CHAPTER

11

Nomenclature of Polyfunctional Groups

IUPAC SYSTEM OF NOMENCLATURE

Following is the priority to write the IUPAC names of different organic compounds having Polyfunctional groups.

PRIORITY LIST

S.No.	Functional group	Formula	Family name	Substitution
1.	Carboxylic acid	— COOH	Alkanoic acid or carboxylic acid	Carboxy
2.	Sulphonic acid	— SO_3H	Alkane Sulphonic acid	Sulpho
3.	Carboxylic acid anhydride	—C(=O)—O—C(=O)—	Alkanoic acid anhydride	
4.	Ester	—$\overset{*}{C}$OOR	Alkyl alkanoate	Carbalkoxy
5.	Acid halide	—$\overset{*}{C}$OX	Alkanoyl halide	Haloformyl, carbox halide, halocarbonyl
6.	Acid Amide	—$\overset{*}{C}$$CONH_2$	Alkanamide	Carbomyl
7.	Cyanide	C≡N	Alkanenitrile	Cyano
8.	Aldehyde	—$\overset{*}{C}$HO	Alkanal	Formyl. Aldo, Oxo
9.	Ketone	—C(=O)—	Alkanone	Oxo, Keto
10.	Alcohol	— OH	Alkanol	Hydroxy
11.	Thiols	— SH	Alkane thiols	Sulphamyl

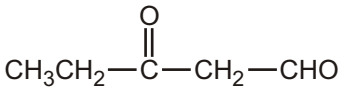
12.	Amines	— NH_2	Alkanamine	Amino
13.	Alkene, alkyne	C C C	Alkene, alkyne	
14.	Ethers	— OR	Alkoxyalkane	Alkoxy

❑ **NOTE:** 1 , 2 and 3 Amines are considered to be different funtional groups.

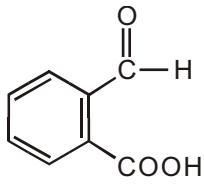
Step-1 : Identification of functional groups and classifying them into main, subsidiary and substituent groups.

1. **Main Functional group :** The functional group getting highest priority is called main functional group.
2. **Subsidiary group :** If the molecule contains C C or C C apart from Main functional group then the C C or C C are called subsidiary group.
3. **Substituent group :** Any other functional group apart from main or subsidiary.

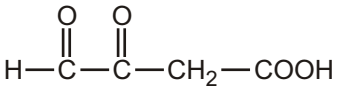
A ketone or aldehyde group can also be named as a substituent on a molecule with a higher priority functional group as its root. A ketone or aldehyde carbonyl is named by the prefix oxo- if it is included as part of the longest chain in the root name. When an aldehyde –CHO group is a substituent and not part of the longest chain, it is named by the prefix formyl. Carboxylic acids frequently contain ketone or aldehyde groups named as substituents.



3-oxopentanal



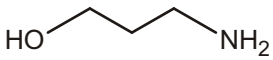
2-formylbenzoic acid



3,4-dioxobutanoic acid

Solved Example

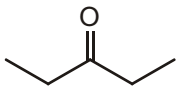
- Identify what suffix you would use in naming the following compound :



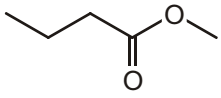
Sol. There are two functional groups in this compound, so we have to decide between calling this compound an amine or calling it an alcohol. If we look at the hierarchy above, we see that an alcohol outranks an amine. Therefore, we use the suffix -ol in naming this compound.

Solved Example

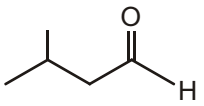
- Identify what suffix you would use in naming each of the following compounds.



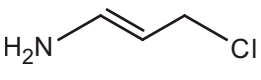
suffix : .....



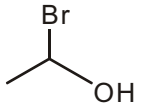
suffix : .....



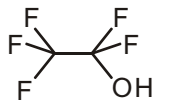
suffix : .....



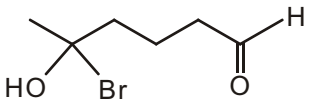
suffix : .....



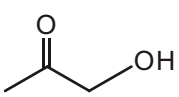
suffix : .....



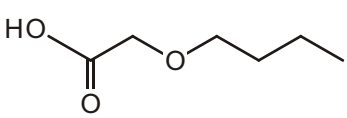
suffix : .....



suffix : .....



suffix : .....



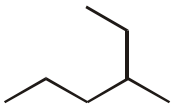
suffix : .....

Ans.

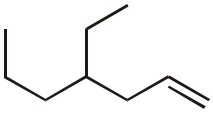
-one	-oate	-al
-amine	-ol	-ol
-al	-one	-oic acid

Solved Example

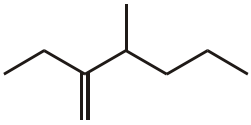
- Name the parent chain in the each of the following compounds.



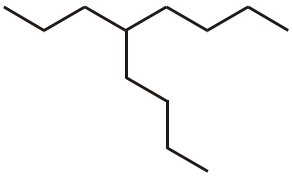
Parent: .....



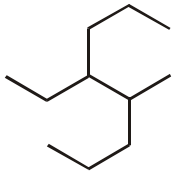
Parent: .....



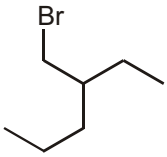
Parent: .....



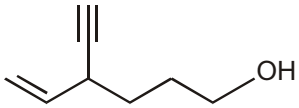
Parent: .....



Parent: .....



Parent: .....



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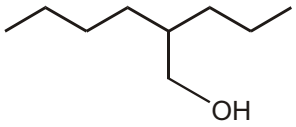

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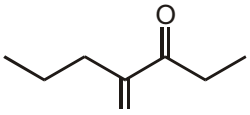


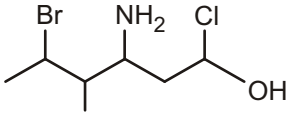
Parent: .....

Ans.

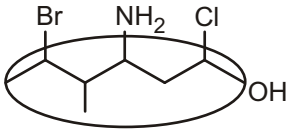
Hexane	Heptene	Hexene
Nonane	Octane	Hexane
Hexene	Hexane	Pentene

Solved Example

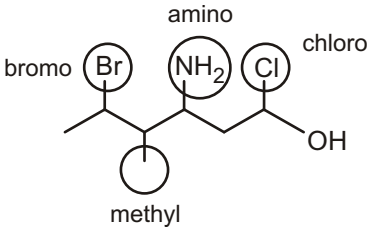
- In the following compound, identify all groups that would be considered substituents, and then indicate how you would name each substituent:



Ans. First we must locate the functional group that gets the priority. Alcohols outrank amines, so the OH group is the priority functional group. Then, we need to locate the parent chain. There are no double or triple bonds, so we choose the longest chain containing the OH group:

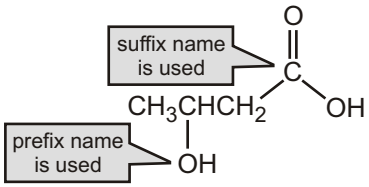


Now we know which groups must be substituents, and we name them accordingly:

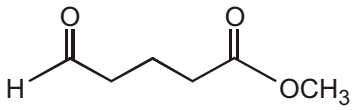


☞ If a compound has two functional groups, the one with the lower priority is indicated by a prefix and the one with the higher priority by a suffix (unless one of the functional groups is an alkene).

