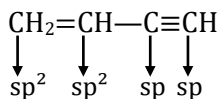


Classification and Nomenclature

SOLUTIONS

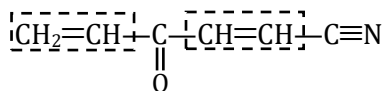
Exercise-I (Conceptual Questions)

1. **Ans. (1)**



So, Hybridisation of C-atoms which are attached to a single bond with each other is $\rightarrow$ sp^2, sp

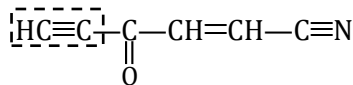
2. **Ans. (1)**



Olefinic bond $\rightarrow$ (C=C)

$\therefore$ Number of olefinic bond = 2

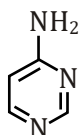
3. **Ans. (3)**



Acetylinic bond $\rightarrow$ $-\text{C}\equiv\text{C}-$

So, number of Acetylinic bond = 1

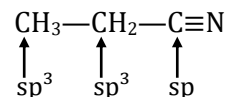
4. **Ans. (1)**



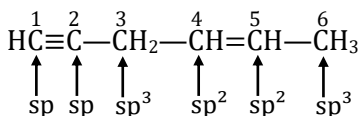
$\therefore$ Atoms other than carbon and hydrogen, when present in cyclic ring are called hetero atoms.

So, number of hetero atoms = 2

5. **Ans. (3)**



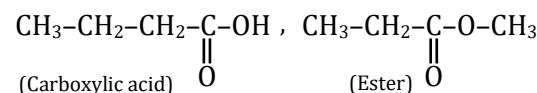
6. **Ans. (3)**



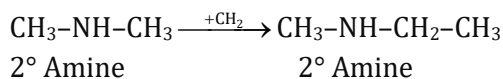
So, $\text{C}_2-\text{C}_3 \Rightarrow \text{sp}-\text{sp}^3$

7. **Ans. (4)**

Molecular formula $\rightarrow \text{C}_4\text{H}_8\text{O}_2$



8. **Ans. (3)**



9. **Ans. (3)**

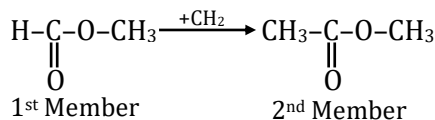
Alkenyne and Family

1st Member $\Rightarrow \text{CH}_2=\text{CH}-\text{C}\equiv\text{CH} \rightarrow \text{C}_4\text{H}_4$

2nd Member $\Rightarrow \text{CH}_3-\text{CH}=\text{CH}-\text{C}\equiv\text{CH} \rightarrow \text{C}_5\text{H}_6$

3rd Member $\Rightarrow \text{CH}_3-\text{CH}_2-\text{CH}=\text{CH}-\text{C}\equiv\text{CH} \rightarrow \text{C}_6\text{H}_8$

10. **Ans. (2)**

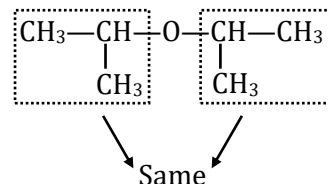


So, Number of carbon atoms in

2nd member of ester family = 3

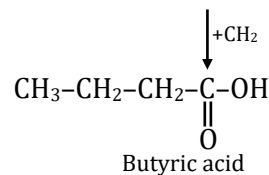
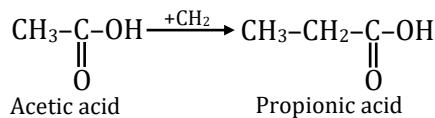
11. **Ans. (4)**

Symmetrical/simple ether $\Rightarrow$ both alkyl group are same



12. **Ans. (4)**

For compounds to be Homologues, Functional group (if present) should be same and the difference of $-\text{CH}_2-$ or molecular mass = 14 should be present.

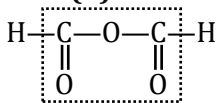


So, Acetic acid & Butyric acid are pair of Homologues.

