# Exercise-1

**Marked Questions may have for Revision Questions.**

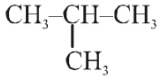
## OBJECTIVE QUESTIONS

### Section (A) : Fundamental of Organic Chemistry

**A-1.** How many π and σ bonds are present in ethylene :

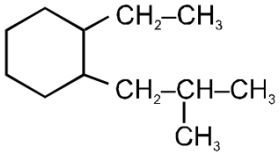
(1) 5 σ , 1 π (2) 3 σ , 3 π (3) 2 σ ,4 π (4) 4 σ , 2 π

**A-2.** Find the number of 1°, 2° & 3° hydrogen atoms in the following compounds :



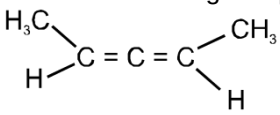
(1) 1° H → 9, 3° H → 1 (2) 1°H → 6, 2°H → 2 (3) 1°H → 6, 2°H → 4 (4) 1°H → 9, 2°H → 1

**A-3.** The number of primary, secondary and tertiary carbon atoms in the following structure are respectively:



(1) 6,3,3 (2) 3,6,3 (3) 3,6,2 (4) 3,2,1

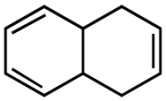
**A-4.** Which of the following compound has sp, $sp^2$ and $sp^3$ hybrid carbon atoms ?

(1) 

(2) $CH_3–CH=CH–CH=CH_2$

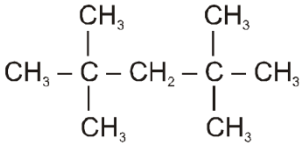
(3) $CH_3–C\equiv C–C\equiv CH$ (4) $CH_2=CH–C\equiv CH$

**A-5.** The number of $sp^2$–$sp^2$ hybrid σ bonds in the following compound are :



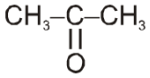
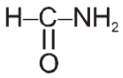
(1) 3 (2) 4 (3) 5 (4) 6

**A-6.** The number of 1º carbon atoms in following compound are :



(1) 5 (2) 6 (3) 8 (4) 4

**A-7.** Which type of hybridisation of each carbon have in the following compounds?

(a) $CH_3–Cl$ (b)  (c) $CH_3–C\equiv N$ (d) 

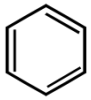
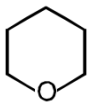
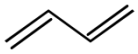
| | **(a)** | **(b)** | **(c)** | **(d)** |
|---|---|---|---|---|
| *(1)* | $sp^3$ | $sp^3$ & $sp^2$ | $sp^3$ & $sp^2$ | $sp$ |
| *(2)* | $sp^2$ | $sp^3$ & $sp$ | $sp^3$ & $sp$ | $sp^2$ |
| *(3)* | $sp^3$ | $sp^3$ & $sp^2$ | $sp^3$ & $sp$ | $sp^2$ |
| *(4)* | $sp^2$ | $sp^3$ & $sp$ | $sp^3$ & $sp^2$ | $sp$ |

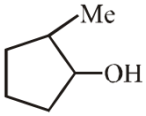
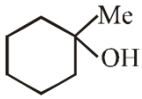
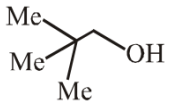
**A-8.** Which is not the homologue of the propene.

(1) Ethene (2) But-2-ene (3) Pent-1-ene (4) Cyclopropane

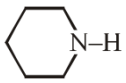
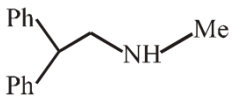
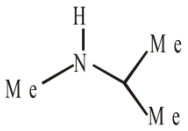
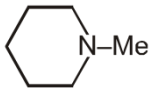
## Section (B) : Classification of organic compounds

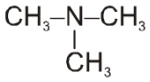
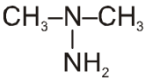
**B-1.** The alicyclic compound is :
(1) Cyclohexane (2) Benzene (3) Pyrrole (4) Hexane

**B-2.** Identify the compound which is homocyclic, aromatic, and unsaturated?
(1)  (2)  (3)  (4) 

**B-3.** Secondary (2°) alcohol is :
(1)  (2)  (3)  (4) All of these

**B-4.** Which of the following is a primary alkyl halide ?
(1) $C_6H_5CHClCH_3$ (2) $CH_3CHClCH_2CH_3$ (3) $(CH_3)_2CHCH_2Cl$ (4) $(CH_3)_3CCl$.

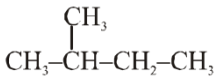
**B-5.** Identify the 3° amines?
(1)  (2)  (3)  (4) 

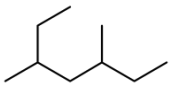
**B-6.** The higher homologue of dimethylamine ($CH_3–NH–CH_3$) has the structure :-
(1)  (2) $CH_3–CH_2–CH_2–NH_2$ (3) $CH_3–NH–CH_2–CH_3$ (4) 

**B-7.** The minimum number of carbon atoms in an alkane having four primary carbon atoms are :-
(1) 4 (2) 8 (3) 5 (4) 6

**B-8.** A primary amine has amino group-($NH_2$) attached to :-
(1) A primary carbon atom only (2) A secondary carbon atom only
(3) A tertiary carbon atom only (4) A primary, secondary or tertiary carbon atom