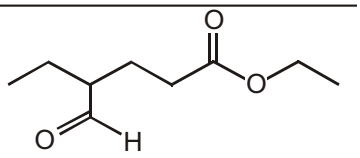
Solved Example



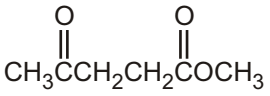
3-hydroxybutanoicacid



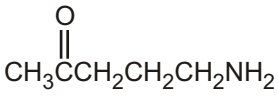
methyl 5-oxopentanoate



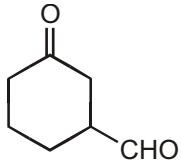
ethyl 4-formylhexanoate



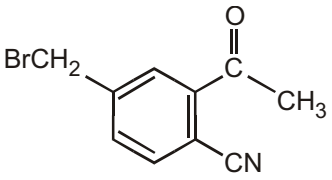
Methyl 4-oxopentanoate
(an ester with a ketone group)



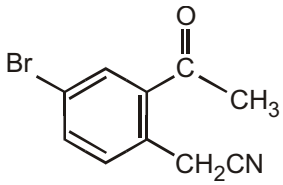
5-Aminopentan-2-one



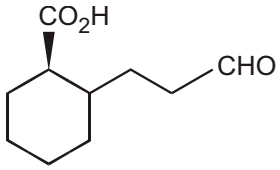
3-Oxocyclohexanecarbaldehyde
(an aldehyde with a ketone group)



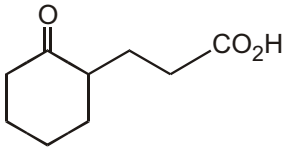
2-Acetyl(4-bromomethyl) benzonitrile



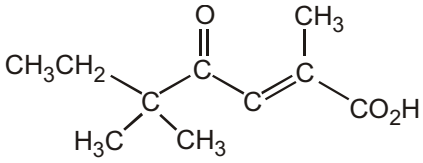
2-(2-Acetyl-4-bromophenyl) acetonitrile



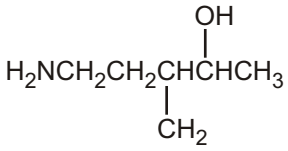
2-(3-oxopropyl)cyclo
-hexanecarboxylic acid



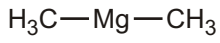
3-(2-Oxocyclohexyl) propanoic acid



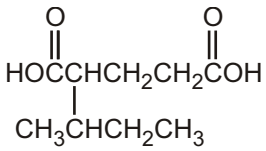
(E)-2,5,5-Trimethyl-4-oxohept-2-enoic acid



5-Amino-3-methylpentan-2-ol



Dimethylmagnesium
(one word, because magnesium is an element)



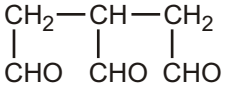
2-(1-methylpropyl) pentanedioic acid

CONDITIONS TO USE SPECIAL SECONDARY SUFFIXES

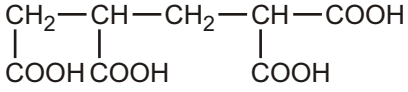
When carbon atom of carbon containing functional groups is not counted in parent chain (in word root) then special secondary suffixes are used.

☞ When three or more same carbon containing functional groups are present.

Solved Example



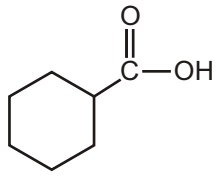
propane-1,2,3-tricarbaldehyde



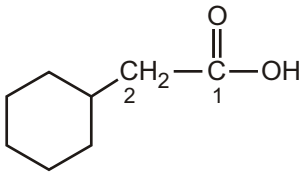
butane-1,1,3,4-tetracarboxylic acid

☞ When carbon containing functional group is directly attached with alicyclic ring.

Solved Example



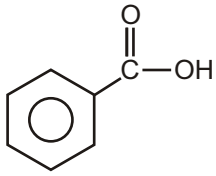
cyclohexanecarboxylic acid



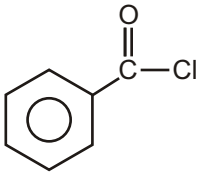
2-cyclohexylethanoic acid

☞ When carbon containg functions if is directly attached with benzene ring

Solved Example

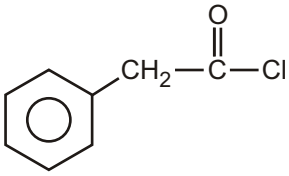


benzenecarboxylic acid



benzenecarbonylchloride

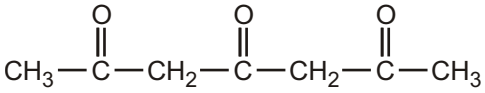
☞ But when benzene and carbon containing functional group are not directly atttached then benzene is treated as phenyl substituent.



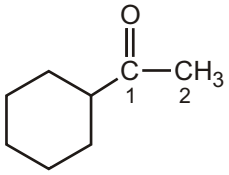
2-Phenylethanoylchloride

❑ **NOTE:** For Keto group above conditions are not applied because its carbon is always counted in parent chain (in word root).

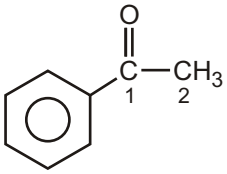
Solved Example



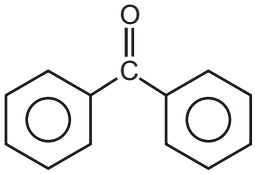
hept ane-2,4,6 trione



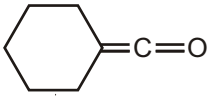
cyclohexyl**eth**anone



phenyl**eth**anone



diphenyl**meth**anone

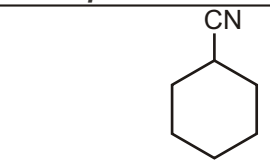


cyclohexylidene**meth**anone

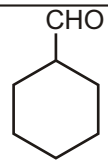
PREFIXES AND SUFFIXES FOR THE CARBON CONTAINING FUNCTIONAL GROUPS

Functional group	Prefix	Suffix
—CHO	Formyl	Carbaldehyde
—COOH	Carboxy	Carboxylic acid
—COX (X F, Cl, Br, I)	Halocarbonyl	Carbonyl halide
—COOR	Alkoxycarbonyl or Alkanoyloxy	Carboxylate
—$CONH_2$	Carbamoyl	Carboxamide
—CN	Cyano	Carbonitrile
	oxo/keto	—

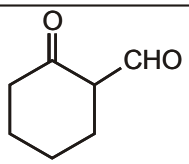
Solved Example



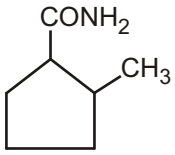
cyclohexanecarbonitrile



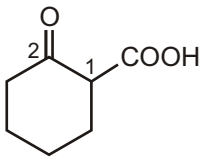
cyclohexanecarbaldehyde



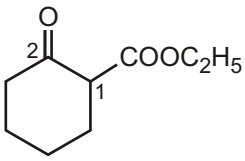
2-oxocyclohexane-1-carbaldehyde



2-methylcyclopentane-1-carboxamide



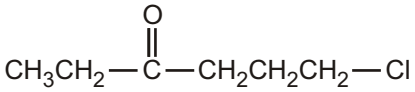
2-oxocyclohexane-1-carboxylic acid

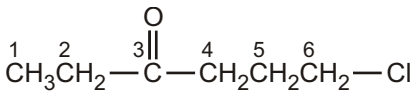


Ethyl 2-oxocyclohexanecarboxylate

Solved Example

▸ Write the IUPAC name of the following compound:

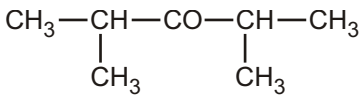


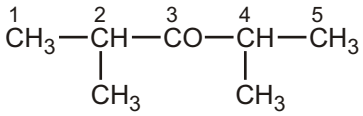
Sol. 

