

ToppersNotes

THE IIT-JEE SECRET ORGANIC CHEMISTRY VOL.-I

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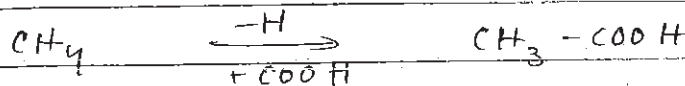
Organic chemistry

Study of organic compounds

Organic compounds :- Hydrocarbon & their derivatives

(Carbon is directly attached to hydrogen)

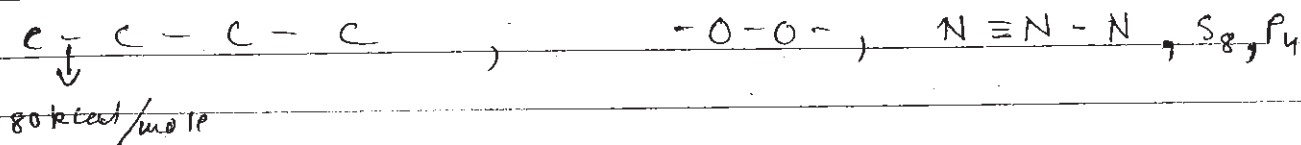
Hydrocarbon :- comp^d containing 'C' & 'H' & 'C' is directly attached to 'H'



*) Carbon is a main element of organic compounds due to following reasons :-

i) catenation :- self-linking tendency

⇒ 'C' has strong self-linking tendency



ii) Tetravalency of 'C' → proposed by 'Kekulé'

iii) Every sp^3 hybridised carbon has tetrahedral shape. Kekulé & Vant Hoff

Formulas :-

1) Molecular formula (M.F.) $\rightarrow$ C_4H_8O , C_5H_{10}

11] General formula (Gr.F) $\rightarrow$ C_nH_{2n}

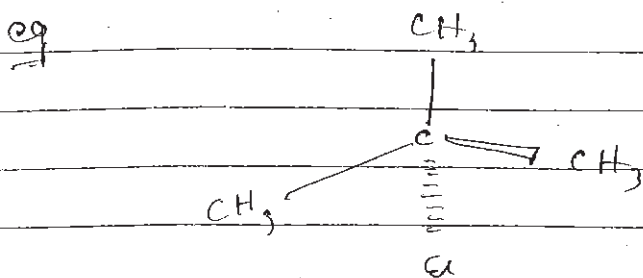
c9 $C_4H_6 \rightarrow C_nH_{2n-2}$

$$C_n H_x \rightarrow C_n H_{2n-6}$$
$$C_9H_9O \rightarrow C_nH_{2n}O$$
$$C_3 H_9 N \rightarrow C_n H_{2n+3} N$$
$$C_2H_2O \rightarrow C_nH_{2n-2}O$$

(iii) Structural Formula $\rightarrow$ Formula which represents connectivity of atom in the compound.

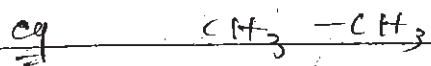
$$\text{ex } C_4H_{10} \rightarrow C-C-C-C \quad \text{or} \quad \begin{array}{c} CH_3-CH-CH_3 \\ | \\ CH_3 \end{array}$$

iv) Stereo chemical formula $\Rightarrow$ formula which tell us about orientation of atom or group of atom present in compound.

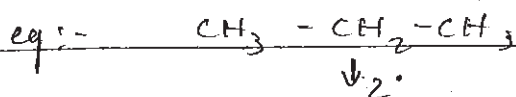


Types of 'C' & 'H'

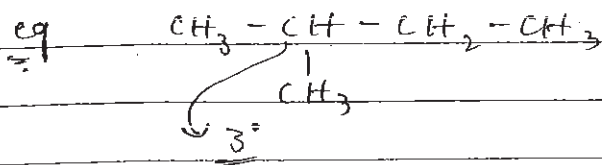
a) 1° or primary 'C' → 'C' which is attached to one 'C' atom



