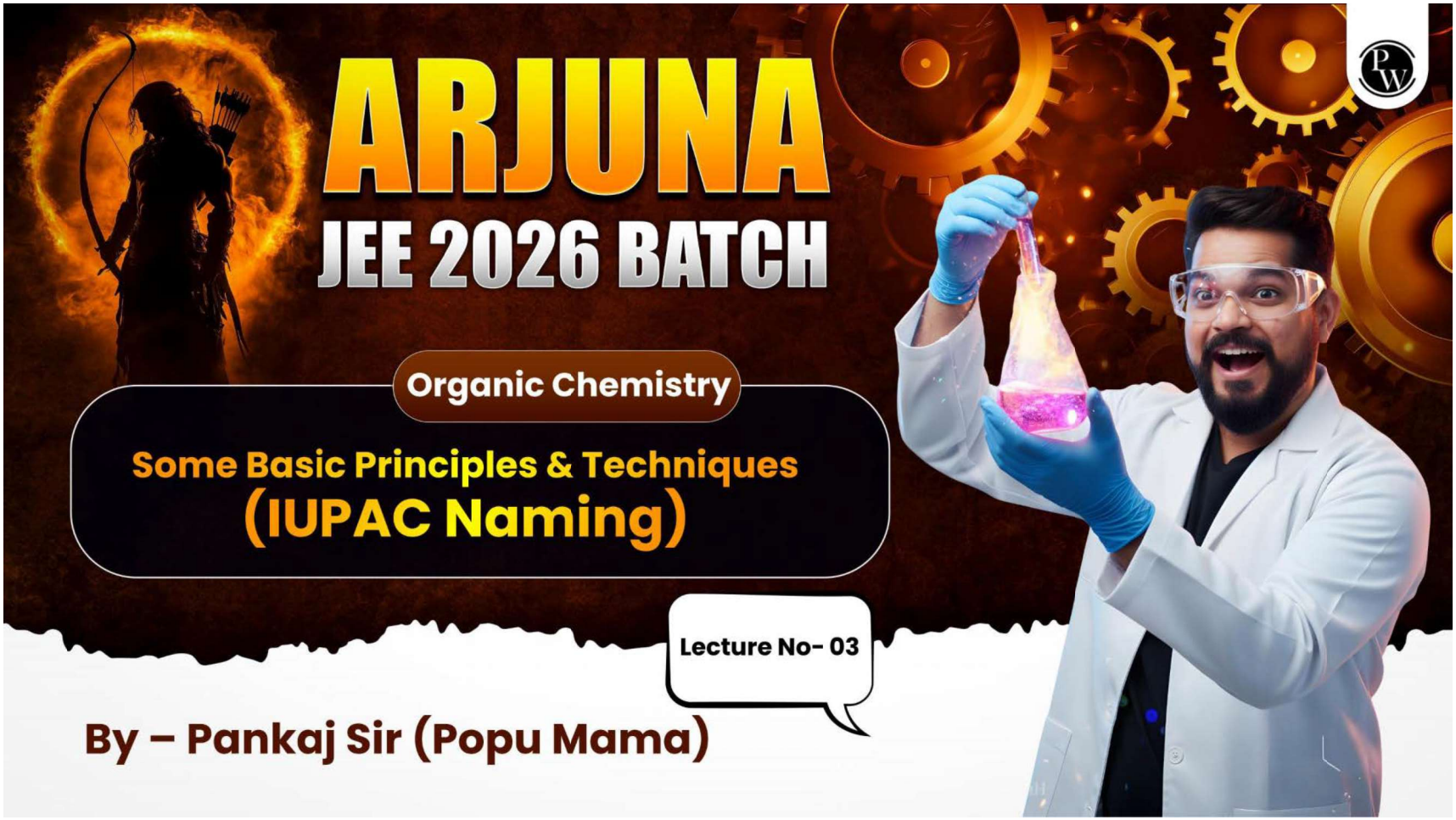
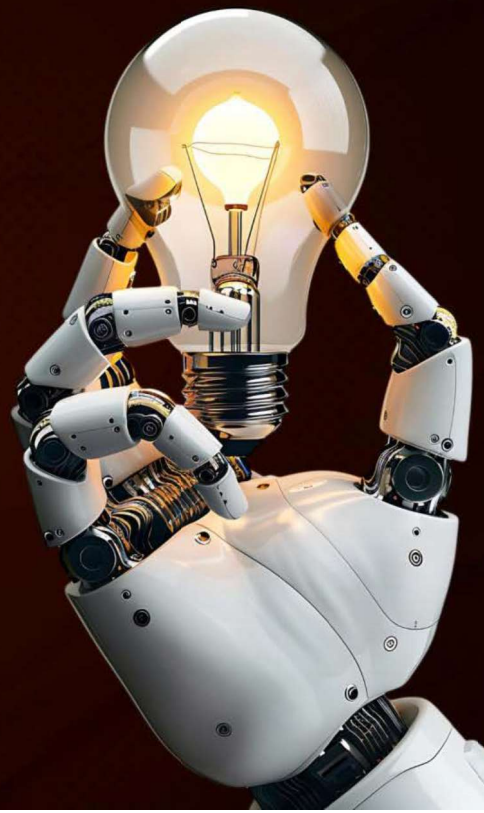

ARJUNA
JEE 2026 BATCH
Organic Chemistry
Some Basic Principles & Techniques
(IUPAC Naming)
Lecture No- 03
By – Pankaj Sir (Popu Mama)

Topics *to be covered*

1. Degree of Carbons, Hydrogens & Halogens
2. Degree of Amines & Hydroxyl Group
3. Classification of Organic Compounds
4. Practice



