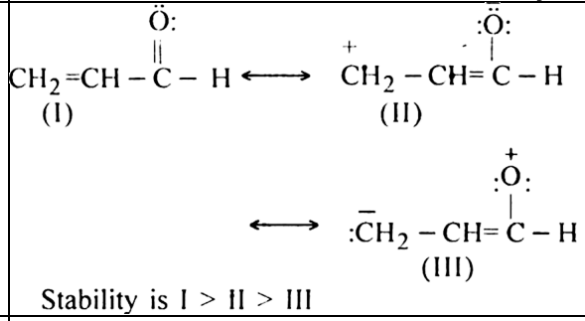
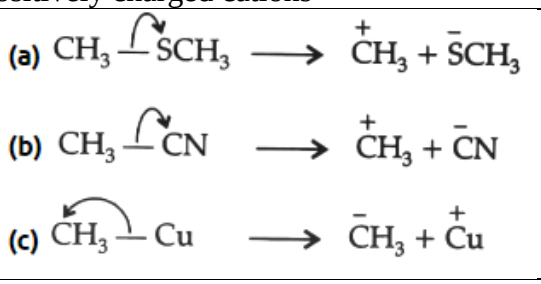
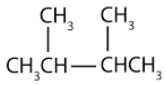
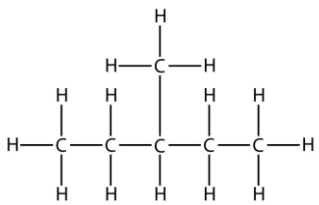
26. Arrange the following in the order of property indicated against each set
    (i) $(CH_3)_3CCH_2^+$, $(CH_3)_3C^+$, $CH_3CH_2CH^+_2$, $CH_3CH^+CH_2CH_3$ (in the order of their increasing stabilities)
    (ii) –COOH, $–CONH_2$, –CHO, $-SO_3H$ (In the decreasing priority order if present in same molecule)
27. Draw the resonance structures for the following compounds. Show the electron shift using curved arrow notation.
    (i) $C_6H_5NO_2$
    (ii) C_6H_5OH
28. What are structural isomers? Explain different types of structural isomers with examples.
29. What are the different type of reaction intermediates formed by the homolytic and heterolytic fission of a covalent bond? Explain with examples.
30. Write short notes on
    (i) Electromeric effect
    (ii) Inductive effect
    (iii) Hyperconjugation
31. Give the bond line formulae and identify the functional group or groups present if any
    (a) Hexanedial

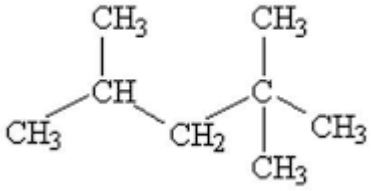
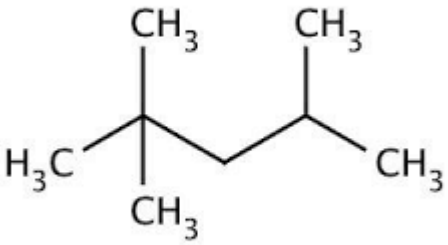
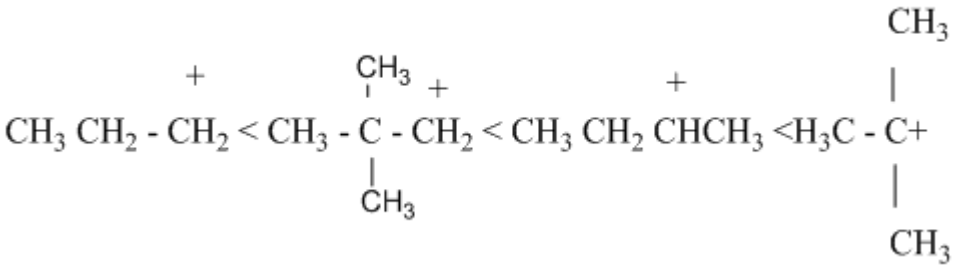
(b) 2-Hydroxy-1,2,3-propanetricarboxylic acid
(c) Cyclopenta-1,3-diene