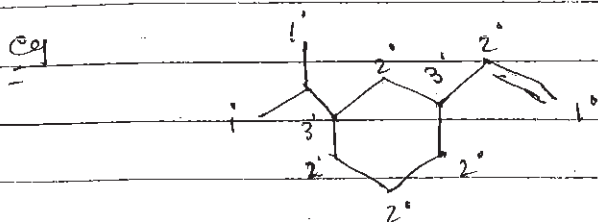
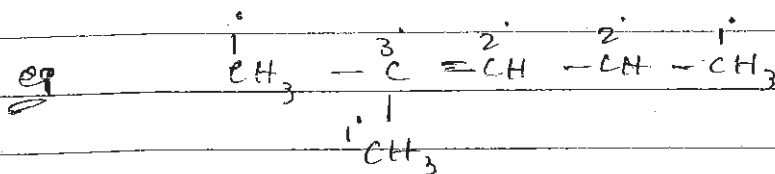
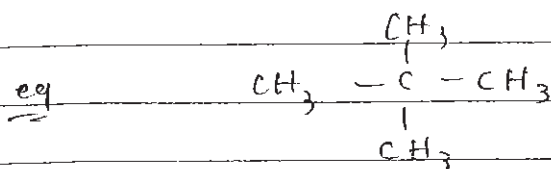
b) 2° or secondary 'C' → 'C' which is attached to two 'C' atoms



c) 3° or tertiary 'C' → 'C' which is attached to 3 'C' atoms



d) 4° or quaternary 'C' → 'C' attached to 4 'C' atoms.