6-Chlorohexan-3-one

Solved Example

▸ Write the IUPAC name of the compound:



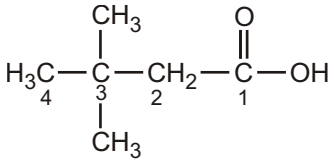
Sol. 

2,4-Dimethylpentan-3-one

Solved Example

- Write the IUPAC name of the following compound : $(CH_3)_3CCH_2COOH$

Sol.

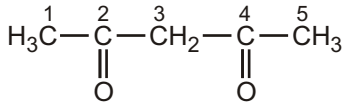


The IUPAC name of the given compound is 3,3-dimethyl-butanoic acid.

Solved Example

- Write the IUPAC name of the following compound : $CH_3COCH_2COCH_3$

Sol.



Pentane-2,4-dione

Solved Example

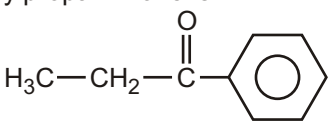
- Write the structure of 3-oxopentanal.

Sol. $CH_3 — CH_2CO — CH_2 — CHO$

Solved Example

- Draw the structural formula of 1-phenylpropan-1-one molecule.

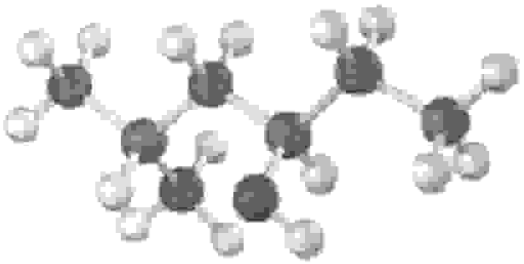
Sol. The structural formula of 1-phenylpropan-1-one is



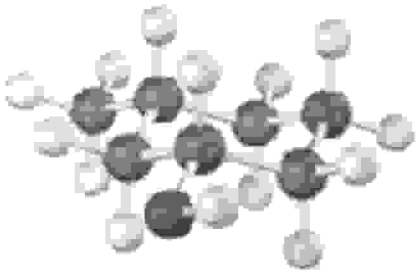
Solved Example

- Give IUPAC names for the following compounds :

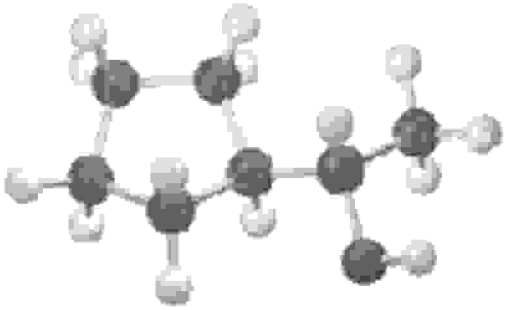
(a)



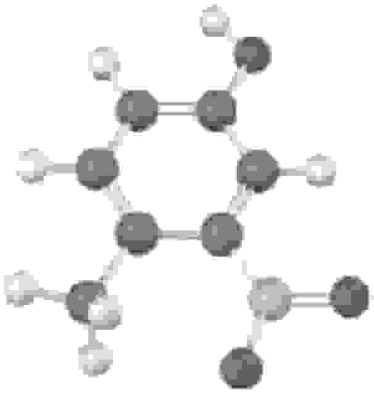
(b)



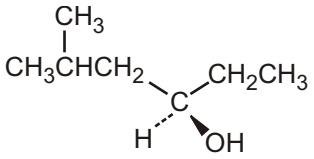
(c)



(d)

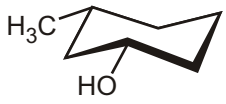


Sol. (a)



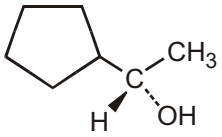
(R)-5-Methyl-3-hexanol

(b)



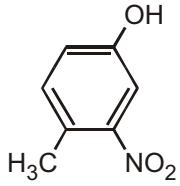
cis-3-Methylcyclohexanol

(c)



(S)-1-Cyclopentylethanol

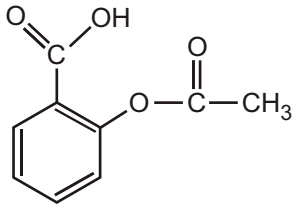
(d)



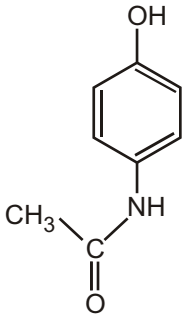
4-Methyl-3-nitrophenol

Solved Example

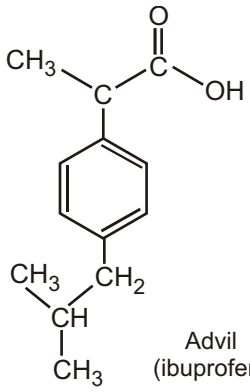
- The following compounds are the active ingredients in over-the-counter drugs used as analgestics (to relieve pain without decreasing sensibility or consciousness), antipyretics (to reduce the body temperature when it is elevated), and/or anti-inflammatory agents (to counteract swelling or inflammation of the joints, skin, and eyes). Identify the functional groups in each molecule.



Aspirin
(acetylsalicylic acid)



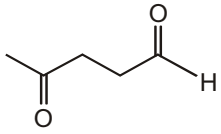
Tylenol
(acetaminophen)



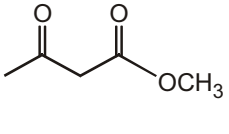
Advil
(ibuprofen)

Sol. All three compounds are aromatic. Aspirin is also a carboxylic acid ($-CO_2H$) and an ester ($-CO_2CH_3$). Tylenol is also an alcohol (–OH) and an amide (–CONH–). Ibuprofen contains alkane substituents and a carboxylic acid functional group.

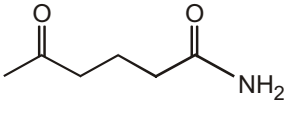
☞ If a ketone has a second functional group of higher naming priority. The ketone oxygen is indicated by the prefix "oxo."