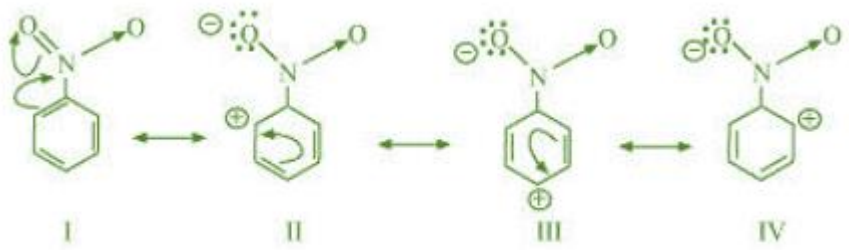
Answers:

1.	b. Hyperconjugation effect
2.	d. BF_3
3.	c. Metamerism
4.	a. –COOH, $–SO_3H$, $–CONH_2$, –CHO
5.	(b) Electromeric effect
6.	(a) Dimethyl ether
7.	(a) 4-methoxy-2-nitrobenzaldehyde
8.	I
9.	(A)
10.	(A)
11.	(A)
12.	 (i) □  (ii)

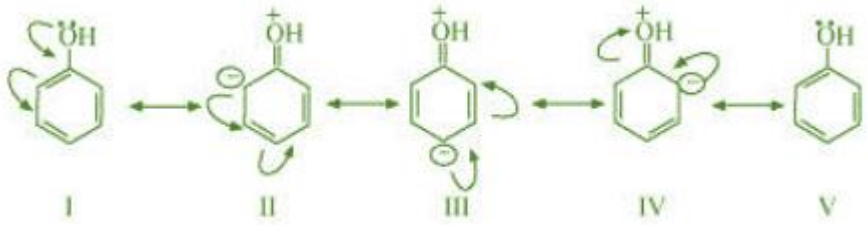
	(iii)  *sec*-butyl alcohol 2-butanol (iv)  but-2-enoic acid
13.	(a)  Isopropyl alcohol (b)  2,3-dimethylbutanal I  Heptan-4-one
14.	Metamerism is a type of isomerism in which compounds having the same molecular formula but different alkyl groups on either side of functional groups. Example diethyl ether and methyl propyl ethers are metamers.
15.	Free radicals are generally produced by homolytic cleavage of a covalent bond.
16	NO_2, CN are electron withdrawing groups -I effect Alkyl groups like methyl ($–CH_3$), ethyl etc. and alkoxy (-OR) are electron donating groups.(+I effect)
17	Due to inductive effect. Larger the number of alkyl group more will be the +I Effect. So tertiary butyl carbocation has more alkyl group than secondary or primary butyl carbocation. Hyperconjugation also stabilises the tertiary butyl carbocation than secondary or primary

18	Negative resonance or mesomeric effect or -R effect is shown by substituents or groups that withdraw electrons by delocalization mechanism from rest of the molecule. The electron density decreases on the molecule Positive resonance or mesomeric effect +R effect is shown by the groups when they release electrons to the rest of the molecule by delocalization. These groups are denoted by +M or +R. Due to this effect, the electron density on the molecule increases
19.	 Stability is I > II > III
20.	Electromeric effect is a temporary effect and observed only in organic compounds with multiple bonds in the presence of an attacking reagent. Inductive Effect is the phenomenon wherein a permanent dipole arises in a given molecule due to the unequal sharing of the bonding electrons in the molecule.
21	Nucleophiles: HS^-,$C_2H_5O^-$,$(CH_3)_3N$,Cl^-These species have one or more unshared pair of electrons or are negatively charged anions (ii) Electrophiles: BF_3,$CH_3-C^+=O$ These species have only six valence electrons or are positively charged cations
22	
23	Electrophiles are electron deficient species and can accept an electron pair from electron rich species. Example carbocations and carbonyl compounds. A nucleophile is electron rich species and donates electron pairs to electron deficient species. Examples carbanions, water ,
24	(i)  (ii) 

	(iii)   (iv)
25	(ii) Correct IUPAC name 1,5-Hexadiene (iii) Correct IUPAC name 3-methyl-hex-3-ene
26	(i)  (iv) – COOH > – SO_3H > – $CONH_2$ >– CHO
27	(i)

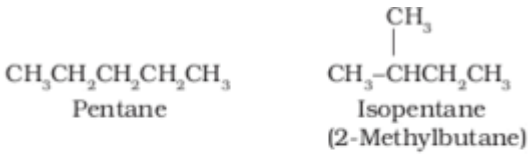


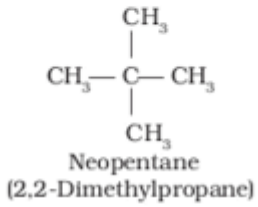
(ii)