Types of 'H' :-

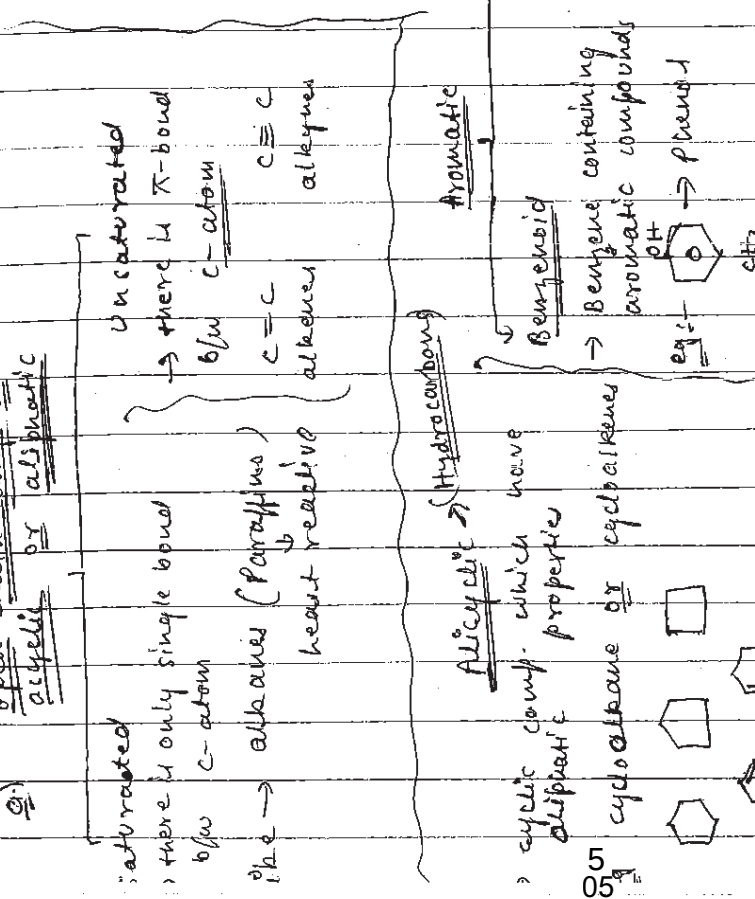
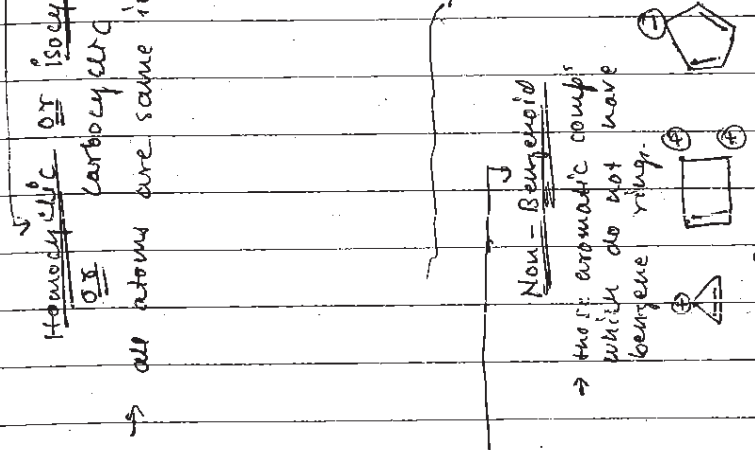
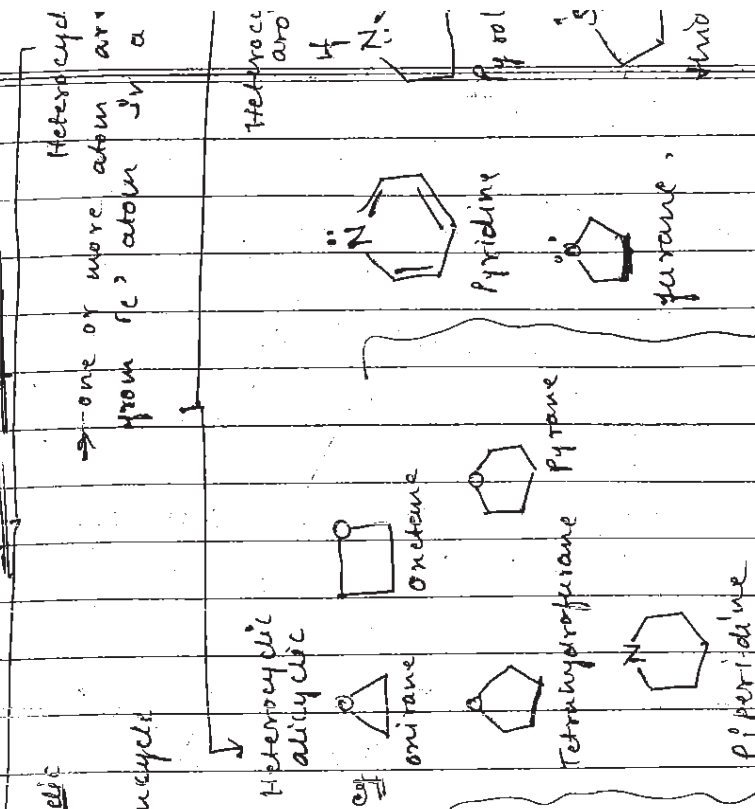
i) 1° or primary 'H' → 'H' attached to 1° 'C'

ii) 2° or sec. 'H' → 'H' attached to 2° 'C'

iii) 3° or tert. 'H' → 'H' attached to 3° 'C'

Classification of Organic Compounds

closed chain compounds



Degree of Unsaturation (D.U) or Double bond eq. of organic compounds

→ D.U tell us about idea of presence of ring or π -bond in the compound.

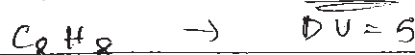
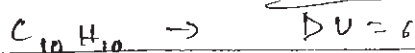
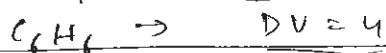
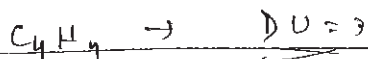
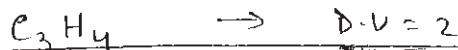
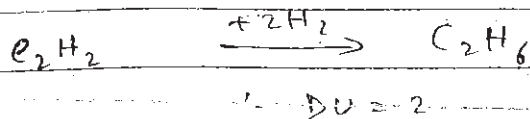
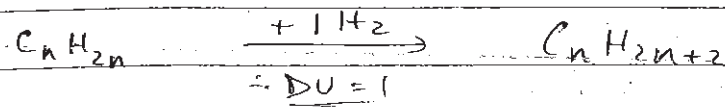
*.) If $D.U = 1$, then compound will have one π -bond or 1 ring