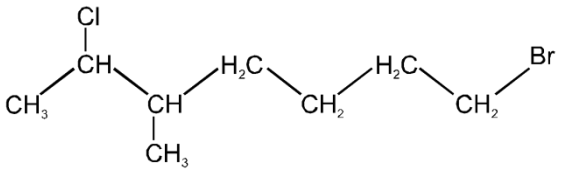
## Section (C) : IUPAC-Nomenclature of Alkane

**C-1.** The correct IUPAC name of the alkane  is:
(1) 2-Methyl propane (2) 2, 2-Dimethyl propane (3) 2-Methyl butane (4) 2, 2-Dimethyl butane

**C-2.** The correct IUPAC name of the alkane  is :
(1) 2-Ethyl-4-methylhexane (2) 5-Ethyl-3-methylhexane
(3) 3,5-Dimethylheptane (4) 3,5-Dimethylhexane

**C-3.** IUPAC name of $(CH_3)_2CHCH(CH_3)_2$ is :
(1) 2,2-Dimethylbutane (2) 2,3-Dimethylbutane (3) 2,4-Dimethylbutane (4) 1-Methylpentane

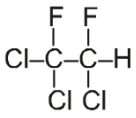
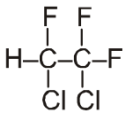
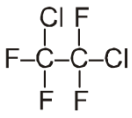
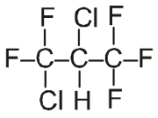
**C-4.** IUPAC name of following compound is :



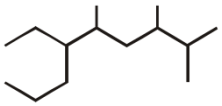
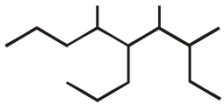
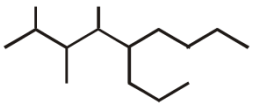
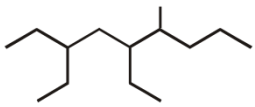
(1) 2-Chloro-3-methyl-7-bromoheptane (2) 7-Bromo-2-chloro-7-methylheptane
(3) 1-Bromo-5-methyl-6-chloroheptane (4) 1-Bromo-6-chloro-5-methyl heptane

**C-5.** IUPAC name of tert-butyl chloride is :
(1) 2-Chloro-2-methylbutane (2) Chlorobutane
(3) 2-Chlorobutane (4) 2-Chloro-2-methylpropane

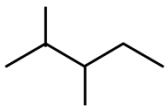
**C-6.** What is the correct chemical formula for 1,2-Dichloro tetrafluoroethane ?

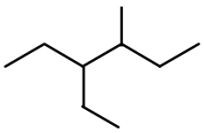
(1)  (2)  (3)  (4) 

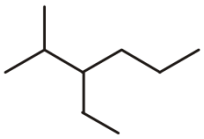
**C-7.** The correct structure of 6-Ethyl-2,3,5-trimethylnonane is :

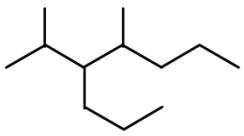
(1)  (2) 
(3)  (4) 

**C-8.** Which structure is incorrect as per the given name :

(1) 2,3-Dimethylpentane 

(2) 3-Ethyl-4-methylhexane 

(3) 3-Ethyl-2,2-dimethylhexane 

(4) 4-Methyl-5-(1-methylethyl)octane 

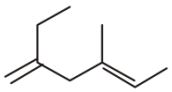
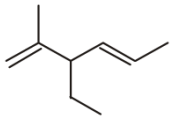
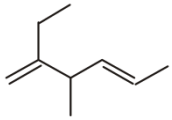
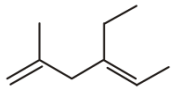
## Section (D) : IUPAC-Nomenclature of Alkene, Alkyne & Alkenyne

**D-1.** Select the structure with correct numbering in the chain :
(1) $\overset{5}{C}H_2 = \overset{4}{C}H - \overset{3}{C}H_2 - \overset{2}{C} \equiv \overset{1}{C}H$ (2) $\overset{1}{C}H_3 - \overset{2}{C}H = \overset{3}{C}H - \overset{4}{C}H_2 - \overset{5}{C} \equiv \overset{6}{C}H$
(3) $\overset{7}{C}H_2 = \overset{6}{C}H - \overset{5}{C}H = \overset{4}{C}H - \overset{3}{C}H_2 - \overset{2}{C}H = \overset{1}{C}H_2$ (4) $\overset{1}{C}H_2 = \overset{2}{C}H - \overset{3}{C}H = \overset{4}{C}H - \overset{5}{C}H_2 - \overset{6}{C} \equiv \overset{7}{C}H$

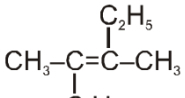
**D-2.** The correct IUPAC name of the compound $CH_2=CH-CH_2-\underset{\displaystyle C_2H_5}{\underset{|}{CH}}-CH_3$

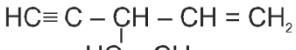
(1) 4-Ethylpent-1-ene (2) 2-Ethylpent-4-ene (3) 4-Methylhex-1-ene (4) 3-Methylhex-1-ene

**D-3.** The correct structure of 2-Ethyl-3-methylhexa-1,4-diene is :

(1)  (2)  (3)  (4) 

**D-4.** Which IUPAC name is **incorrect** :

(1)  2, 3-Diethylbutene

(2)  3-Ethynylpenta-1,4-diene

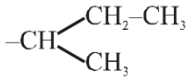
(3) $HC\equiv C-CH=CH_2$ Butenyne

(4) $CH_3-CH=CH-C\equiv CH$ Pent-3-en-1-yne

**D-5.** Which of the following name is wrong for $CH_2=CHCH_2Cl$ ?

(1) Allyl chloride (2) 1-Chloroprop-3-ene (3) 3-Chloroprop-1-ene (4) 3-Chloropropylene