Topics *to be covered*

1. Bond Line Structures

$A-B$ $A=B$ $A\equiv B$

2. Calculation of sigma (σ) and Pi (π)

3. Hybridization

σ + Lone Lp = 4 sp^3
= 3 sp^2
= 2 sp


PANKAJ SIR
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PhysicsWallah
अनुगच्छतु प्रवाहं
@PSCAA

Home Work

PYQs

Question (IIT-JEE 2012)

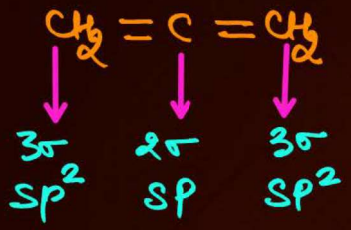
In allene (C_3H_4), the type(s) of hybridization of the carbon atoms is (are):

A. sp and sp^3

B. sp and sp^2

C. only sp^3

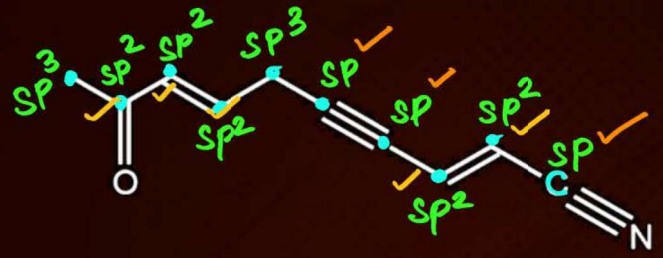
D. sp^2 and sp^2



Question (JEE Mains 2025, 24 Jan. Shift-2)

(Target-2)

In the given structure, number of sp and sp^2 hybridized carbon atoms present respectively are:



A. 3 and 6

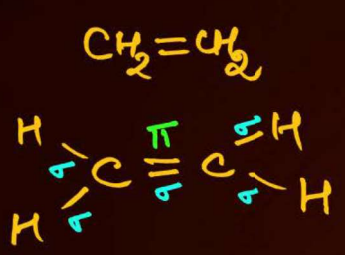
B. 4 and 6

C. 3 and 5

D. 4 and 5

Question (JEE Mains 2024, 5 April Shift-1)

Number of σ and π bonds present in ethylene molecule is respectively:



(A) 3 and 1

(B) 5 and 2

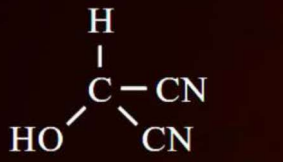
(C) 4 and 1

(D) 5 and 1

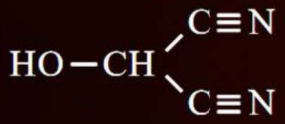
Question (JEE Mains 2024, 27 Jan. Shift-2)

Bond line formula of $HOCH(CN)_2$ is:

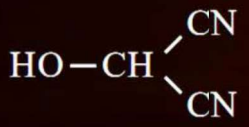
A



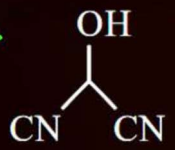
B



C



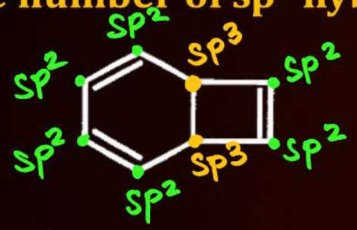
D



Home Work

Question 01

The number of sp^3 hybridised carbons in the compound given below is:



A 1

B 2

C 4

D 5

Question 02

(A) sp^3 and sp^2

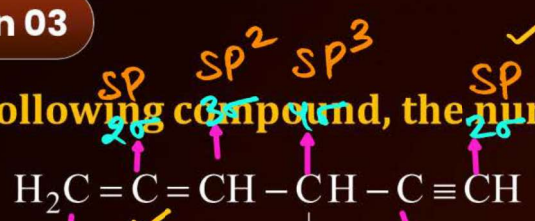
(B) sp^2 and sp^3

(C) sp^3 and sp

(D) sp^2 and sp

Question 03

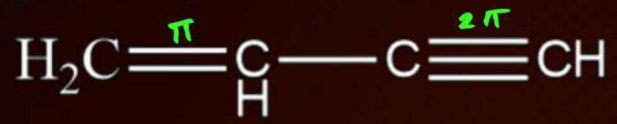
In the following compound, the number of '*sp*' hybridised carbon is:



- A 2
- B 3
- C 4
- D 5

Question 04

The number of sigma and pi bonds in [redacted] are:



7σ + 3π

(A) 5 sigma and 5 pi

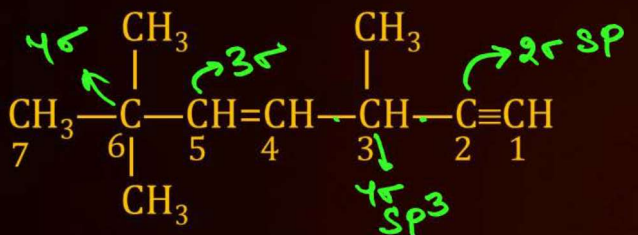
(B) 7 sigma and 3 pi

(C) 8 sigma and 2 pi

(D) 6 sigma and 4 pi

Question 05

The state of hybridization of C_2, C_3, C_5 and C_6 of the hydrocarbon,



is in the following sequence:

A sp, sp^3, sp^2 and sp^3

B sp, sp^2, sp^2 and sp^3

C sp, sp^2, sp^3 and sp^2

D sp^3, sp^2, sp^2 and sp

Question 06

The number of σ bonds in o-xylene is:

o-xylene

A 6

B 9

C 12

D 18

Question 07

In the compound
$HC \equiv C-CH_2-CH=CH-CH_3$, total sigma bond and pie bonds respectively are