*.) If $D.U = 2$, then comp. will have 2 π -bond, or 2 ring or 1 π -bond + 1 ring

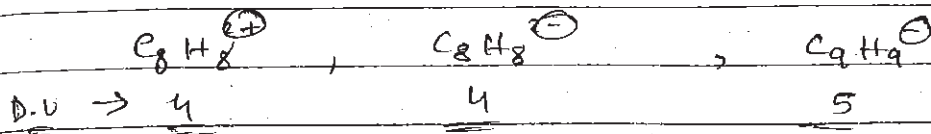
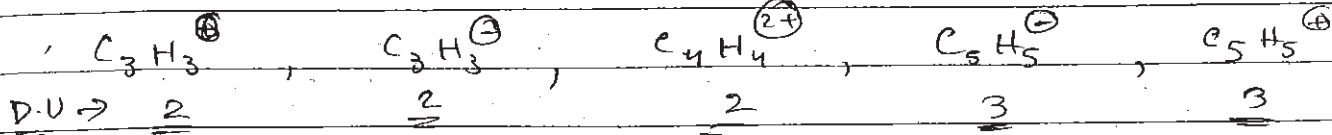
*.) If $D.U = 3$, then comp. will have 3 π , 3 ring, (2 π + 1 ring), (2 ring + 1 π)

*.) If $D.U \geq 4$, then ~~comp~~ most probably comp. will have benzene ring:

Calculation of D.U, for hydrocarbon

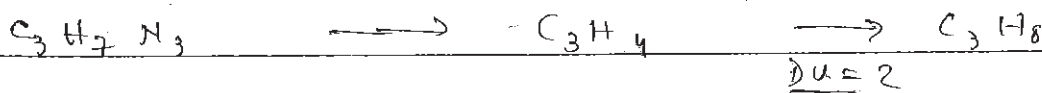
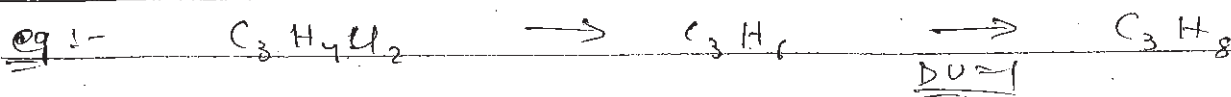
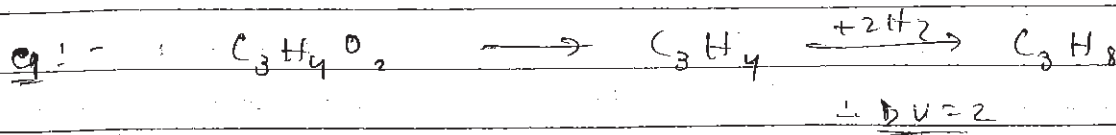
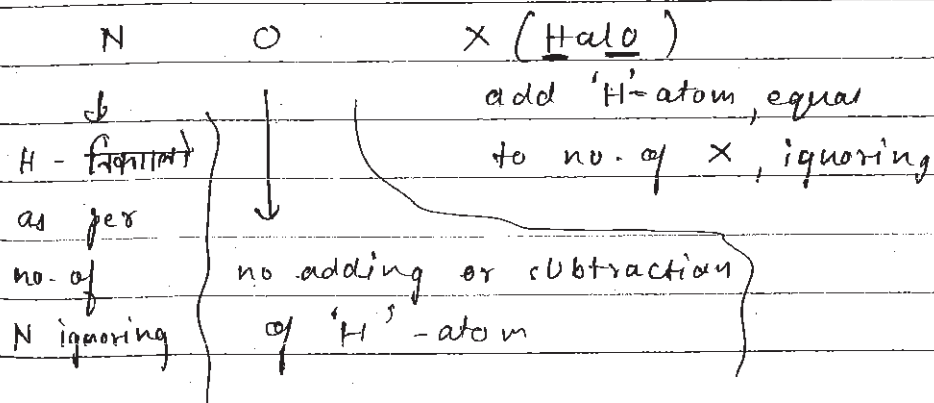
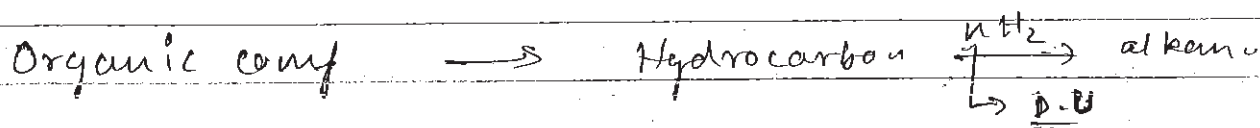