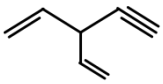
**D-6.** The common name of the following alkyl group is:



(1) isopropyl group (2) sec-butyl group (3) Tert-butyl group (4) Ethyl group

**D-7.** $CH_2=CH-$ is called as :

(1) Isoethyl (2) Ethenyl or vinyl (3) s-ethyl (4) Ethene

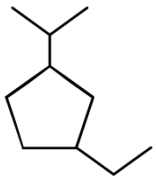
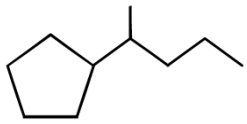
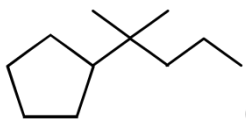
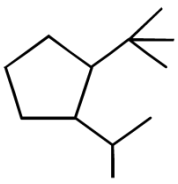
**D-8.** 

(1) 3-Ethenylpent-1-en-4-yne (2) 3-Ethynylpenta-1,4-diene

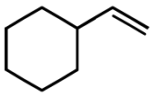
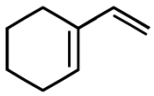
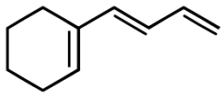
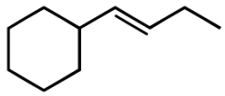
(3) 3-Ethenylpent-4-en-1-yne (4) 3,3-diethenylpent-1-yne

## Section (E) : IUPAC-Nomenclature of Cyclic Compounds

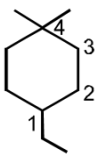
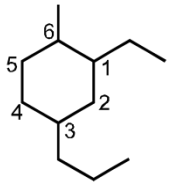
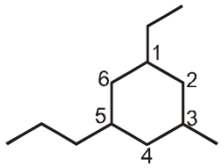
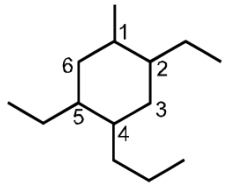
**E-1.** In which of the following side chain (acyclic chain) is the main chain ?

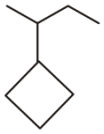
(1)  (2)  (3)  (4) 

**E-2.** In which of the following cyclic chain is the main chain ?

(1)  (2)  (3)  (4) 

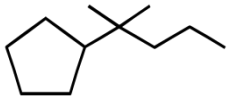
**E-3.** In which of the following compound IUPAC numbering is correct ?

(1)  (2)  (3)  (4) 

**E-4.** IUPAC name for  is :

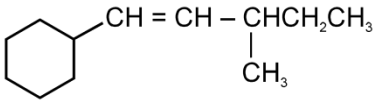
(1) (1-Methylpropyl)cyclobutane (2) 2-(n-butyl)cyclobutane

(3) 2-Cyclobutylbutane (4) 1-Cyclobutylbutane

**E-5.** The correct IUPAC name of  is :

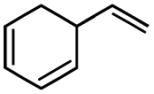
(1) 1-Cyclopentyl-1, 1-dimethylbutane (2) 2-Cyclopentyl-2-methylpentane

(3) 2-Methyl-2-cyclopropylpentane (4) 1, 1-Dimethyl-1-cyclopentylbutane

**E-6.** IUPAC name of the compound  is :

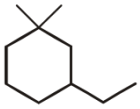
(1) 1-Cyclohexyl-3-methylpent-1-ene (2) 3-Methyl-5-cyclohexylpent-1-ene

(3) 1-Cyclohexyl-3-ethylbut-1-ene (4) 1-Cyclohexyl-3,4-dimethylbut-1-ene

**E-7.** The correct IUPAC name of the compound  is :

(1) 1-Ethenylcyclohexa-2, 4-diene (2) 5-Ethenylcyclohexa-1, 3-diene

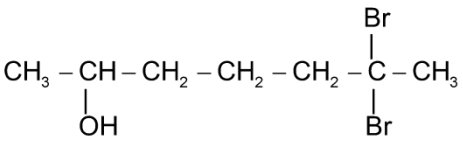
(3) 6-Ethenylcyclohexa-1, 3-diene (4) Cyclohexa-2, 4-dienylethene

**E-8.**  has the IUPAC name-

(1) 1- Ethyl-3,3-dimethyl cyclohexane (2) 3- Ethyl-1,3-dimethyl cyclohexane

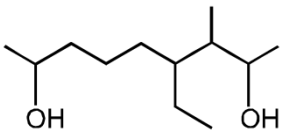
(3) 3- Ethyl-1,1-dimethyl cyclohexane (4) 3,3-Dimethyl -1-ethyl cyclohexane

## Section (F) : IUPAC - Nomenclature of Functional groups (–$SO_3H$, –OH, –$NH_2$, –SH, C=O)

**F-1.** The IUPAC name of  is :

(1) 6, 6-Dibromoheptan-2-ol (2) 2, 2-Dibromoheptan-6-ol

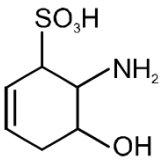
(3) 6, 6-Dibromoheptan-2-al (4) None of these

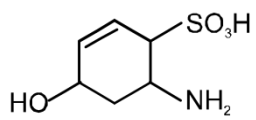
**F-2.** The correct IUPAC name of the compound  is :