13. **Ans. (3)**

∴ Alkanal = $C_nH_{2n}O$

14. **Ans. (1)**



∴ Minimum number of carbon atoms present in carboxylic acid anhydride = 2

15. **Ans. (4)**

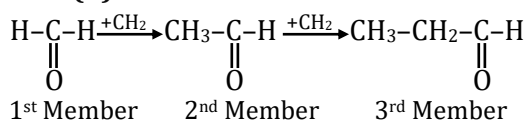
$C_nH_{2n} \rightarrow$ Alkene and cyclic alkane.

16. **Ans. (3)**

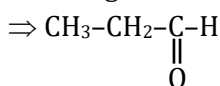
Alkyne $\rightarrow C_nH_{2n-2}$

So, $C_9H_{16} \rightarrow$ Alkyne group present.

17. **Ans. (1)**

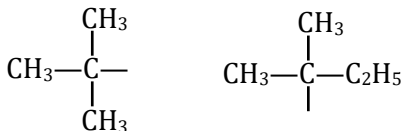


So, 3rd member of aliphatic aldehyde homologous series.

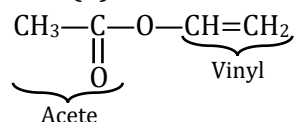


18. **Ans. (3)**

Tertiary radicals $\rightarrow$



19. **Ans. (1)**



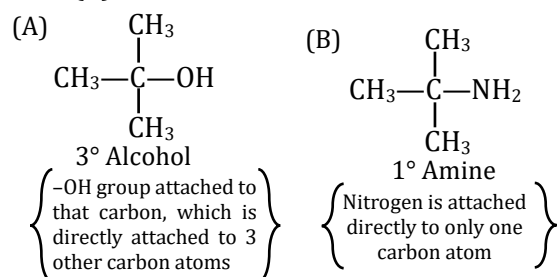
20. **Ans. (4)**

$R-NH_2$ where 'R' can be primary, secondary or (1° amine) tertiary carbon atom.

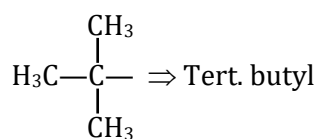
21. **Ans. (4)**

Secondary radical means free valency on 2° C

22. **Ans. (3)**

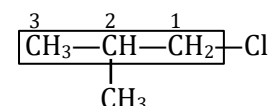


23. **Ans. (2)**



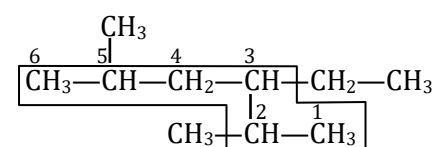
24. **Ans. (3)**

Isobutyl chloride -



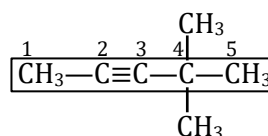
1-Chloro-2-methyl propane.