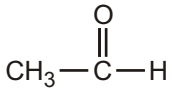
systematic name : 4-oxopentanal



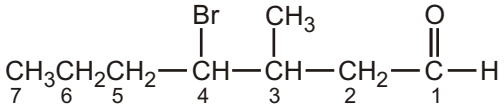
methyl 3-oxobutanoate



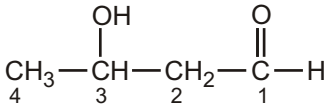
5-oxohexanamide



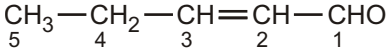
Ethanal



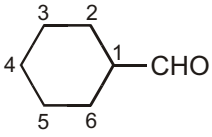
4-bromo-3-methylheptanal



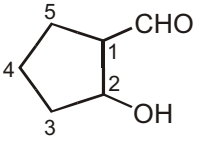
3-hydroxybutanal



2-pentenal
or
pent-2-enal



cyclohexanecarbaldehyde



2-hydroxycyclopentane-1-carbaldehyde

EXERCISE

SINGLE CHOICE QUESTIONS

1. Which of the following organic compounds does NOT have the molecular formula of $C_3H_6O_2$?

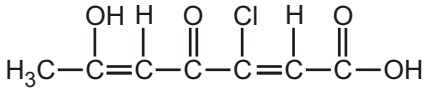
(A) Propanoic acid (B) Methyl ethanoate (C) Ethyl ethanoate (D) Ethyl methanoate

2. What is the IUPAC name for the organic compound with the condensed formula of $HCOCHBrCOCH_3$?

(A) 3-bromo-4-formylpropan-2-one (B) 4-formyl-3-bromopropan-2-one

(C) 2-bromo-3-oxobutanal (D) 3-oxo-2-bromobutanal

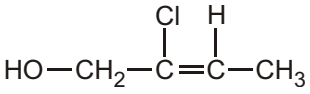
3. What is the IUPAC name of the following compound?



(A) 5-chloro-2-hydroxy-4-oxohepta-2,5-dienoic acid (B) 2-hydroxy-4-oxo-5-chlorohepta-2,5-dienoic acid

(C) 3-chloro-6-hydroxy-4-oxohepta-2,5-dienoic acid (D) 3-chloro-4-oxo-6-hydroxyhepta-2,5-dienoic acid

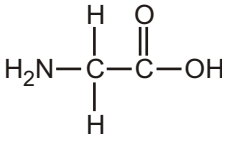
4. What is the IUPAC name of the following compound?



(A) 2-chloro-l-hydroxybut-2-ene (B) 3-chloro-4-hydroxybut-2-ene

(C) 2-chlorobut-2-en-1-ol (D) 3-chlorobut-2-en-4-ol

5. Consider the following organic compound :



Which of the following statements concerning the compound above are correct?

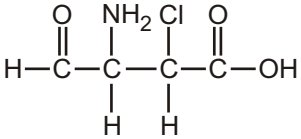
(1) It has two functional groups namely amide group and carboxyl group.

(2) It is soluble in water.

(3) Its IUPAC name is 2-aminoethanoic acid.

(A) (1) and (2) only (B) (1) and (3) only (C) (2) and (3) only (D) (1), (2) and (3)

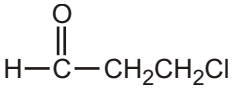
6. What is the IUPAC name for the following compound?



(A) 2-chloro-3-amino-4-oxobutanoic acid (B) 3-amino-2-chloro-4-oxobutanoic acid

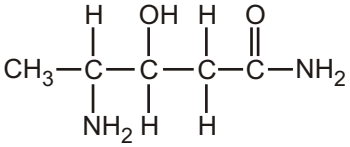
(C) 2-amino-3 -carboxy-3-chloropropanal (D) 2-amino-3-chloro-3-carboxypropanal

7. What is the IUPAC name of the following compound ?



(A) 1-chloropropan-3-al (B) Chloropropanal (C) 3-chloropropan-l-al (D) 3-chloropropanol

8. What is the IUPAC name for the following compound?



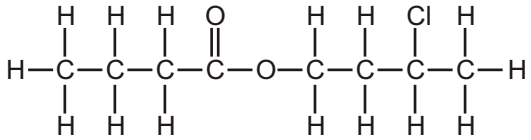
(A) 3-hydroxy-4-aminopentanamide

(B) 4-amino-3-hydroxypentanamide

(C) 4-amino-3-hydroxy-4-methylbutanamide

(D) 3-hydroxy-4-amino-4-methylbutanamide

9. What is the IUPAC name of the following compound ?



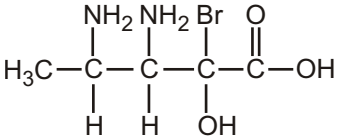
(A) 3-chlorobutyl butanoate

(B) 2-chlorobutyl butanoate

(C) Butyl 2-chlorobutanoate

(D) Propyl 4-chloropentanoate

10. What is the IUPAC name of the following compound?



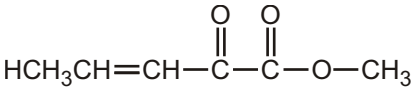
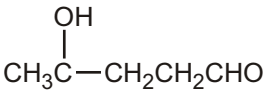
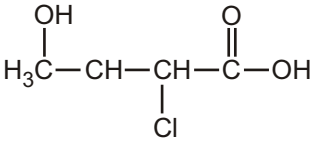
(A) 2,3-diamino-3-bromo-3-hydroxypentanoic acid

(B) 3,4-diamino-2-bromo-2-hydroxypentanoic acid

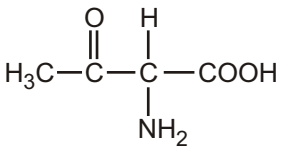
(C) 2-bromo-2-hydroxy-3,4-diaminopentanoicacid

(D) 2-bromo-2-hydroxy-3,4-diamino-4-methylbutanoic acid

11. Which of the following combinations about the structural formula for a compound correct?

	Compound	**Structural formula**
(A)	Diol	HOOC – COOH
(B)	Methyl 2-oxopent-3-enoate	
(C)	5-formylpent-2-ol	
(D)	3-carboxy-3-chlorobutan-2-ol	

12. What is the IUPAC name of the following compound?



(A) 3-amino-4-carboxybutan-2-one

(B) 3-amino-4-carboxybutan-2-al

(C) 2-amino-3-oxobutanoic acid

(D) 2-amino-3-methyl-3-oxopropanoic acid

13. Which of the following is the condensed formula for 3-oxopentanal?

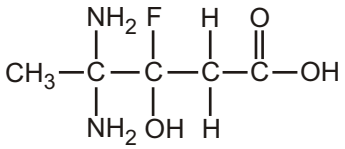
(A) $CH_3CH_2COCH_2COH$

(B) $CH_3CH_2COCH_2CHO$

(C) $CH_3CH_2CH_2COCHO$

(D) $CH_3CH_2CH_2COCOH$

14. What is the IUPAC name for the following compound?



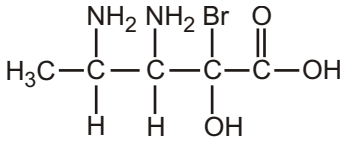
(A) 3-fluoro-3-hydroxy-4,4-diaminopentanoic acid

(B) 4,4-diamino-3-fluoro-3-hydroxypentanoic acid

(C) 3-fluoro-3-hydroxy-4,4-diamino-4-methylbutanoic acid

(D) 4,4-diamino-3-fluoro-3-hydroxy-4-methylbutanoic acid

15. Consider the following compound:



Which of the following homologous series does the above compound belong to?