13σ, 3π

A 5, 13

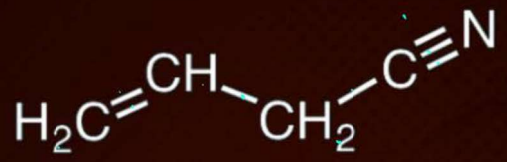
B 13, 3

C 13, 5

D None of these

Question 08

Allyl cyanide contains σ and π-bonds:



9σ, 3π

A. 5σ, 7π

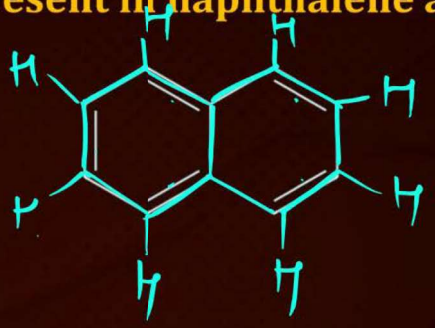
B. 9σ, 3π

C. 3σ, 4π

D. 9σ, 9π

Question 09

The number of π-bonds and σ-bonds present in naphthalene are respectively.



A 6, 19

B 5, 19

C 5, 11

D 5, 20

Question 10

Only sp and sp^2 hybrid orbitals are involved in the formation of:

A $CH_3 - CH = CH_2$ (sp^3 sp^2 sp^2)

B $CH_3 - CH_3$ (sp^3 sp^3)

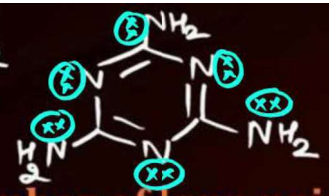
C $CH_3 - C \equiv CH$ (sp^3 sp sp)

D $H_2C = C = CH_2$ (sp^2 sp sp^2)

Answer Key

1. B
2. D
3. C
4. B
5. A
6. D
7. B
8. B
9. B
10. D

melamine



KBCC# 01 (L.S.N)

The number of lone pairs in melamine are $x_1 = 6$

The number of pi bond electrons in C_2H_2 ($CH \equiv CH$) are $x_2 = 4$

The maximum number of d orbital electrons are $x_3 = 2$

The number of SP^2 hybridised carbons in Allene are $x_4 = 2$ ($CH_2 = C = CH_2$; Sp^2 sp Sp^2)

then find the value of $\sum_{i=1}^{4} ix_i$

$1x_1 + 2x_2 + 3x_3 + 4x_4$

$1 \times 6 + 2 \times 4 + 3 \times 2 + 4 \times 2$

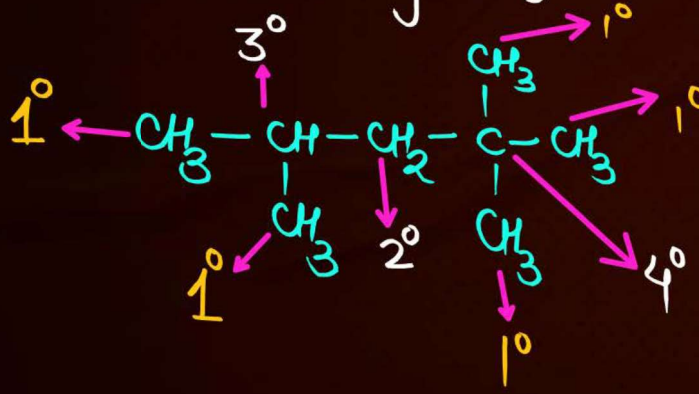
$6 + 8 + 6 + 8 = 28$

NEW TOPICS

Degree of Carbons

$1^\circ \rightarrow$ Primary
$2^\circ \rightarrow$ Secondary
$3^\circ \rightarrow$ Tertiary
$4^\circ \rightarrow$ quaternary

Definition The no. of 'c' atoms directly connected with the carbon is called degree of that carbon



1° 'C' = 5 $\quad 1^\circ H = 15$

2° 'C' = 1 $\quad 2^\circ H = 2$

3° 'C' = 1 $\quad 3^\circ H = 1$

4° 'C' = 1 $\quad 4^\circ H = 0$ PHK DKHK

Q find no. of $1^\circ C, 2^\circ C, 3^\circ C, 4^\circ C, 1^\circ H, 2^\circ H, 3^\circ H$?