25. **Ans. (3)**



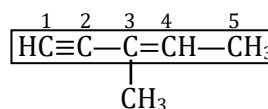
3-Ethyl-2,5-dimethylhexane

26. **Ans. (3)**



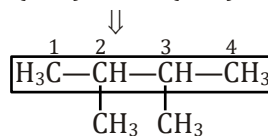
4,4-Dimethyl-2-pentyne

27. **Ans. (2)**



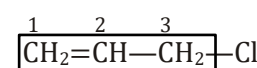
3-Methyl-3-penten-1-yne

28. **Ans. (2)**



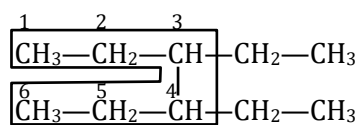
2,3-Dimethylbutane

29. **Ans. (3)**



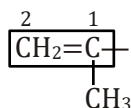
3-Chloropropene

30. **Ans. (3)**



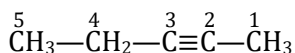
3, 4- Diethylhexane

31. Ans. (2)



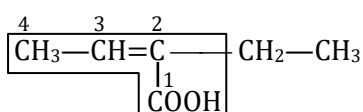
1-Methylethenyl

32. Ans. (1)


 Incorrect $\rightarrow$ 3-Pentyne

 Correct $\rightarrow$ 2-Pentyne

33. Ans. (3)

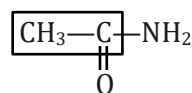


2-Ethyl but -2- enoic acid

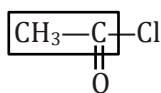
or

2-Ethyl -2- butenoic acid

34. Ans. (4)

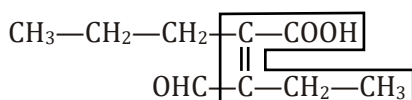


Ethanamide



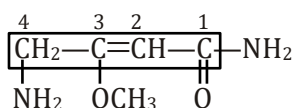
Ethanoyl chloride

35. Ans. (2)


 $\therefore$ Total carbon in PCC = 5

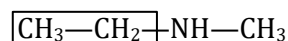
 Priority $\rightarrow$ Functional group > Multiple Bonds
> Number of carbons > Substituent.

36. Ans. (2)



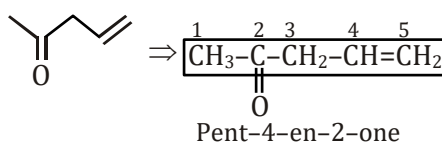
4-Amino-3-methoxy-2-butenamide

37. Ans. (3)



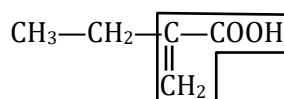
N-methylethanamine

38. Ans. (3)



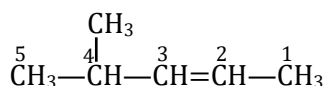
Pent-4-en-2-one

39. Ans. (2)


 Priority $\rightarrow$ F.G. > M.B. > Number of carbon atoms > substituent

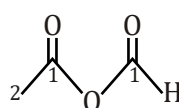
So, Total number of carbon in PCC = 3

40. Ans. (3)



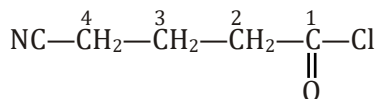
4-Methyl pent-2-ene

41. Ans. (4)



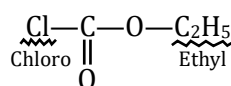
Ethanoic methanoic anhydride

42. Ans. (3)



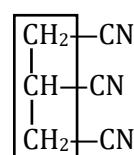
4-Cyano butanoyl chloride

43. Ans. (3)



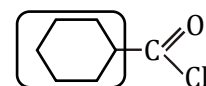
Ethyl Chloro methanoate

44. Ans. (3)



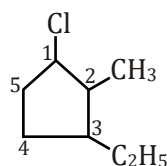
Propane-1,2,3-tricarbonitrile

45. Ans. (2)



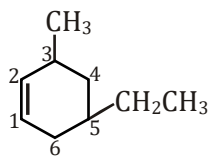
Cyclohexane carbonyl chloride

46. Ans. (2)



1-Chloro-3-ethyl-2-methylcyclopentane

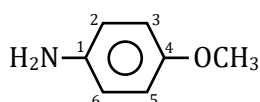
47. Ans. (2)



5-Ethyl-3-methylcyclohex-1-ene

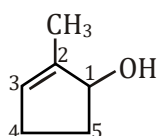
Numbering should start from F.G. > M.B. > Number of substituent.

48. Ans. (3)



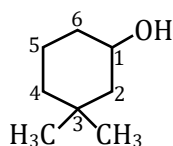
4-Methoxy aniline

49. Ans. (3)



⇒ 2-Methyl cyclopent-2-en-1-ol

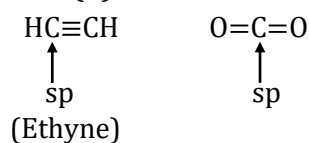
50. Ans. (3)



3,3-Dimethylcyclohexanol

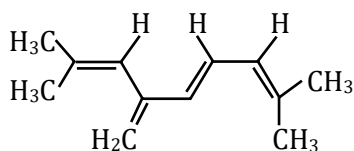
Exercise-II (Previous Year Questions)

1. Ans. (2)



(Ethyne)