(A) Amines (B) Alcohols (C) Ketones (D) Carboxylic acids

16. Which of the following is the condensed formula for 4-aminobutanamide?

(A) $NH_2CH_2(CH_2)_2CONH_2$ (B) $NO_2CH_2(CH_2)_2CONH_2$

(C) $NH_2CO(CH_2)_2CONH_2$ (D) $CH_3(CH_2)_2CH(NH_2)_2$

17. Which of the following combinations is correct?

	IUPAC name	**Trivial name**	**Common use**
(A)	Propan-l-ol	Isopropyl alcohol	Solvent
(B)	Ethanoic acid	Acetic acid	Solvent
(C)	Methanal	Formaldehyde	Production of polymers
(D)	Trichloromethane	Chloroform	Fuel additive

18. Which of the following statements about ethanoic acid and methyl methanoate are correct?

(1) They are functional group isomers with the molecular formula $C_2H_4O_2$.

(2) They belong to different homologous series.

(3) They have different chemical properties.

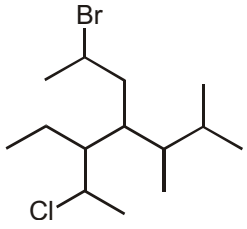
(A) (1) and (2) only (B) (1) and (3) only (C) (2) and (3) only (D) (1), (2) and (3)

19. Which of the following compound are functional group isomers of $C_4H_8O_2$?

(1) Methyl propanoate (2) 4-hydroxybutanal (3) Butane-1,4-diol

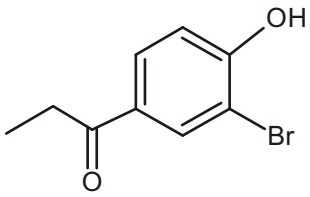
(A) (1) and (2) only (B) (1) and (3) only (C) (2) and (3) only (D) (1) (2) and (3)

20. How many total number of substituents are present in the following compound?



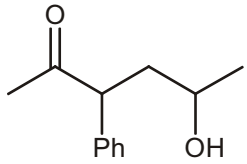
(A) 3 (B) 4 (C) 5 (D) 6

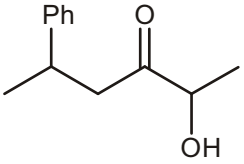
21. What is the IUPAC name for

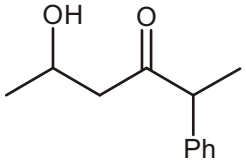


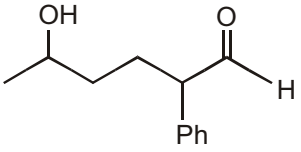
(A) m-Bromo-p-hydroxypropiophenone
(B) 2-Bromo-4-propanoyl phenol
(C) 3-Bromo-4-hydroxy phenyl propan-1-one
(D) 2-Hydroxy-5-propanoyl bromo benzene

22. What is the correct structure for 5-hydroxy-2-phenyl hexan-3-one?

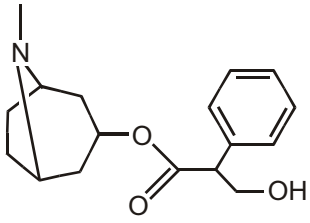
(A) 

(B) 

(C) 

(D) 

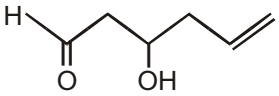
23. Which of the functional group is NOT present in Atropine?



Atropine

(A) Amine
(B) Phenol
(C) ester
(D) Benzene ring

24. What is the correct IUPAC name of the following compound.



(A) 4-Hydroxyhex-1-en-6-al
(B) 1-Oxohex-5-en-3-ol
(C) 3-Hydroxyhex-5-enal
(D) 6-Oxohex-1-en-4-ol

25. IUPAC name of Benzyl alcohol is :

(A) Phenol
(B) Hydroxymethyl Benzene
(C) Benzenol
(D) 1-Phenyl methanol

26. IUPAC name of T. N. T. is :

(A) Trinitrotoluene
(B) 1,2,3-Trinitrotoluene
(C) 2,4,6-Trinitrotoluene
(D) 2-methyl-1,3,5-Trinitrotoluene

27. What is the IUPAC name of Laughing gas?

(A) Nitrogen oxide
(B) Nitrogen dioxide
(C) Dinitrogen Oxide
(D) Nitrous oxide

28. The given compound is called Churchane. What is the Double Bond Equivalent value of Churchane?

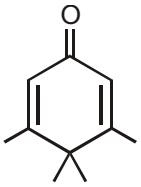
(A) 4 (B) 5

(C) 6 (D) 7

29. What is the IUPAC name of Natrium?

(A) Sodium (B) Nitride (C) Natride (D) Sodide

30. The common name of the given compound is Penguinone because it is a penguine shaped ketone. What is the IUPAC name of Penguinone?



(A) 6-oxo-2,3,3,4-tetramethylcyclohexa-1,4-diene

(B) 3,4,4,5-tetramethylcyclohexa-2,5-dien-1-one

(C) 6-formyl-2,3,3,4-tetramethylcyclohexa-1,4-diene

(D) 2,3,3,4-tetramethylcyclohexa-1,4-dien-6-one

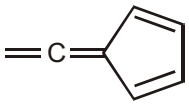
31. Which of the following is the correct IUPAC name of Unsymmetric Butylene?

(A) 1-Butene (B) 2-Butene (C) 2-MethylPropene (D) 2-Methylbutene

32. Which of the following Common names of Carboxylic acids and their sources is correctly matched?

(A) Formic acid- Vinegar (B) Acetic acid- Ant (C) Butyric acid- Butter (D) Steric acid- Goat

33. What is correct IUPAC name of the given compound?



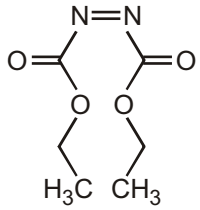
(A) 5-ethenylidene-1,3-cyclopentadiene

(B) 1,3-cyclopentadiene-5-ethenyl ketene

(C) cyclopentyl-2,4-dienylidene ethene

(D) 1-ethenylidenyl-cyclopenta-2,4-diene

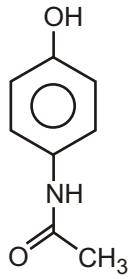
34. The given compound is called as DEAD. What is the full-form of DEAD?



(A) Diethyl azodicaboxylic acid (B) Diethyl azodicaboxylic anhydride

(C) Diethyl azodicaboxylate (D) Diethyl azodione

35. What is the IUPAC name of Paracetamol?



(A) N-(4-hydroxyphenyl)acetamide (B) N-phenylacetamide

(C) N-phenolethanamide (D) N-(4-hydroxyphenyl)ethanamide

36. IUPAC name of Acetophenone is :

(A) Benzophenone
(B) 1,1-Biphenylmethanone
(C) Benzene Methyl methanone
(D) 1-Phenyl Ethanone

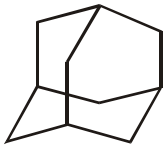
37. What is the name of the compound shown?