A

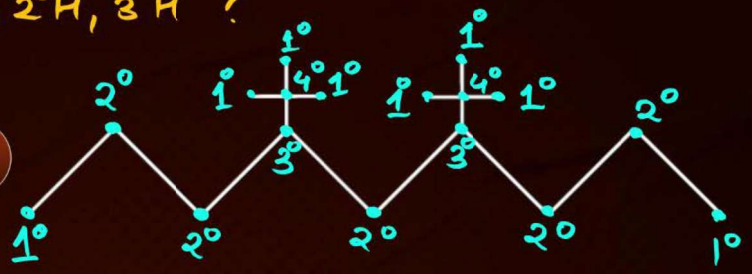
1° 'C' = 3 1° 'H' = 9

2° 'C' = 6 2° 'H' = 11

3° 'C' = 3 3° 'H' = 2

4° 'C' = 0 4° 'H' = 0

B



1° 'C' = 8 1° 'H' = 24

2° 'C' = 5 2° 'H' = 10

3° 'C' = 2 3° 'H' = 2

4° 'C' = 2 4° 'H' = 0

OP Points

Super Primary Carbon

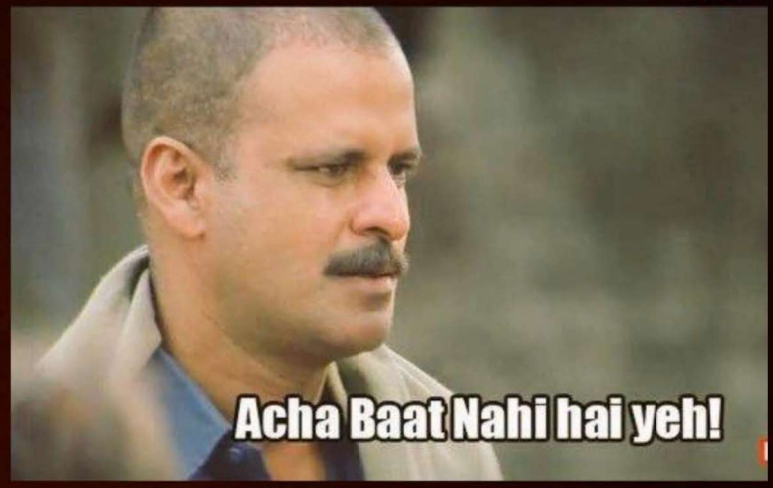
OP Points

Four Degree Hydrogen

Nahi hota hai

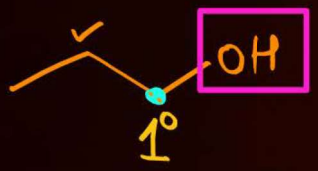
PHK

DKHK

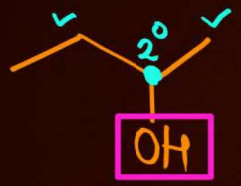


Degree of Alcohols

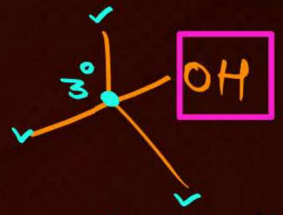
Definition The degree of 'C' at which 'OH' group is present



1° Alcohol



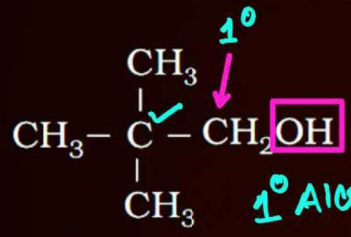
2° Alcohol

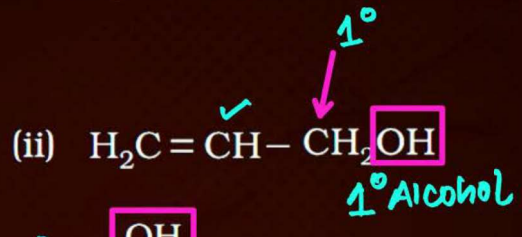


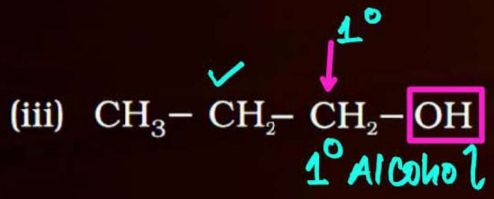
3° Alcohol

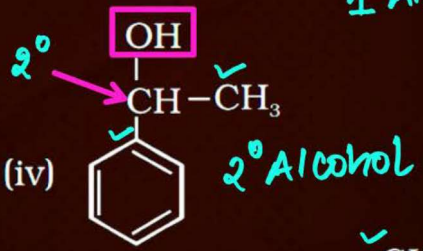
Question (NCERT Example

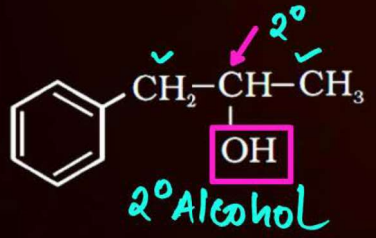
Classify the following as primary, secondary and tertiary alcohols:

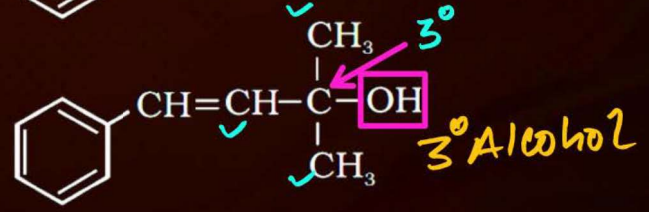
(i) 

(ii) 

(iii) 

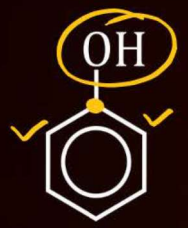
(iv) 

(v) 

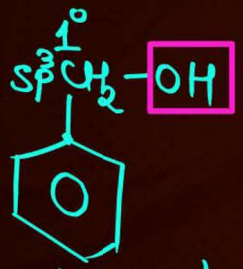
(vi) 