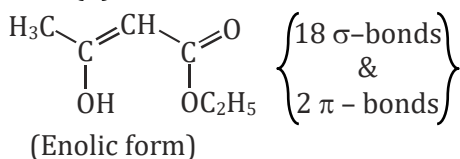
2. Ans. (1)



Total π - bond = 4

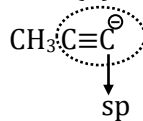
Total π - electrons = $4 \times 2 = 8\pi e^-$

3. Ans. (4)



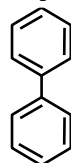
(Enolic form)

4. Ans. (4)



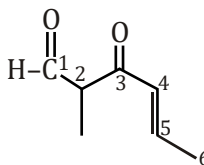
5. Ans. (3)

Coplanar :- All atoms should be in same plane



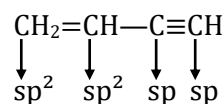
All atoms are sp^2 hybridised.

6. Ans. (4)

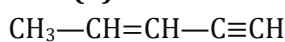


3-keto-2-methylhex-4-enal

7. Ans. (2)



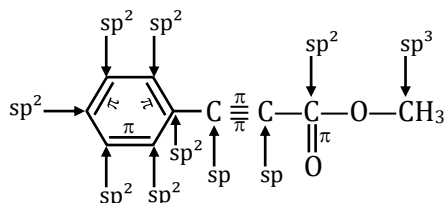
8. Ans. (1)



pent-2-en-4-yne

10 σ -bonds, 3- π -bonds

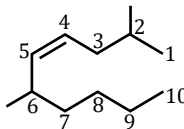
9. Ans. (3)



(i) Total sp^2 hybridised carbon atoms = 7

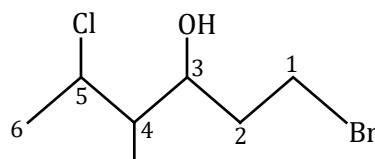
(ii) Total π - bonds = 6

10. Ans. (1)



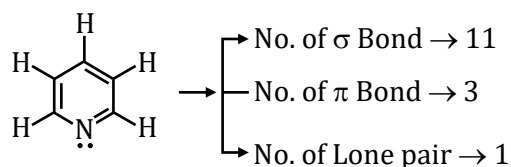
2, 6 Dimethyldec-4-ene

11. Ans. (4)

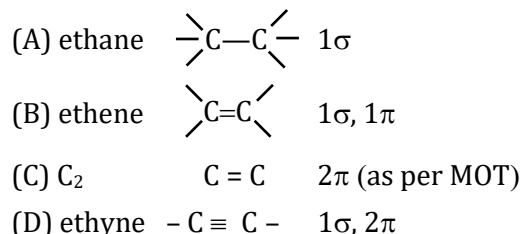


1-Bromo-5-chloro-4-methylhexan-3-ol

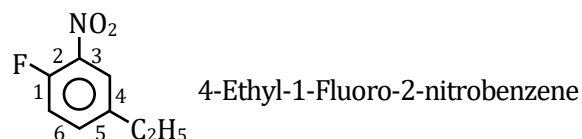
12. Ans. (2)



13. Ans. (3)

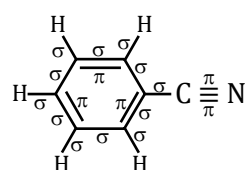


14. Ans. (1)



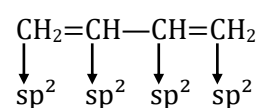
Exercise-III (Analytical Questions)

1. Ans. (4)


 Number of σ -bonds = 13

 Number of π -bonds = 5

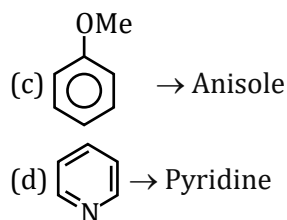
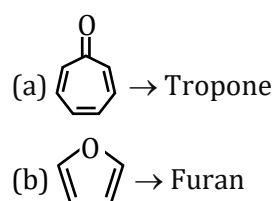
2. Ans. (3)


 All carbons are sp^2 hybridised so, the compound is planar.