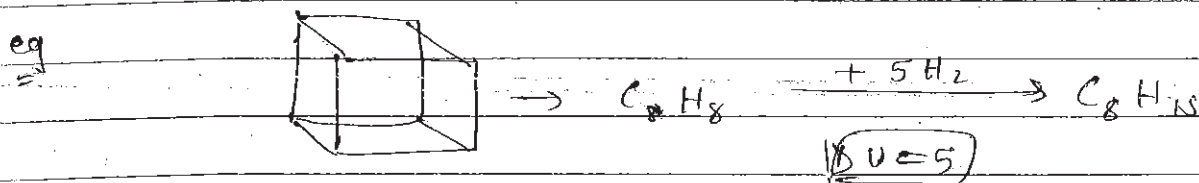
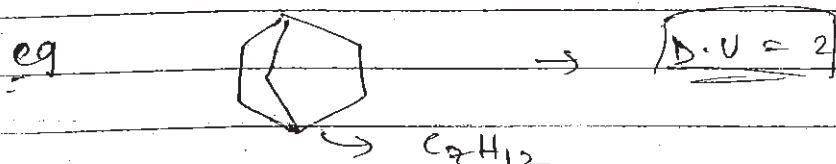
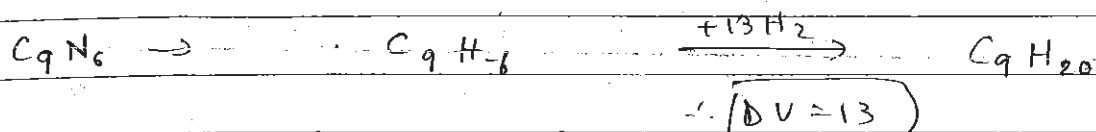
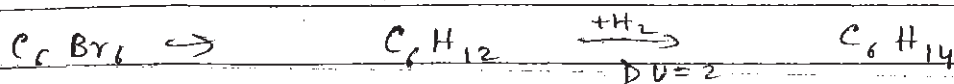
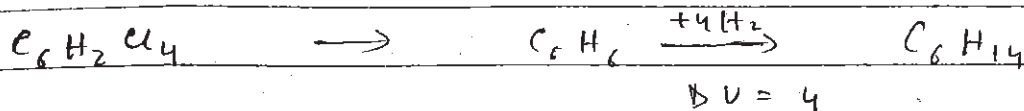
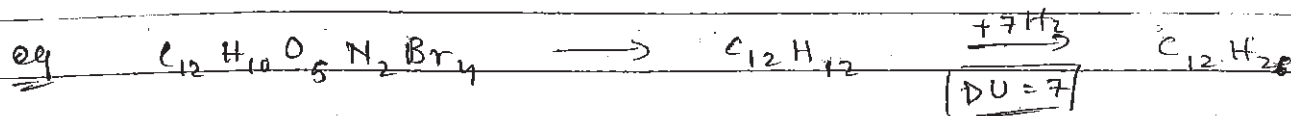
of carb.