OP Points

Degree of Phenol



koi degree nahi

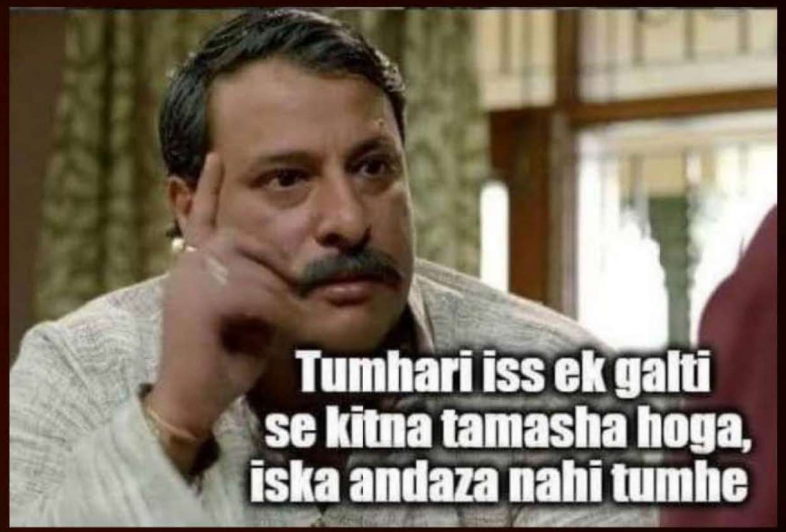


2° ~~Alcohol~~

PHK

DKHK

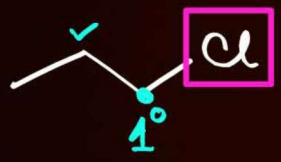
✓ 1° Alcohol



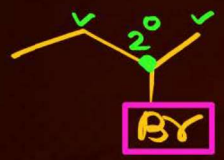
Degree of Halogens

X = F, Cl, Br, I

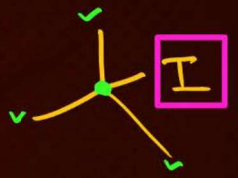
Definition The degree of C at which halogen(X) is present



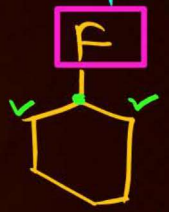
1° chloride



2° Bromide



3° Iodide



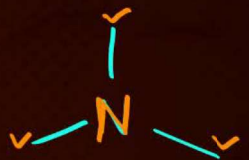
2° fluoride

Degree of Amines

Definition The no. of 'C' atoms directly connected with Nitrogen.

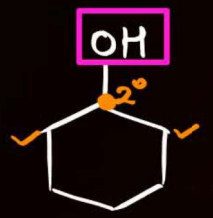
1° amine

2° amine

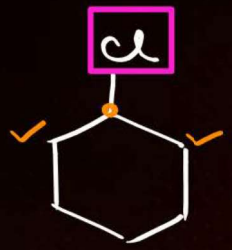


3° amine

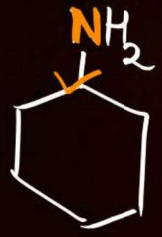
Q



2° Alcohol



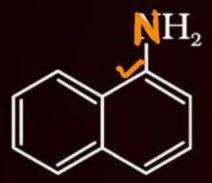
2° chloride



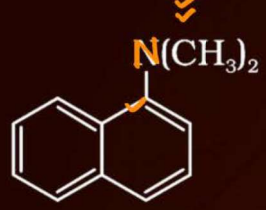
1° Amine

Question (NCERT Example)

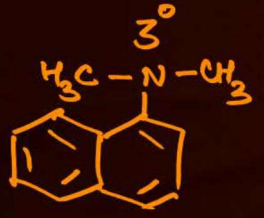
Classify the following amines as primary, secondary or tertiary:

(i) 

1°

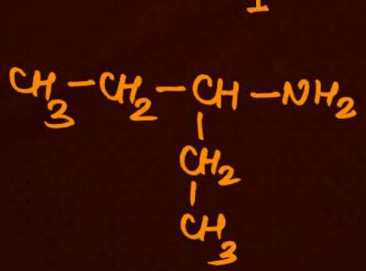
(ii) 

3°



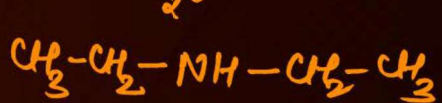
(iii) $(C_2H_5)_2CHNH_2$

1°



(iv) $(C_2H_5)_2NH$

2°

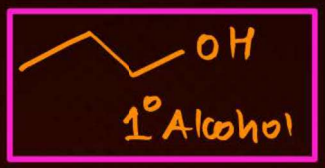


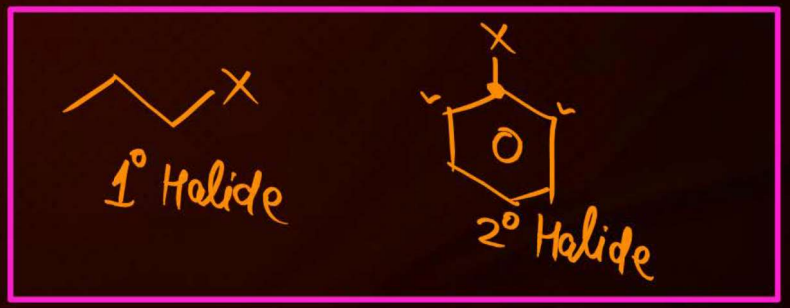
OP Points

Degree of Aniline

Degree hoti hai

1° amine

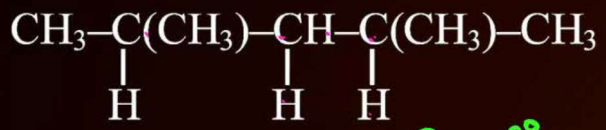


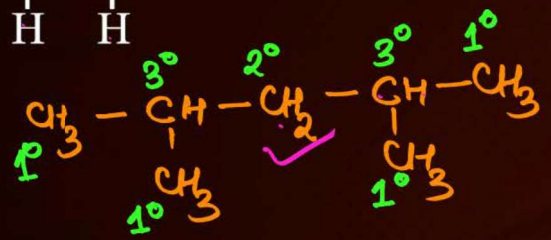


PYQs

Question (JEE Mains 2024, 8 April Shift-1)

In the given compound, the number of 2° carbon atom/s is ____.