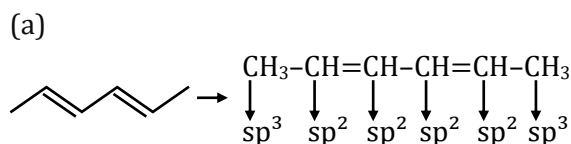
3. Ans. (2)

 Hydrogen, attached to 2°C , is known as 2°H .

4. Ans. (4)



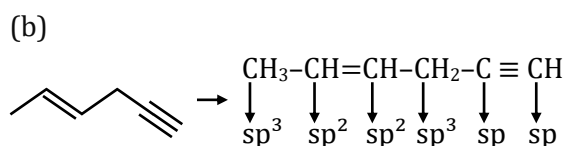
5. Ans. (2)



$$sp^2 \text{ 'C' } = 4$$

$$sp^3 \text{ 'C' } = 2$$

$$\frac{sp^2}{sp^3} = \frac{4}{2} = 2$$

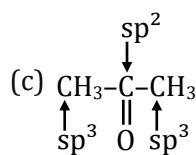
 a $\rightarrow$ r


$$sp^3 \text{ 'C' } = 2$$

$$sp^2 \text{ 'C' } = 2$$

$$sp \text{ 'C' } = 2$$

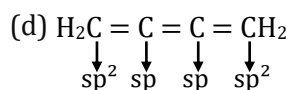
$$sp^3 : sp^2 : sp = 1$$

 b $\rightarrow$ p


$$sp^3 \text{ 'C' } = 2$$

$$sp^2 \text{ 'C' } = 1$$

$$\text{So } \frac{sp^3}{sp^2} = \frac{2}{1} = 2$$

 c $\rightarrow$ s


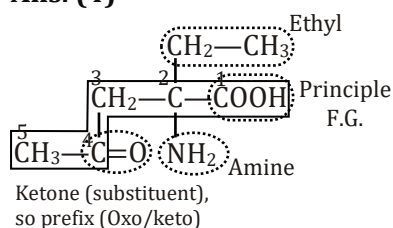
$$sp \text{ 'C' } = 2$$

$$sp^2 \text{ 'C' } = 2$$

$$\text{So } \frac{sp}{sp^2} = \frac{2}{2} = 1$$

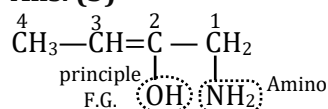
 d $\rightarrow$ q

6. Ans. (4)



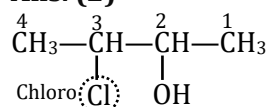
2-Amino-2-ethyl-4-oxo pentanoic acid

7. Ans. (3)



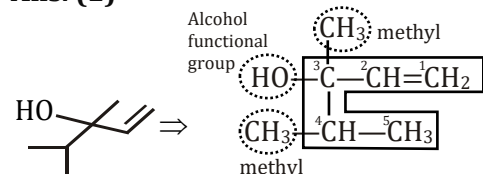
Correct name → 1-Amino-2-buten-2-ol

8. Ans. (2)



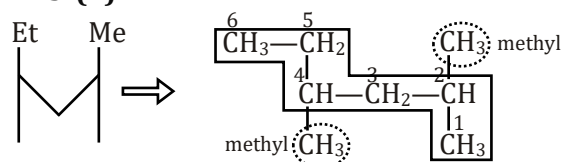
3-Chloro-2-butanol

9. Ans. (1)



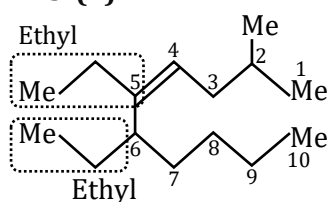
3, 4-Dimethyl-1-penten-3-ol

10. Ans. (4)



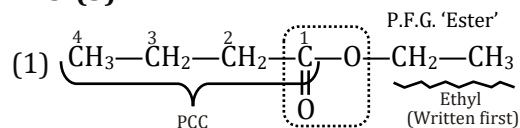
2,4-Dimethylhexane

11. Ans. (2)

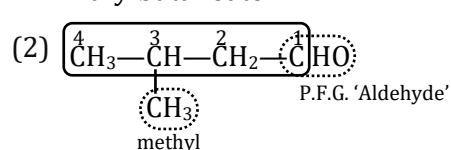


5, 6-Diethyl-2-methyl-4-decene

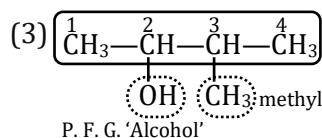
12. Ans. (3)