(A) 1,3-dimethylbicyclo[5.3.0]decane
(B) 1,3-dimethylbicyclo[5.3.1]decane
(C) 1,8-dimethylbicyclo[5.3.0]decane
(D) 1,9-dimethylbicyclo[5.3.0]decane

38. Which of the following is an allylic alcohol?

(A) CH_2 $CHCH_2OCH_3$
(B) CH_2 $CHCH(CH_3)OH$
(C) CH_3CH $CHCH_2OH$
(D) CH_2 $CHCH_2CH_3$

39. Number of 6-membered rings in Adamantane is :



(A) 4
(B) 5
(C) 6
(D) 7

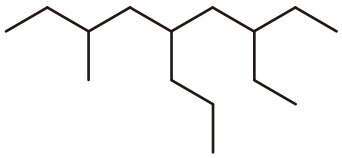
40. Which of the following hydrocarbons does not have isomers?

(A) C_3H_6
(B) C_4H_6
(C) C_4H_8
(D) C_3H_8

41. The general formula for non-cyclic alkenes is :

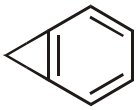
(A) $C_nH_{2n\ 2}$
(B) C_nH_{2n}
(C) C_nH_n
(D) $C_nH_{n\ 2}$

42. What is correct IUPAC name of the given compound?



(A) 7-ethyl-3-methyl-5-propyl Nonane
(B) 6-ethyl-4-(2-methylbutyl)
(C) 3-ethyl-7-methyl-5-propyl Nonane
(D) 3-methyl 5-(2-ethyl butyl)-octane

43. What is correct IUPAC name of the given compound?



(A) Bicyclo [4.1.0] hepta-1,2,4-triene
(B) Bicyclo [0.1.4] hepta-1,2,4-triene
(C) Bicyclo [4.1] hepta-1,2,4-triene
(D) Bicyclo [1.4] hepta-1,2,4-triene

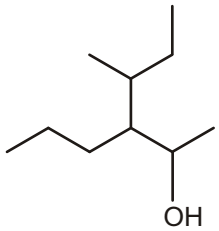
44. IUPAC name of Ethylformate is :

(A) Ethyl ethanoate
(B) Ethyl methanoate
(C) Methyl methanoate
(D) Methyl ethanoate

45. IUPAC name of Phenylacetate is :

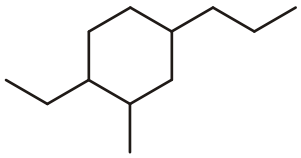
(A) Phenyl ethanoate
(B) Phenyl 1-Phenyl methanoate
(C) Phenyl methanoate
(D) 1-Phenyl Ethanone

46. How many carbon atoms are in the longest carbon chain (IUPAC)?



(A) 4
(B) 5
(C) 6
(D) 7

47. The correct IUPAC name of the given compound is :



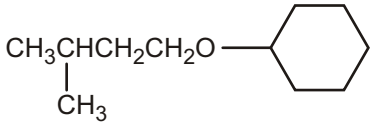
(A) 5-ethyl-1-methyl-2-propylcyclohexane

(B) 1-ethyl-3-methyl-4-propylcyclohexane

(C) 4-ethyl-2-methyl-1-propylcyclohexane

(D) 4-ethyl-1-methyl-3-propylcyclohexane

48. What is the common name of the given compound?



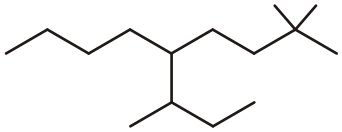
(A) Cyclohexyl secpentyl ether

(B) Cyclohexyl isopentyl ether

(C) Cyclohexyl isobutyl ether

(D) Cyclohexyl secbutyl ether

49. What is correct IUPAC name of the given compound?



(A) 4-Butyl-3,7,7-Trimethyloctane

(B) 5-Butyl-2,2,6-Trimethyloctane

(C) 6-methyl-5(3,3-dimethylbutyl)octane

(D) 2,2-Dimethyl-5-(1-methylpropyl)nonane

50. Number of -OH groups in Vitamin-C are :

(A) 2 (B) 3 (C) 4 (D) 5

51. Which of the following IUPAC names is correctly written?

(A) trans-1-tert-butylpropene

(B) 6-methylcycloheptene

(C) 3-butene

(D) (Z)-2-hexene

52. Without drawing the structures, correctly match the given compounds with fused bicyclic compound and bridged bicyclic compound:

P = bicyclo[2.1.1]hexane Q = bicyclo[3.1.0]hexane

(A) fused bicyclic compound = P bridged bicyclic compound = P

(B) fused bicyclic compound = P bridged bicyclic compound = Q

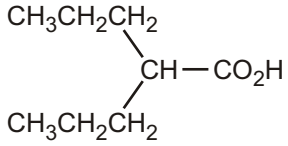
(C) fused bicyclic compound = Q bridged bicyclic compound = P

(D) fused bicyclic compound = Q bridged bicyclic compound = Q

53. Which of the following compounds can contain a benzene ring?

(A) $C_{10}H_{16}$ (B) $C_8H_6Cl_2$ (C) C_5H_4 (D) $C_{10}H_{16}O$

54. The given compound is called valproic acid used in treatment of epilepsy. What is the correct name of valproic acid?



Valproic acid

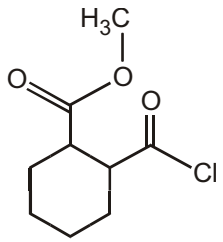
(A) Heptane-4-carboxylic acid

(B) 2-propylpentanoic acid

(C) 2-propylpentanecarboxylic acid

(D) Heptane-4-oic acid

55. IUPAC name of the given compound is :



(A) Methyl 2-chloroformyl-1-cyclohexanecarboxylate

(B) 2-Methoxy carbonyl Cyclohexanecarbonyl chloride

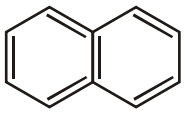
(C) Methyl 2-chloroformyl-1-cyclohexanoate

(D) 2-Methoxy carbonyl Cyclohexanonyl chloride

56. The ratio of pi bonds to sigma bonds in benzene is :

(A) 1 : 2 (B) 1 : 3 (C) 1 : 4 (D) 4 : 1

57. Common name of the given compound is :



(A) Naphthalene (B) Anthracene (C) Phenanthracene (D) Phenanthrene

58. IUPAC name of the given compound is :

$CH_3C(\quad O)N(CH_3)_2$

(A) N-ethylethanamide (B) N-methylethanamide

(C) N,N-diethylethanamide (D) N,N-dimethylethanamide

59. IUPAC name of Isoprene is :

(A) 2-methylbuta-1,3-diene (B) 2,3-dimethylbuta-1,3-diene

(C) Methylbuta-1,3-diene (D) 2-methylbut-1-ene

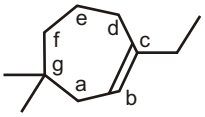
60. IUPAC name of the given compound is :

$(CH_3)_2C \quad CHC(C_2H_5) \quad CH_2$

(A) 2-methyl-4-methylidenehex-2-ene (B) 4-ethyl-2-methylpenta-1,3-diene

(C) 2-ethyl-4-methylpenta-1,3-diene (D) 4-methyl-2-methylidenehex-2-ene

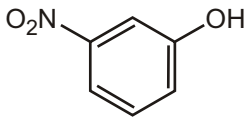
61.



From the carbon indicated a-g, which will get the number 1?