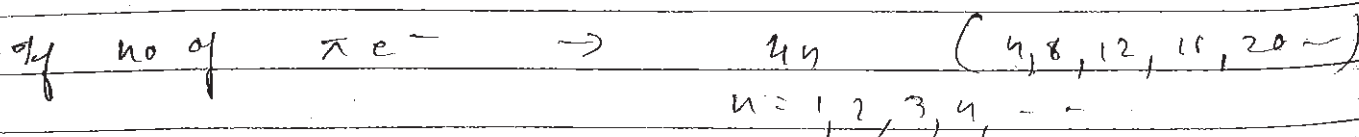
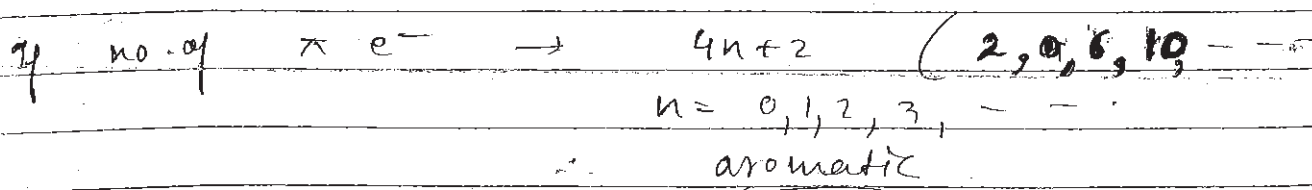
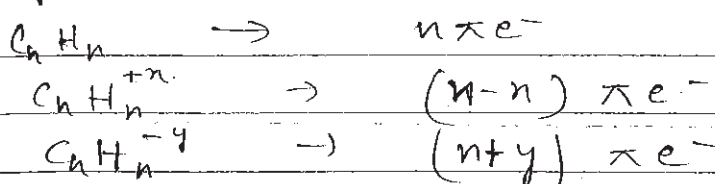
or