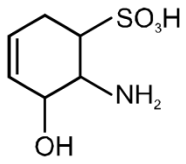
(1) 4-Ethyl-3-methylnonane-2, 8-diol (2) 6-Ethyl-7-methylnonane-2, 8-diol

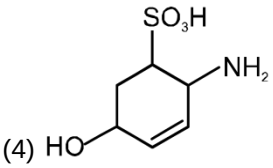
(3) 5-Ethyl-1, 6, 7-trimethylheptane-1, 7-diol (4) 4-Ethyl-2-methylnonane-2, 7-diol

**F-3.** The correct structure of 6-Amino-4-hydroxycyclohex-2-ene-1-sulphonic acid is :

(1) 

(2) 

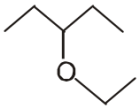
(3) 

(4) 

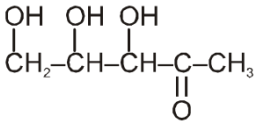
**F-4.** Which of the following represents neopentyl alcohol ?

(1) $CH_3CH(CH_3)CH_2CH_2OH$ (2) $(CH_3)_3C.CH_2OH$

(3) $CH_3CH_2CH_2CH_2OH$ (4) $CH_3CH_2CH(OH)CH_2$

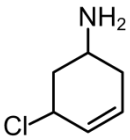
**F-5.** The correct IUPAC name of the compound  is :

(1) 2-Ethoxypentane (2) 3-Ethoxypentane (3) 3-Pentoxyethane (4) 3-Ethylpentan-3-ol

**F-6.** The correct IUPAC name of the  compound is :

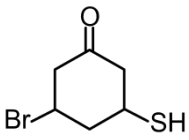
(1) 2-Oxopentane-3,4,5-triol (2) 3,4,5-Trihydroxypentan-2-one

(3) 1,2,3-Trihydroxypentan-2-one (4) 1,2,3-Trihydroxypentan-4-one

**F-7.** 

(1) 5-Amino-3-Chlorocyclohex-1-ene (2) 4-Amino-6-Chlorocyclohex-1-ene

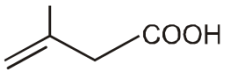
(3) 3-Chlorocyclohex-1-en-5-amine (4) 6-Chlorocyclohex-3-en-1-amine

**F-8.** 

(1) 3-Bromo-5-mercaptocyclohexan-1-one (2) 5-Bromo-3-mercaptocyclohexan-1-one

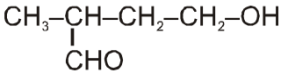
(3) 3-Bromo-5-oxocyclohexane-1-thiol (4) 5-Bromo-3-oxocyclohexane-1-thiol

## Section (G) : IUPAC-nomenclature of chain terminating functional groups (–COOH, –COX, –CN, –CHO)

**G-1.** The IUPAC name of the compound  is :

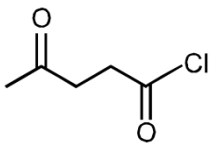
(1) 3-Methylbut-2-en-1-oic acid (2) 3-Methylbut-3-en-1-oic acid

(3) 2-Methylbut-1-en-4-oic acid (4) 3-Methylenebutan-1-oic acid

**G-2.** The IUPAC name of the  is :

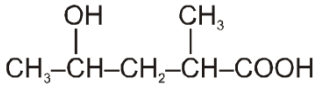
(1) 3-Formylbutan-1-ol (2) 2-Methylbutane-4-ol-1-al

(3) 4-Hydroxy-2-methylbutanal (4) 2-Methyl-4-hydroxybutanal

**G-3.** The correct IUPAC name of compound  is :

(1) 1-Chloropentane-1, 4-dione (2) 4-Chlorocarbonylbutan-2-one

(3) 4-Oxopentanoyl chloride (4) 3-Oxobutanecarbonyl chloride

**G-4.** The IUPAC name of  is :-

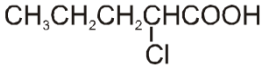
(1) 1-Hydroxy-4-methylpentanoic acid (2) 1-Methyl-3-hydroxypentanoic acid

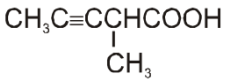
(3) 4-Hydroxy-2-methylpentanoic acid (4) 4-Carboxypentanol-2.

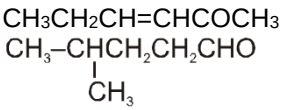
**G-5.** The IUPAC name for $CH_2=CHCN$ is :

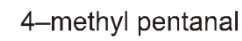
(1) Vinyl cyanide (2) Cyanoethene (3) Acrylonitrile (4) Prop-2-enenitrile

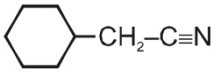
**G-6.** Which of the following compound is wrongly named ?