(A) Three

(B) One

(C) Two

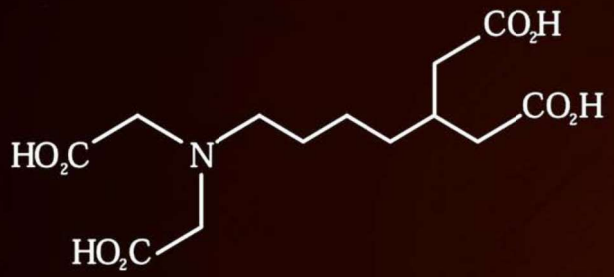
(D) Four

Home Work

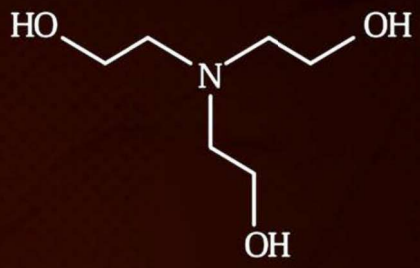
Question 01

In which of the following molecules nitrogen atom is sp^2 hybridised?

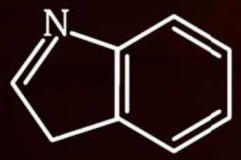
A



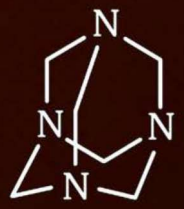
B



C

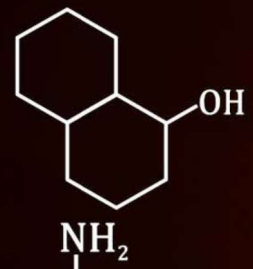


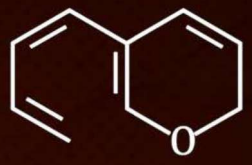
D



Question 02

Which of the following is heterocyclic compound?

A 

B 

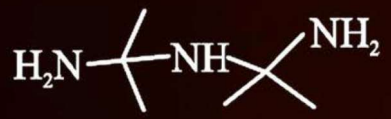
C 

D 

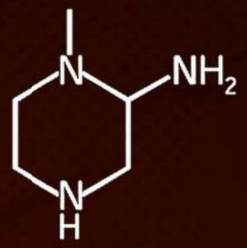
Question* 03

Which of the following compound contain all 1°, 2° & 3° amine?

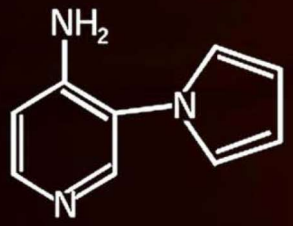
A



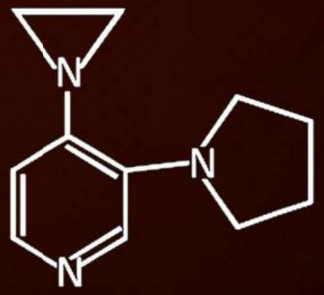
B



C



D



Question 04

Number of 2° nitrogen present in given compound are:

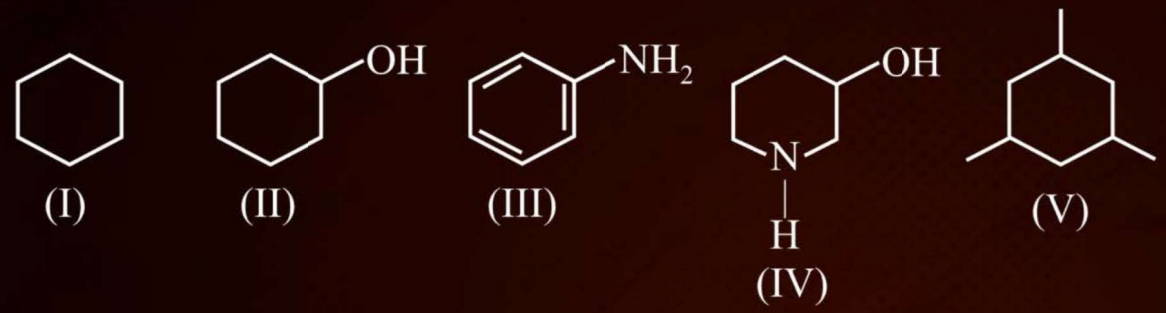
A 2

B 3

C 4

D 5

Question* 05



(I) (II) (III) (IV) (V)

Which of the following represent homocyclic compounds?

A. I, IV, V

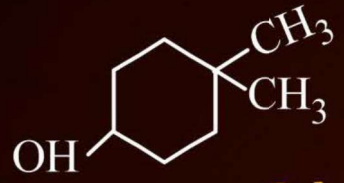
B. II, III, V

C. I, II

D. IV, V

Question 06

Based on given compounds match the column.



Column-I	Column-II
(A) 1° Carbon	(P) 5
(B) 2° Carbon	(Q) 9
(C) 2° Hydrogen	(R) 2
(D) 1° Hydrogen	(S) 6

A $A \rightarrow P, B \rightarrow R, C \rightarrow Q, D \rightarrow S$

B $A \rightarrow R, B \rightarrow P, C \rightarrow Q, D \rightarrow S$

C $A \rightarrow R, B \rightarrow P, C \rightarrow S, D \rightarrow Q$

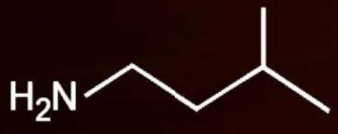
D $A \rightarrow P, B \rightarrow R, C \rightarrow S, D \rightarrow Q$

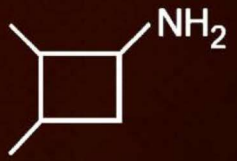
Question* 07

Which among the following compound(s) is a primary amine with the molecular formula $C_5H_{11}N$?

A 

B 

C 

D 

Question 08

Which is correct?

A It contains four sp^2 hybridized C atoms.