Calculation of D.U. for organic compound



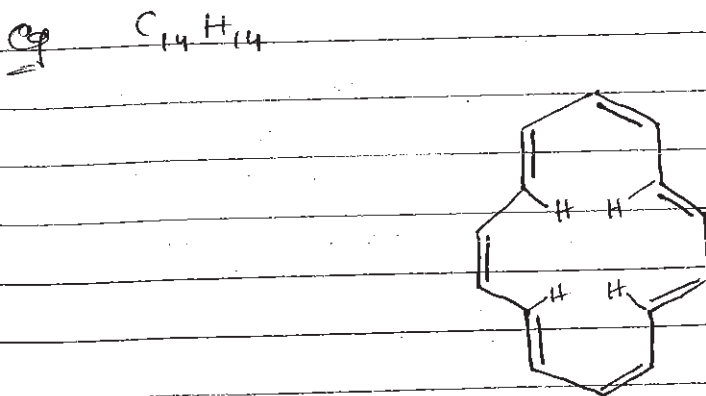
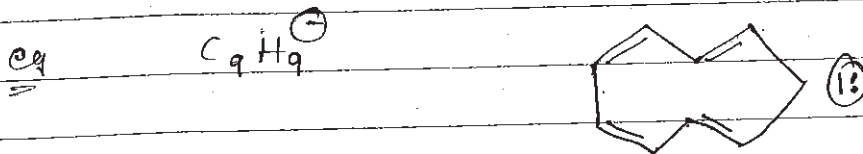
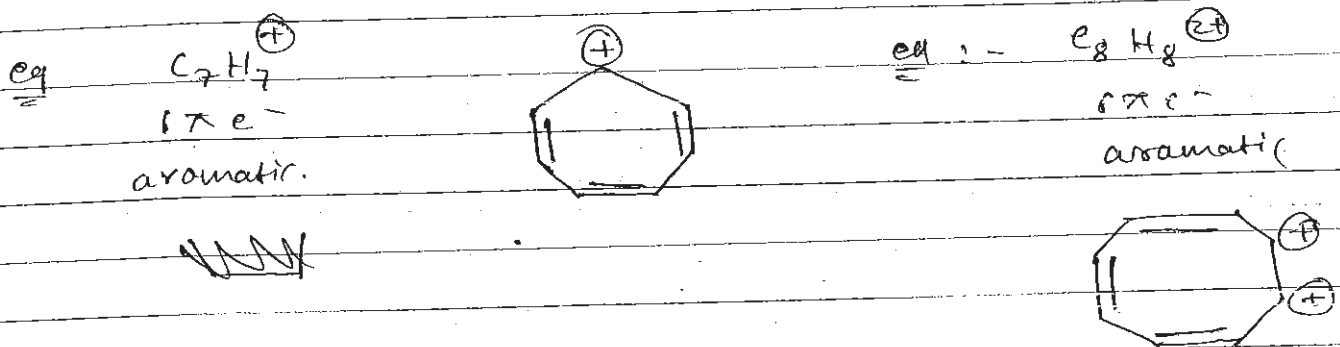
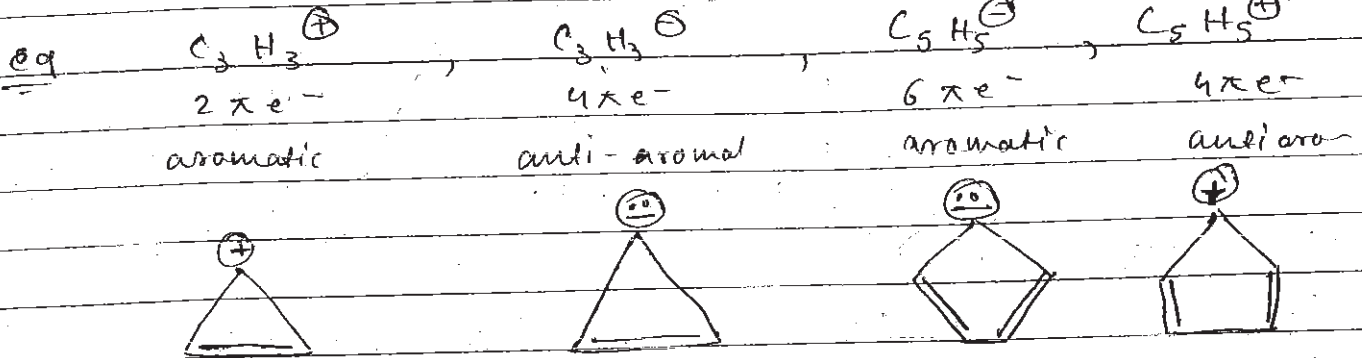