(1)  2-Chloropentanoic acid

(2)  2-Methylpent-3-enoic acid

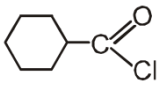
(3)  Hex-3-en-2-one

(4)  4-Methylpentanal

**G-7.** The IUPAC name of  is :

(1) Cyclohexanemethylcarbonitrile (2) 2-Cyclohexylethanenitrile

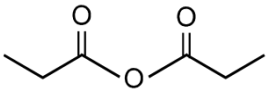
(3) 2-Cyclohexylethanecarbonitrile (4) Cyclohexaneethylnitrile

**G-8.** The IUPAC name for the compound  is :-

(1) Cyclohexanoyl chloride (2) Cyclohexanecarbonyl chloride

(3) 1-Chlorocyclohexanal (4) Chlorocyclohexyl methanal

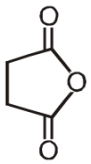
## Section (H) : IUPAC-nomenclature of chain terminating functional groups (–COOR, –$CONH_2$, –CO–O–CO–)

**H-1.** The IUPAC name of the compound  is :

(1) Propanoic anhydride (2) Dipropanoic anhydride

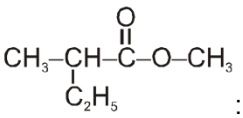
(3) Ethoxy propanoic acid (4) 1-Oxopropyl propanoate

**H-2.** The IUPAC name of the compound is :



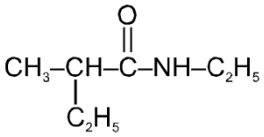
(1) Cyclobutanedioic anhydride (2) Butanedicarboxylic anhydride

(3) Cyclobutanedicarboxylic anhydride (4) Butanedioic anhydride

**H-3.** The correct IUPAC name of compound is  :

(1) Methyl 2-ethylpropanoate (2) Methyl butane-2-carboxylate

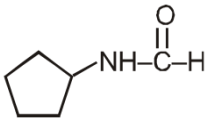
(3) Methyl 2-methylbutanoate (4) Methoxypentanone



**H-4.** The IUPAC name of the compound is :

(1) N-Ethyl-2-ethylpropanamide (2) N-Ethyl-2-methylbutanamide

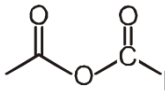
(3) N-Ethyl-2-methylpropanecarboxamide (4) N-Ethyl-2-ethylethanecarboxamide



**H-5.** IUPAC name of the compound is :

(1) N-Cyclopentylamide (2) N-Cyclopentylmethanamide

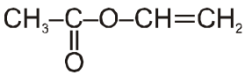
(3) Cyclopentanemethanamide (4) N-Aminocyclopentylmethanal



**H-6.** The correct IUPAC name of is

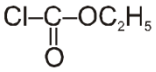
(1) Butane-2, 4-dione (2) Formyl ethanoate

(3) Acetic anhydride (4) Ethanoic methanoic anhydride



**H-7.** Common name of the given compound is :-

(1) vinyl acetate (2) acryl acetate (3) methyl acrylate (4) Vinyl ethanoate

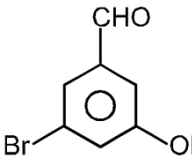


**H-8.** The IUPAC name of is :

(1) Ethoxy formyl chloride (2) Ethoxy methanoyl chloride

(3) Ethyl chloro methanoate (4) Ethoxy carbonyl chloride

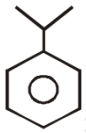
## Section (I) : IUPAC-Nomenclature of Aromatic compounds



**I-1.** The IUPAC name of the compound is :

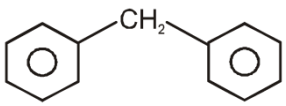
(1) 5-Bromo-3-hydroxybenzenecarbaldehyde (2) 3-Bromo-5-formylphenol

(3) 3-Bromo-5-hydroxybenzenecarbaldehyde (4) 1-Bromo-3-formyl-5-hydroxybenzene



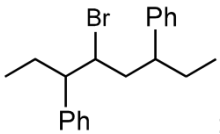
**I-2.** Correct name of the :

(1) Propylbenzene (2) Isopropylbenzene (3) Dimethylbenzene (4) Ethylmethylbenzene



**I-3.** IUPAC name of the :

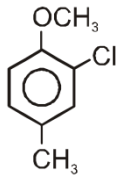
(1) Methyldibenzene (2) Isophenyl methane (3) Dimethylbenzene (4) Diphenyl methane



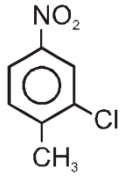
**I-4.** Correct IUPAC name of the :

(1) Cyclohexylbenzene (2) 4-Bromo-3, 6-diphenyloctane

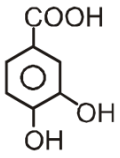
(3) 1, 2-Dichloro-4-ethyl-5-nitrobenzene (4) 4-Chloro-1-nitro-2-propylbenzene

**I-5.**  is named as -

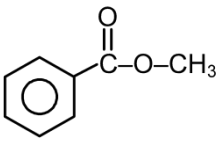
(1) 4-Chloro-2-methyl anisole (2) 2-Chloro-4-methyl anisole
(3) 3-Chloro-1-methyl anisole (4) 1-Chloro-3-methyl anisole

**I-6.**  has the IUPAC name-

(1) 4-Methyl-5-Chloro-1-nitrobenzene (2) 1-Methyl-4-nitro-6-Chloro benzene
(3) 2-Chloro-1-methyl-4-nitrobenzene (4) 1-Chloro-2-methyl-5-nitrobenzene

**I-7.** The IUPAC name of  is :-

(1) 3,4-Dihydroxybenzenecarboxylic acid (2) 1,2-Dihydroxybenzoic acid
(3) 4-Carboxy-2-hydroxy phenol (4) 4-Carboxybenzene-1,2-diol

**I-8.** IUPAC name of the compound  is :

(1) Methyl benzene carboxylate (2) Methyl phenyl methanoate
(3) Phenyl ethanoate (4) Methyl cyclohexanoate