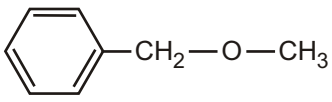
(A) a (B) b (C) c (D) g

62. An appropriate name for the compound shown to the right is :



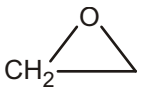
(A) p-nitrophenol (B) m-nitrophenol (C) o-nitrophenol (D) m-nitrophenyl

63. A correct name for the compound on the ring would be :

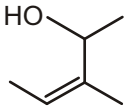


(A) methyl phenyl ether (B) benzyl methyl ether

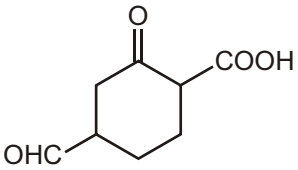
(C) dimethyl phenyl ether (D) methoxybenzene

64. The IUPAC name of the compound  is :

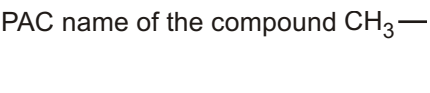
(A) 1, 2 - epoxy - 3 propanol
(B) 1, 2 - oxa - 3 - propanol
(C) 2, 3 - epoxy - 1 - propanol
(D) 2, 3 - epoxy allyl alcohol

65. The IUPAC name of the compound  is :

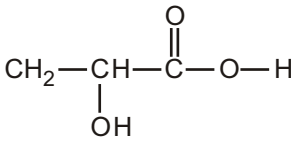
(A) 3, 4 - dimethyl but - 2 - en - 4 - ol
(B) 3 - methyl pent - 2 - en - 4 - ol
(C) 3 - methyl pent - 3 - en - 2 - ol
(D) 1, 2 - dimethyl but - 2 - en - 1 - ol

66. The correct IUPAC name of the compound  is

(A) 5 - carboxy - 3 - oxocyclohexane carboxaldehyde
(B) 2 - carboxy - 5 - formylcyclohexane
(C) 4 - formyl - 2 - oxocyclohexane carboxylic acid
(D) 4- carboxy - 3 - oxocyclohexanal

67. The IUPAC name of the compound  is :

(A) hydroxypentenoic acid
(B) 4 - hydroxy - 3 - pentenoic acid
(C) 4 - hydroxy - 4 - pentenoic acid
(D) 4 - hydroxy - 4 - methyl - 3 - ene pentenoic acid

68. What is the IUPAC name of the following compound? 

(A) 2-hydroxypropanoic acid
(B) 2-methyl-2-hydroxyethanoic acid
(C) Propanoic acid
(D) 2-carboxyethanol

MATCH THE COLUMN

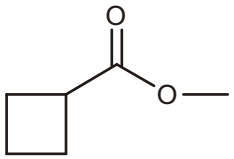
1. Which of the following pairs is correctly matched?

Column I	Column II
P. Paraffins	**1.** Alkanes
Q. Olefins	**2.** Alkenes
R. Di-olefins	**3.** Alkynes
S. Di-paraffins	**4.** Buta-1,3-diene
T. Poly-olefins	**5.** Hexa-1,3,5-triene
U. Poly-paraffins	

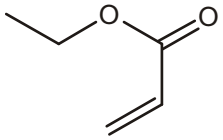
(A) P-1 Q-2 R-4 T-5
(B) P-1 Q-2 R-4 T-5
(C) P-2 Q-1 S-4 U-5
(D) P-2 Q-1 S-4 U-5

UNSOLVED EXAMPLE

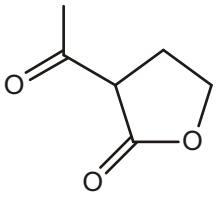
1. How many compounds shown below can be classified as an ester as well as a ketone?



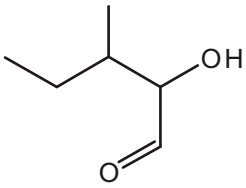
(1)



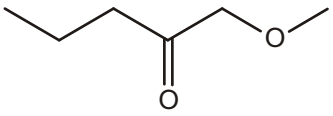
(2)



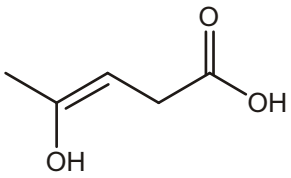
(3)



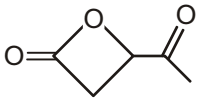
(4)



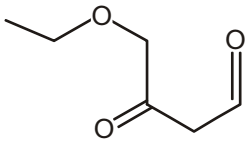
(5)



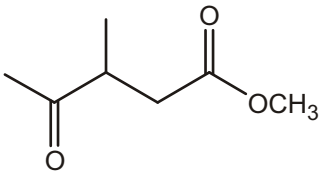
(6)



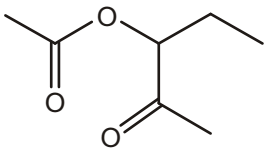
(7)



(8)



(9)

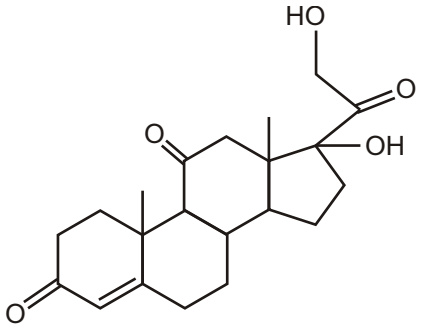


(10)

2. *X* Number of alcohols (structurally different) possible for $C_4H_{10}O$

Y Number of ketones (structurally different) possible for $C_5H_{10}O$

Z Number of different functional groups present in the below compound :



Find the value of $\frac{X \quad Y \quad Z}{2}$?

3. Draw the structures of

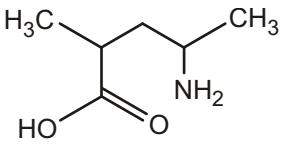
(A) 1, 6-hexanedioic acid

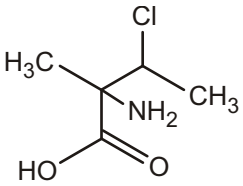
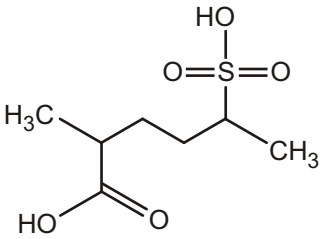
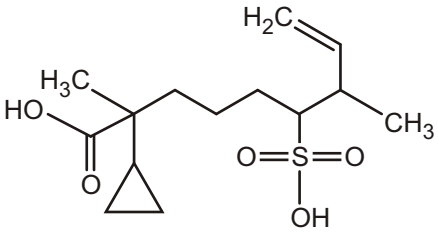
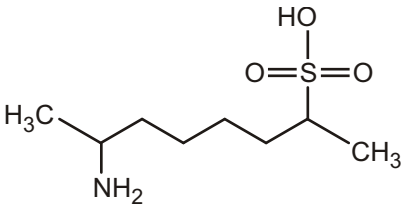
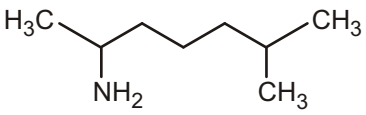
(B) ethyl 2-ethyl 2-hydroxybutanoate

(C) 2-amino-3-cyclohexyl-1-propanol

(D) 2,2 diethyl cyclobutane carboxylic acid

WORK SHEET

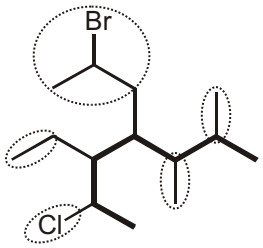
S.No.	Compounds	Write IUPAC - Name
1.		