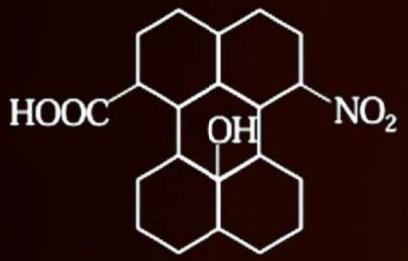
B It contains nine sp^3 hybridized C atoms.

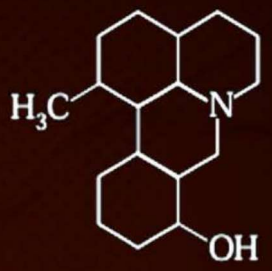
C It contains two 3° H–atoms & two sp^2 hybridized 'C'.

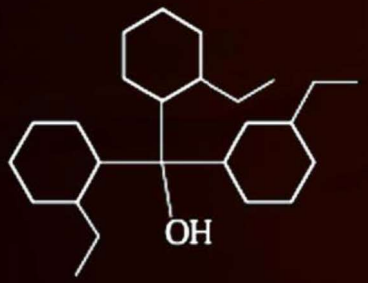
D It contains ten H–atoms & two sp^2 hybridized 'C' atoms.

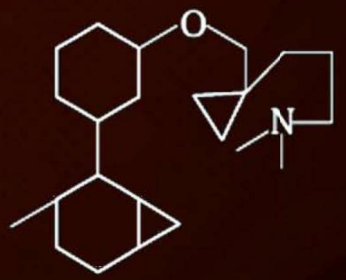
Question 09

Which of the following is a Heterocyclic compound?

A 

B 

C 

D 

Question* 10

Find out the number of 1°, 2° & 3° carbon atoms in the above compounds.

A I is having four 2° & four 3° carbons.

B II is having three 1°, six 2°, three 3° & two 4° carbon.

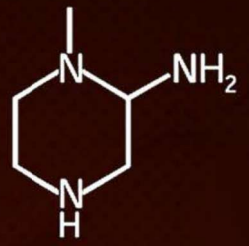
C III is having four 1°, two 2°, eight 3° & one 4° carbon.

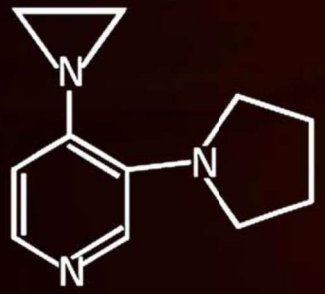
D IV is having three 1°, three 2° & three 3° carbons.

Question 11

Which of the following compound contain all 1°, 2° & 3° amine?

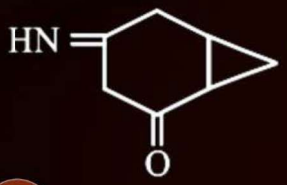
A 

B 

C 

D None of these

Question 12



Which statement is correct?

A Two sp hybridized 'C' atoms & six - 2° H atoms are present in it.

B Two 3° C - atoms & two sp^2 hybridized 'C' atoms are present in it.

C N is sp^3 & two - 2° - C atoms are present in it.

D Two 3° – H – atoms, Eight –2° – H– atoms & four –sp^3 – hybridized 'C' atoms are present in it.

Answer Key

1. C
2. B
3. B & C
4. A
5. B & C
6. B
7. A & B
8. C
9. B
10. A, B, C & D
11. B
12. B

KBCC # 02 (L-S-N)