## Section (J) : Structural Isomerism

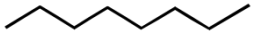
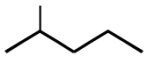
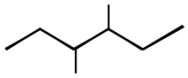
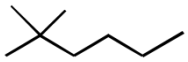
**J-1.** Isomers have essentially identical :

(1) Structural formula (2) Chemical properties (3) Molecular formula (4) Physical properties

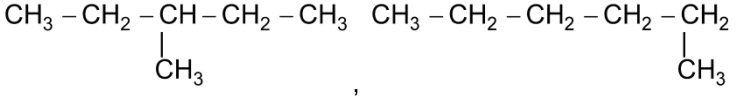
**J-2.** Compounds with same molecular formula but different structural formulae are called:

(1) Isomers (2) Isotopes (3) Isobars (4) Isoelectric

**J-3.** Which compound is not the isomer of 3-Ethyl-2-methylpentane ?

(1)  (2)  (3)  (4) 

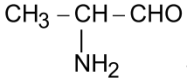
**J-4.** What is the correct relationship between the following compounds ?



(1) Chain isomers (2) Position isomers (3) Functional isomers (4) Identical

**J-5.** What is the relation between 3-Ethylpentane and 3-Methylhexane ?

(1) Chain isomers (2) Position isomers (3) Functional isomers (4) No relation

**J-6.** (I) $CH_3 - CH_2 - NH - CHO$ ; (II)  Which type of isomerism is observed between I and II ?

(1) Chain isomerism (2) Position isomerism

(3) Functional isomerism (4) Metamerism

**J-7.** Which of the following pairs of compounds are chain isomers?
(1) Isobutyl alcohol and s-pentyl alcohol (2) Isobutyl alcohol and t-butyl alcohol
(3) Secpentyl alcohol and neopentyl alcohol (4) Ethyl alcohol and ethylene glycol

**J-8.** A position isomer of 2-pentanone is :
(1) 3-Pentanone (2) 3-Methyl-2-butanone
(3) 1-Pentanal (4) 2,2-Dimethylpropanal

**J-9.** *o*-Cresol & benzyl alcohol are :
(1) Functional isomers (2) Position isomers (3) Chain isomers (4) All the above

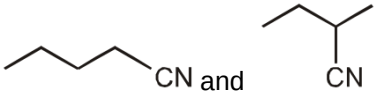
**J-10.** Monocarboxylic acids are functional isomers of :
(1) Alcohols (2) Ethers (3) Esters (4) Aldehydes and ketones.

**J-11.** $CH_3CONH_2$ & $HCONHCH_3$ are called :
(1) Position isomers (2) Chain isomers (3) Tautomers (4) Functional isomers

**J-12.** Which of the following pair of compounds are not isomers ?
(1) Propyne and cyclopropene (2) Propyne and propadiene
(3) Propene and cyclopropene (4) 1-Propanol and methyoxyethane

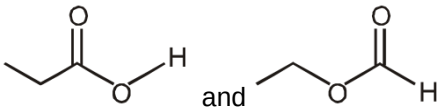
**J-13.** Saturated acyclic ethers are isomeric with :
(1) Aldehydes (2) Ketones
(3) Both aldehydes and ketones (4) Alcohols