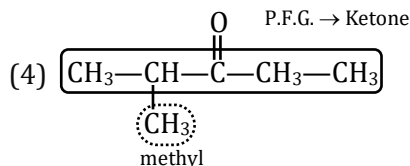
Ethylbutanoate



3-Methylbutanal

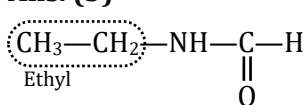


3-Methyl-2-butanol (correct IUPAC name)



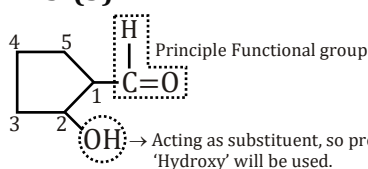
2-Methyl-3-pentanone

13. Ans. (3)



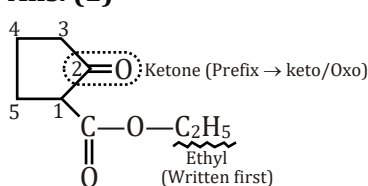
N-ethylmethanamide

14. Ans. (3)



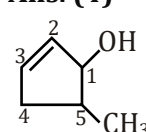
2-Hydroxycyclopentanecarbaldehyde

15. Ans. (1)



Ethyl-2-ketocyclopentanecarboxylate

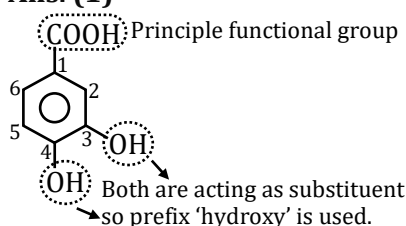
16. Ans. (4)



Priority Rule → Principle functional group > Multiple Bond > Substituent

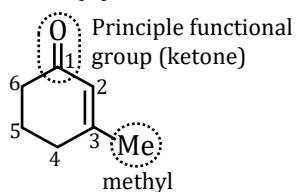
So, Correct IUPAC name → 5-methylcyclopent-2-en-1-ol

17. Ans. (1)



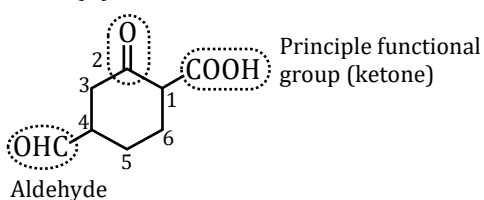
3,4 - Dihydroxybenzoic acid.

18. Ans. (1)



3-Methyl-2-cyclohexenone

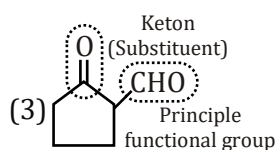
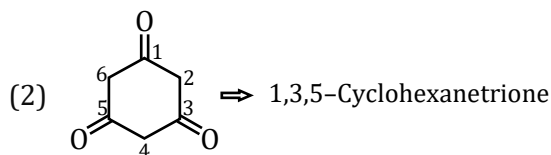
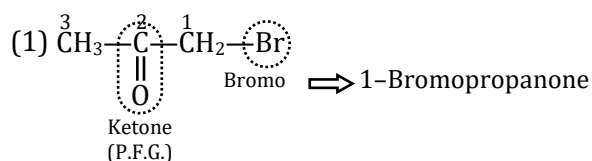
19. Ans. (2)



Principle functional group → Since carbon of-
COOH group is not in PCC, so suffix 'carboxylic
acid'

Aldehyde → Acting as substituent, since
carbon of aldehyde group is not coming in
parent carbon chain, so prefix 'formyl' is used.
4-Formyl-2-Oxo cyclohexane carboxylic
acid.

20. Ans. (4)



$\Rightarrow$ 2-Ketocyclopentanecarbaldehyde

So all are correct