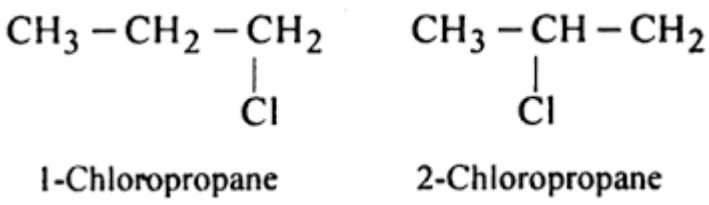
28 Structural isomerism is the phenomenon in which the compounds would be having the same Molecular formula but different structural formula

- Chain Isomerism: Chain isomerism occurs when there is a difference in the atomic arrangement of the carbon to the carbon chain of a molecule.

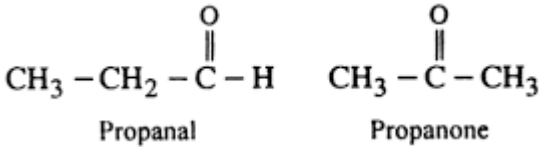
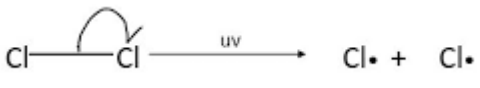
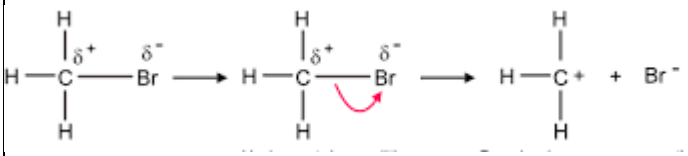


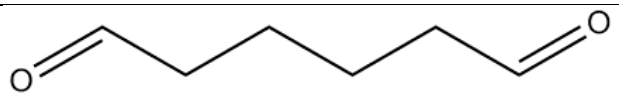
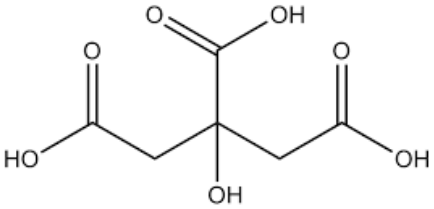


- Position Isomerism: Positional isomerism arises when there is a difference in the positions occupied by the substituent atoms or a group of atoms or due to the unsaturation occurring in the chain.



- Functional Group Isomerism: The Functional group isomerism occurs when there is a presence of the different form of functional groups with the same chemical formula.

	 Propanal Propanone • Metamerism : Compounds having the same molecular formula but different number of carbon atoms on either side of the functional group are called metamers and the phenomenon is called metamerism. $CH_3 - CH_2 - O - CH_2 - CH_3$ Ethoxyethane $CH_3 - O - CH_2 - CH_2 - CH_3$ 1-Methoxypropane
29	In Homolytic fission, the cleavage of the covalent bond takes place in such a way that each bonded atom retains one electron of the shared pair leading to the formation of free radicals  In heterolytic fission, the covalent bond is broken in such a way that one of the fragments takes both the electron of the pair leaving none on the other. This results into two charged particles. 
30	(i) The instantaneous formation of a dipole in the molecule of an organic compound due to the complete transfer of shared pi electron pairs to one of the atoms under the influence of an attacking reagent is referred to as the Electromeric effect. +E effect occurs when the electron pair of the pi bond is moved towards the attacking reagent. -E effect occurs when the electron pair of the pi bond is moved away from the attacking reagent (ii) The inductive effect is a permanent state of polarization. The electron density in a σ bond between two unlike atoms is not uniform. The electron density is denser toward the more electronegative of the two atoms. The inductive effect is a distance-dependent phenomenon: The -I effect is seen around a more electronegative atom or group, and electron density is higher there than elsewhere in the molecule. Electron-withdrawing groups include halogen, nitro, cyano, ester and aryloxy The +I effect is observed among the less electronegative atoms of the molecule by electron-releasing groups like alkyl groups. (iii) Hyperconjugation effect is a permanent effect in which localization of σ electrons of C-H bond of an alkyl group directly attached to an atom of the unsaturated system or to an atom with an unshared p orbital takes place.

31	(a)  Hexanedial	Aldehyde
	(b)  2-Hydroxy-1,2,3-propanetricarboxylic acid	Hydroxyl group and Carboxyl group
	(c)  Alkene	
Prepared by: Mrs Jenesha Joseph		Checked by : HOD - SCIENCE