2.			
3.			
4.			
5.			
6.			

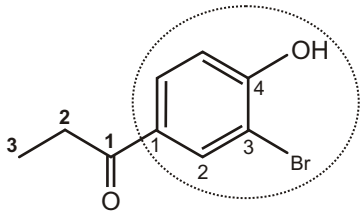
Answers

Single Choice Questions

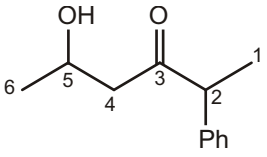
1. (C)	**2.** (C)	**3.** (C)	**4.** (C)	**5.** (C)	**6.** (B)	**7.** (C)	**8.** (B)
9. (A)	**10.** (B)	**11.** (B)	**12.** (C)	**13.** (B)	**14.** (B)	**15.** (D)	**16.** (A)
17. (B)	**18.** (D)	**19.** (A)	**20.** (C)	**21.** (C)	**22.** (C)	**23.** (B)	**24.** (C)
25. (D)	**26.** (C)	**27.** (D)	**28.** (C)	**29.** (A)	**30.** (B)	**31.** (A)	**32.** (C)
33. (A)	**34.** (C)	**35.** (D)	**36.** (D)	**37.** (D)	**38.** (B)	**39.** (A)	**40.** (D)
41. (B)	**42.** (C)	**43.** (A)	**44.** (B)	**45.** (A)	**46.** (C)	**47.** (C)	**48.** (B)
49. (D)	**50.** (C)	**51.** (D)	**52.** (C)	**53.** (B)	**54.** (B)	**55.** (A)	**56.** (C)
57. (A)	**58.** (D)	**59.** (A)	**60.** (C)	**61.** (C)	**62.** (B)	**63.** (B)	**64.** (C)
65. (C)	**66.** (C)	**67.** (B)	**68.** (A)				

20. 

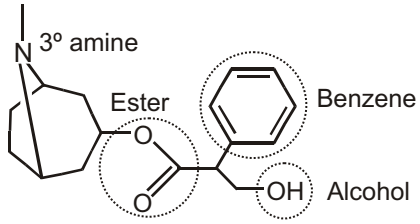
Total 5 substituents

21. 

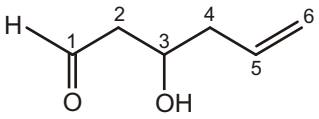
3-Bromo-4-hydroxy phenyl propan-1-one
Ketone is main functional group.

22. 

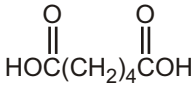
5-hydroxy-2-phenyl hexan-3-one

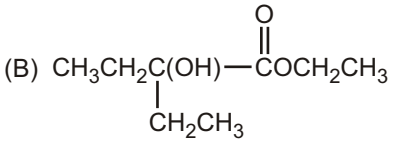
23. 

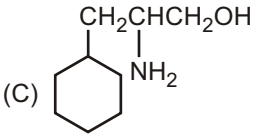
Not having phenol.

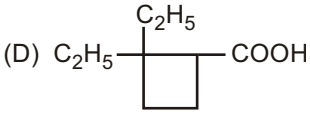
24. 

Principal functional group is –CHO (according to priority table).

69. (A) 

(B) 

(C) 

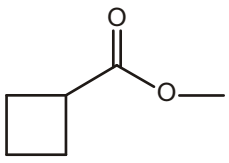
(D) 

Match the Column

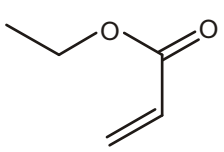
1. (A)

Unsolved Example

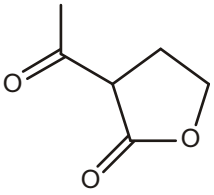
1. (4)



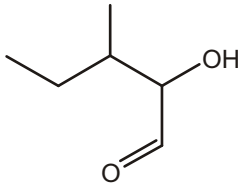
Ester
(1)



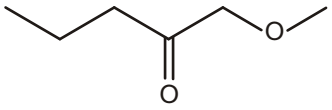
Ester, alkene
(2)



Ester, ketone
(3)

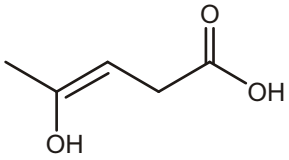


Aldehyde, alcohol
(4)



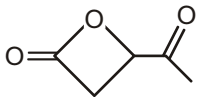
Ketone, ether

(5)



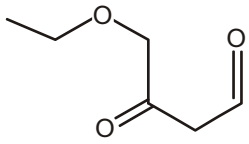
Alkene, alcohol, carboxylic acid

(6)



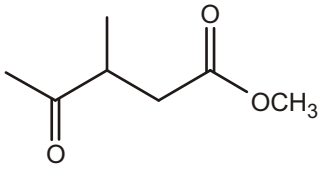
Ester, Ketone

(7)



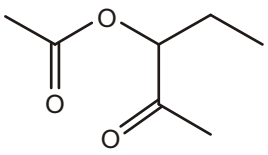
Ester, Ketone, aldehyde

(8)



Ketone ester

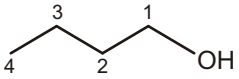
(9)



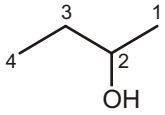
Ketone, ester

(10)

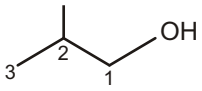
2. (5)



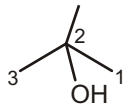
butan-1-ol



butan-2-ol

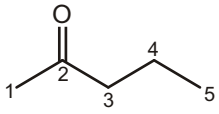


2-methyl propan-1-ol

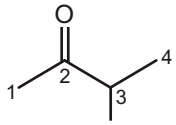


2-methyl propan-2-ol

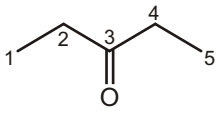
; X 4



pentan-2-one

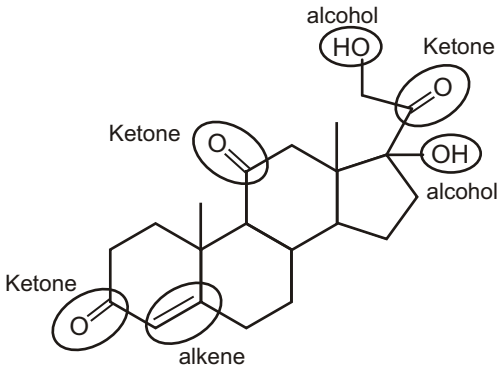


3-methyl butan-2-one alcohol



pentan-3-one

; Y 3



Only Ketone, Alkene, Alcohol are present ; Z 3

thus $\frac{X \quad Y \quad Z}{2}$ 5

Work Sheet

1. 4-amino-2-methylpentanoic acid

2. 2-amino-3-chloro-2-methylbutanoic acid

3. 2-methyl-5-sulfohexanoic acid

4. 2-cyclopropyl-2,7-dimethyl-6-sulfo non-8-enoic acid

5. 7-aminooctane-2-sulfonic acid

6. 6-methylheptan-2-amine

❑❑❑