**J-14.** Identify the relationship between the given compounds.



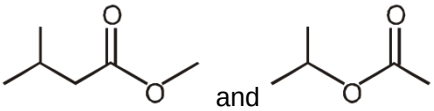

(1) Chain Isomers (2) Functional isomers (3) Homologs (4) Position Isomers

**J-15.** Identify the relationship between the given compounds.



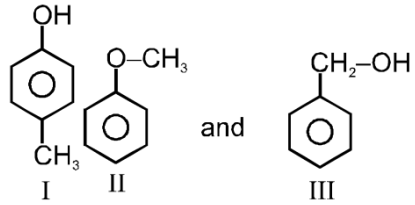

(1) Chain Isomers (2) Functional isomers (3) Homologs (4) Position Isomers

**J-16.** Identify the relationship between the given compounds.



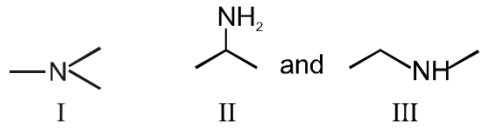

(1) Chain Isomers (2) Functional isomers (3) Homologs (4) Position Isomers

**J-17.** Identify the relationship among the followings :



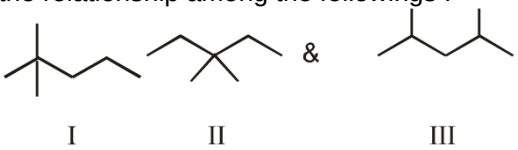

(1) Chain Isomers (2) Functional isomers (3) Metamers (4) Position Isomers

**J-18.** Identify the relationship among the followings :

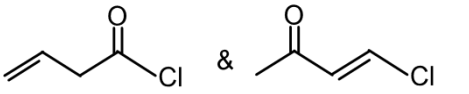



(1) Chain Isomers (2) Functional isomers (3) Metamers (4) Position Isomers

**J-19.** Identify the relationship among the followings :

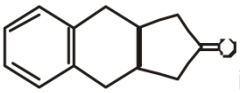



(1) Chain Isomers (2) Functional isomers (3) Metamers (4) Position Isomers

**J-20.**  are :


(1) Chain Isomers (2) Functional isomers (3) Metamers (4) Position Isomers

## Section (K) : Number of Structural Isomers

**K-1.** Degree of unsaturation in  is :
(1) 3 (2) 4 (3) 7 (4) 6.

**K-2.** How many positional isomers are possible for dimethylcyclohexane ?
(1) 3 (2) 4 (3) 5 (4) 6

**K-3.** How many aromatic isomers are possible for trichlorobenzene ($C_6H_3Cl_3$) ?
(1) 2 (2) 3 (3) 4 (4) 5

**K-4.** The number of ether isomers represented by formula $C_4H_{10}O$ is (only structural) :
(1) 4 (2) 3 (3) 2 (4) 1

**K-5.** Total number of 2° amine isomers of $C_4H_{11}N$ would be (only structural) :
(1) 4 (2) 3 (3) 5 (4) 2

**K-6.** Find the number of total structurally isomeric 3° amides with molecular formula $C_5H_{11}NO$ :
(1) 4 (2) 3 (3) 2 (4) 5

**K-7.** How many structural isomers of all the tertiary alcohols with molecular formula $C_6H_{14}O$ ?
(1) 2 (2) 3 (3) 4 (4) 5

**K-8.** The number of structural isomers for $C_5H_{10}$ is :
(1) 8 (2) 6 (3) 9 (4) 10

**K-9.** Molecular formula $C_4H_{10}O$ represent :
(1) Two primary alcohol (2) One secondary alcohol
(3) One tertiary alcohol (4) All of these

**K-10.** The number of isomeric aldehydes and ketones with formula $C_5H_{10}O$ are (structural isomers)
(1) 7 (2) 6 (3) 5 (4) 8

# Exercise-2

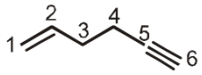
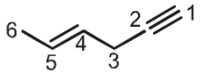
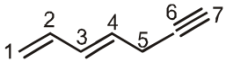
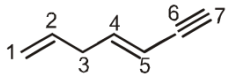
**Marked Questions may have for Revision Questions.**

## PART - I : OBJECTIVE QUESTIONS

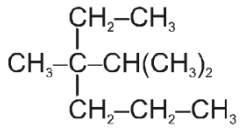
**1.** How many σ and π bonds are present in $CH_3COOH$ ?

(1) 1, 7 (2) 5, 2 (3) 7, 1 (4) 3, 2

**2.** Which is incorrect numbering in the following compounds as per IUPAC rules ?

(1)  (2)  (3)  (4) 

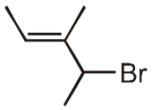
**3.** The IUPAC name of the given structure is :-



(1) 3-Methyl-3-isopropylhexane (2) 3-Isopropyl-3-methylhexane
(3) 3-Ethyl-2,3-dimethylhexane (4) 2,3-Dimethyl-3-ethylhexane

**4.** $CH_3–CH=CH–C\equiv CH$ has IUPAC name :

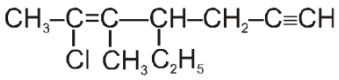
(1) Pent-2-en-4-yne (2) Pent-4-yn-2-ene (3) Pent-1-yn-3-ene (4) Pent-3-en-1-yne

**5.** The IUPAC name of  is :

(1) 2-Bromo-3-methylbut-3-ene (2) 4-Bromo-3-methylpent-2-ene
(3) 2-Bromo-3-methylpent-3-ene (4) 4-Bromo-2,3-dimethylbut-2-ene

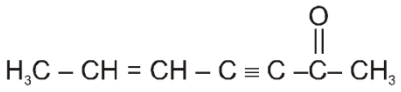
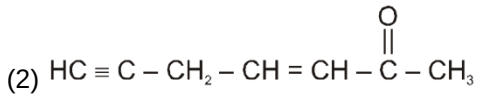
**6.** The IUPAC name of  is :

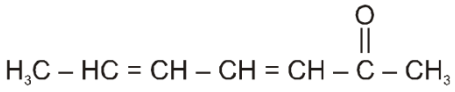
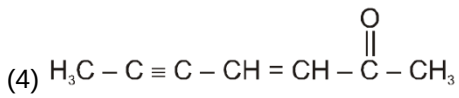
(1) 6-Chloro-4-ethyl-5-methylhept-5-en-1-yne
(2) 6-Chloro-4-ethyl-5-methylhept-1-yn-5-ene
(3) 2-Chloro-4-ethyl-3-methylhept-2-en-6-yne
(4) 2-Chloro-4-ethyl-3-methylhept-6-yn-2-ene

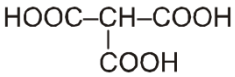
**7.** The correct name for the compound  is :

(1) 2-Bromo-5-hydroxyhexanal (2) 1-Bromo-4-hydroxypentanal
(3) 2-Hydroxy-5-bromohexanal (4) None of these

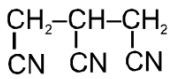
**8.** The correct structure for the compound Hept-3-en-5-yne-2-one is :

(1)  (2) 

(3)  (4) 

**9.** The correct IUPAC name of  is :

(1) Tricarboxymethane (2) Propanetrioic acid
(3) Tributanoic acid (4) Methanetricarboxylic acid

**10.** The IUPAC name of the compound  is :

(1) 1,2,3-Tricyanopropane (2) 3-Cyanopentane-1,5-dinitrile
(3) Propane-1,2,3-tricarbonitrile (4) Propan-1,2,3-tricarbylamine.