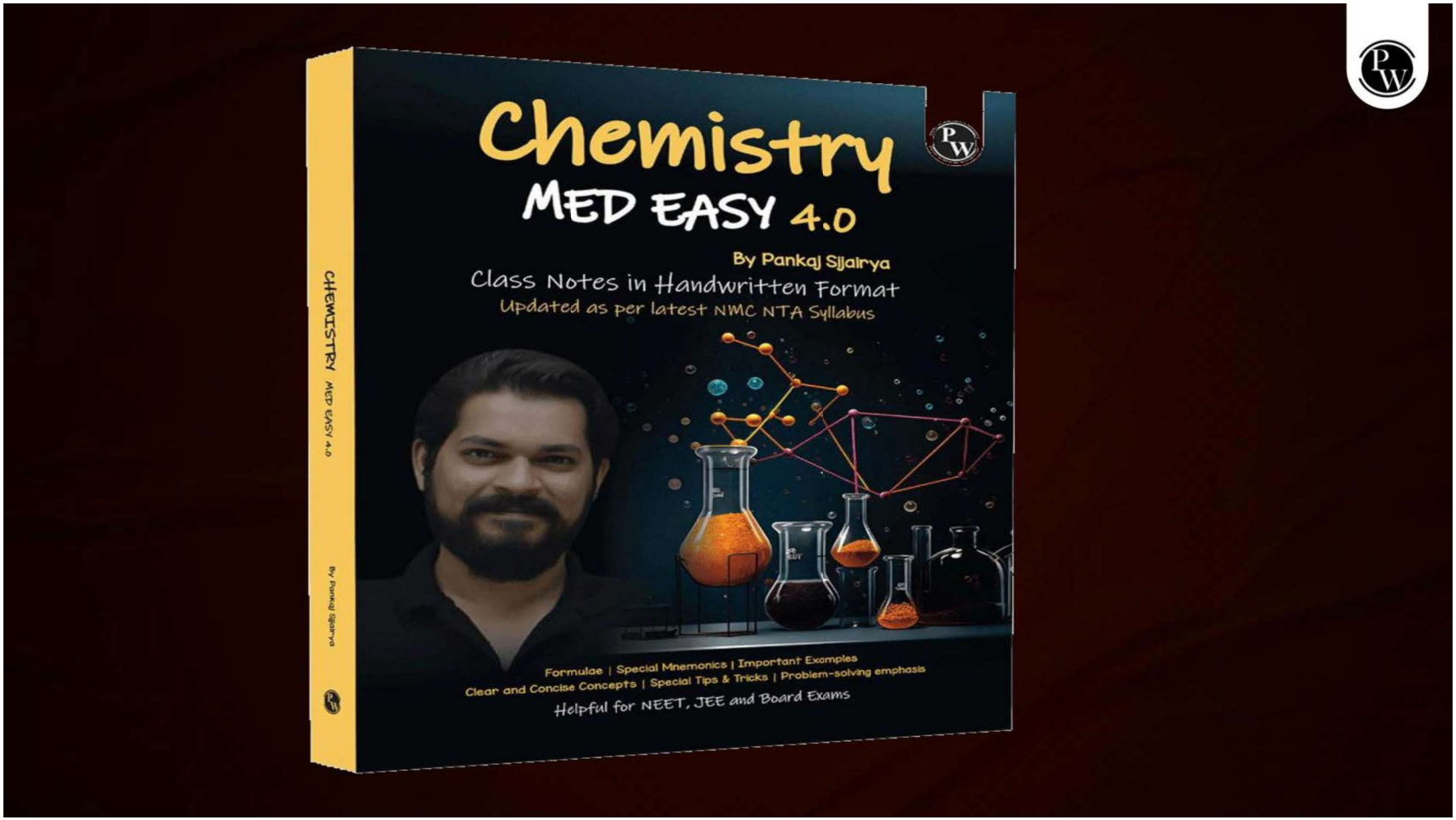
for the compound $C(CN)_4$

The sum of σ bonds & π bonds is x

The sp hybridised atoms is y

The sum of $1^{\circ}C$ & total Lone pairs $= z$

then find $\frac{xz}{y}$?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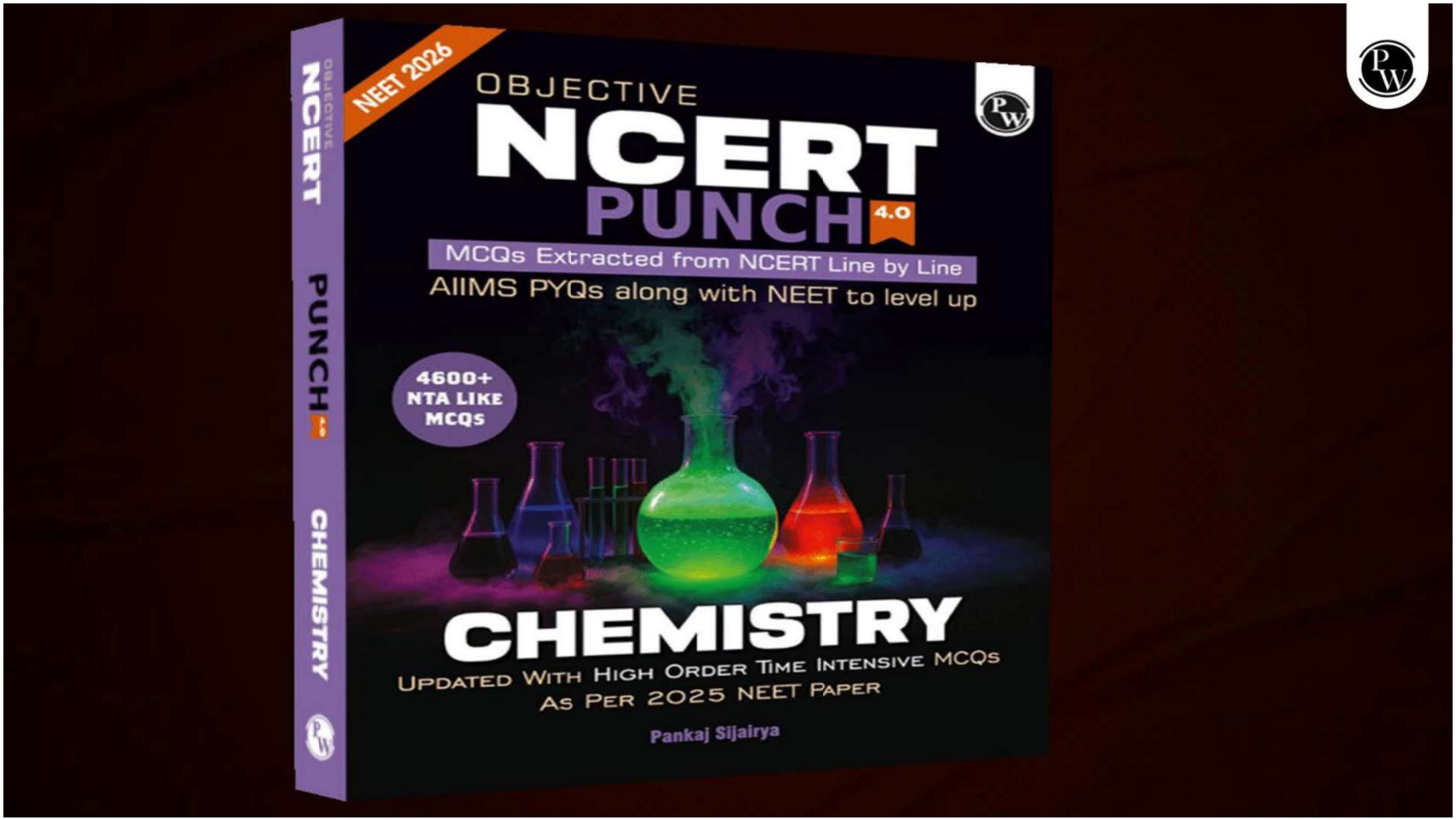
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NCERT
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CHEMISTRY

Homework From PW Module (Arjuna JEE)

Prarambh Exercise-01

Q. 1, 2, 4, 5 & 6


Thank you!!