if in form

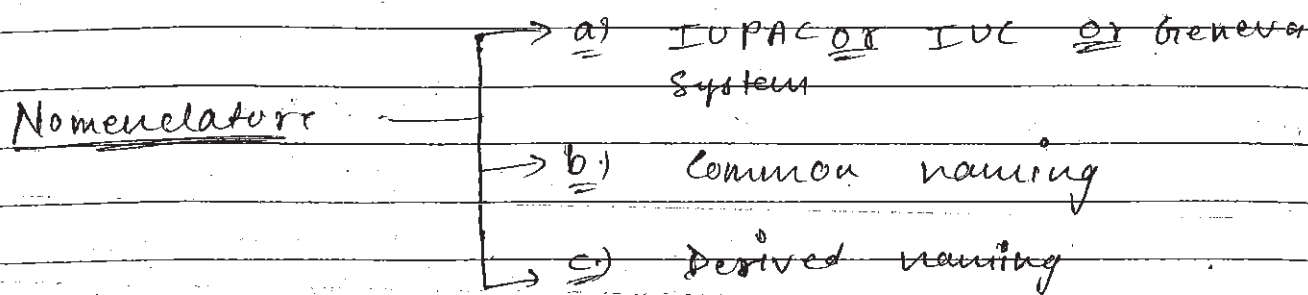


8 anti-aromatic

if not in form. $C_n H_n$
then non-aromatic



Nomenclature of Organic Comp^y :-

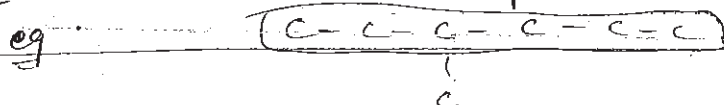


IUPAC Nomenclature

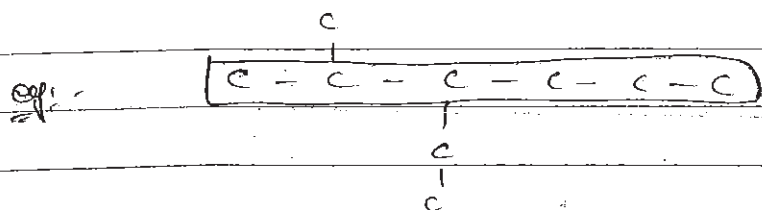
1) Naming of saturated hydrocarbons

a) Selection of parent chain -

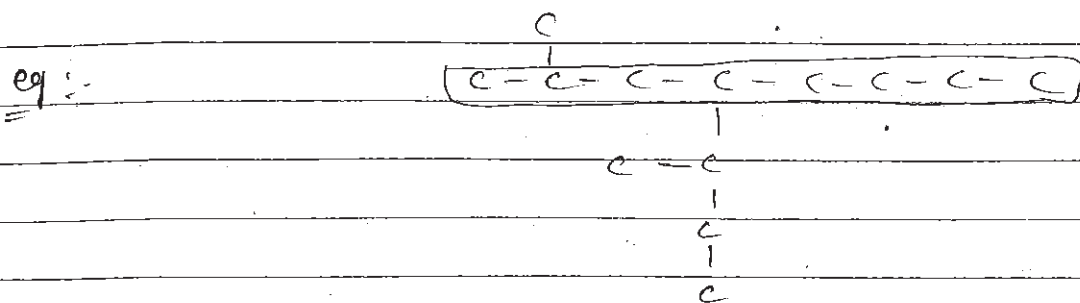
- It should be a longest C-chain



- If more than one longest 'C'-chain is present, then that will be a parent chain having more no. of side chain.



- If no. of side chain are also same, then that will be parent chain, having its side chain at lower no.

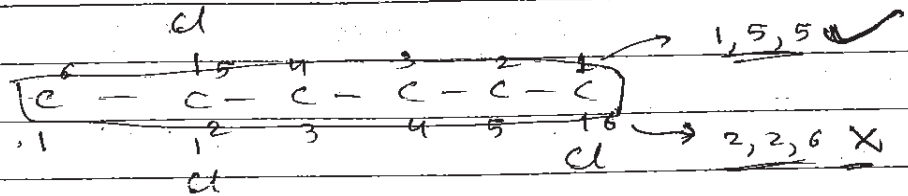


simple side chains. But ^{ToppersNotes} 'bis', 'tris' ... of complex side chain is not considered in alphabetical order.

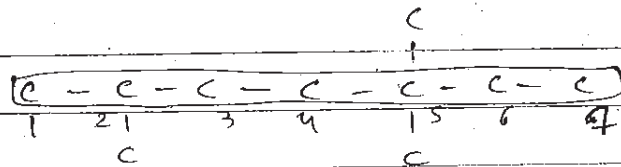
b) Numbering of parent chain

a) Numbering is done in such a way that lowest set of locant is obtained.

eg:-

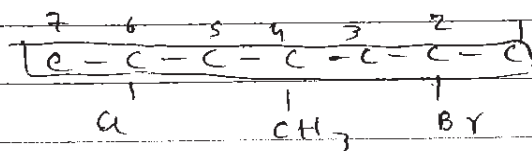


eg:-

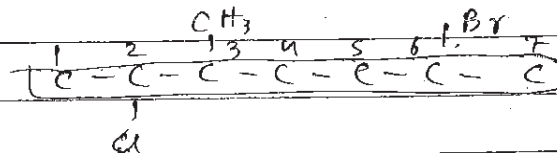


a) If lowest set of ~~number~~ locant is not working then alphabetical order is used.

eg



eg



Note:- name of complex side chain is considered to begin from 1st letter of its complete name.

eg