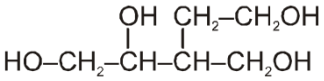
**11.** The IUPAC name of $CH_3–CH_2–NH–CH_3$ is :-

(1) Methylethylamine (2) 1-methylaminoethane
(3) N-methylethanamine (4) N-ethylmethanamine

**12.** The correct IUPAC name of 2-chloro-3-butanol is :-

(1) 3-Chloro-2-hydroxybutane (2) 3-Chloro-2-butanol
(3) 3-Hydroxy-2-chlorobutane (4) 2-Chloro-3-hydroxybutane

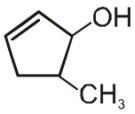
**13.** The IUPAC name of the given compound is :-



(1) 3-hydroxymethylpentane-1,4,5-triol (2) 3-hydroxyethylbutane-1,2,4-triol
(3) 4-hydroxyethyl-1,2,4-trihydroxybutane (4) 3-hydroxymethylpentane-1,2,5-triol

**14.** The IUPAC name of acetyl acetone is :
(1) 2,5-Pentanedione (2) 2,4-Pentanedione (3) 2,4-Hexanedione (4) 2,4-Butanedione

**15.** 3-Phenylprop-2-enoic acid is the IUPAC name of :
(1) Mendallic acid (2) Adipic acid (3) Succinic acid (4) Cinnamic acid

**16.** The IUPAC name of the compound  is :
(1) 4-Methylcyclopent-1-en-2-ol (2) 2-Methylcyclopent-4-en-1-ol
(3) 3-Methylcyclopent-1-en-2-ol (4) 5-Methylcyclopent-2-en-1-ol

**17.** The IUPAC name of glycerine is-
(1) Glycerol (2) 1, 2-Ethanediol (3) Propane-1,2,3- triol (4) 1, 2, 3-Trihydroxypropane

**18.** Phenol is also called :
(1) salicylic acid (2) benzyl alcohol (3) carbolic acid (4) salol

**19.** Picric acid is a yellow coloured compound. Its chemical name is :
(1) trinitrobenzene (2) 2,4,6-trinitrophenol (3) trinitrotoluene (4) trinitroaniline

**20.** How many isomers of $C_5H_{11}OH$ will be primary alcohols ?
(1) Four (2) Five (3) Three (4) Two

**21.** The number of possible alkynes with molecular formula $C_5H_8$ is :
(1) 6 (2) 5 (3) 4 (4) 3

**22.** Total number of structure isomers of $C_4H_{10}O$ is :
(1) 7 (2) 4 (3) 3 (4) 8

**23.** How many acids and esters are possible for the compound with molecular formula $C_4H_8O_2$ ?
(1) Two acids + Two esters (2) Two acids + Four esters
(3) Four acids + Two esters (4) Three acids + Three esters

**24.** How many structure isomers could be obtained from the alkane $C_6H_{14}$ ?
(1) Four (2) Five (3) Six (4) Seven

**25.** The number of dihydric phenols possible with the molecular formula $C_6H_6O_2$ is
(1) 2 (2) 3 (3) 4 (4) 5

**26.** Structural isomers possible for $C_4H_8Br_2$ are
(1) 9 (2) 8 (3) 7 (4) 6

**27.** How many structures are possible containing aromatic ring, having molecular formula $C_7H_6O_2$?
(1) 2 (2) 3 (3) 4 (4) 5

**28.** The third member of the family of alkenynes has the molecular formula :
(1) $C_6H_6$ (2) $C_5H_6$ (3) $C_6H_8$ (4) $C_4H_4$

## PART - II : MISCELLANEOUS QUESTIONS

### Section (A) : ASSERTION/REASONING

**DIRECTIONS :**

**Each question has 4 choices (1), (2), (3) and (4) out of which ONLY ONE is correct.**

(1) Both assertion and reason are correct, and the reason is the correct explanation for the assertion

(2) Both assertion and reason are correct, but the reason is not the correct explanation for the assertion

(3) The assertion is incorrect, but the reason is correct

(4) Both are assertion and reason are incorrect

**A-1.** **Assertion :** If unsaturated hydrocarbon is given, then always select that main chain which have maximum number of carbon atoms.
**Reason :** Priority is given to number of carbon atoms rather than multiple bonds in main chain.

**A-2.** **Assertion :** Pyrrole is an aromatic heterocyclic compound.
**Reason :** It is cyclic, has complete delocalisation of electrons and follows Hukel's rule.

**A-3.** **Assertion :** Butane and 2-Methyl butane cannot be chain isomers.
**Reason :** Butane is a straight chain alkane while 2-Methyl butane is a branched chain alkane.

**A-4.** **Assertion :** Alkanes containing more than 3–carbon atoms can exhibit chain isomerism.
**Reason :** Because all the carbon atoms in alkanes are $sp^3$ hybridized.

**A-5.** **Assertion :** Benzyl alcohol and o-cresol are functional isomers.
**Reason :** Alcohols and phenols give different-different chemical test.

### Section (B) : MATCH THE COLUMN

**B-1.** 

| **Column-I (Molecular formula of benzene derivative )** | **Column-II (No. of aromatic structural isomers)** |
|---|---|
| (A) $C_6H_4X_2$ | (p) 6 |
| (B) $C_6H_4XY$ | (q) 3 |
| (C) $C_6H_3X_3$ | (r) 4 |
| (D) $C_6H_3X_2Y$ | (s) 5 |

**(Here ⇒ X, Y, Z monovalent substituents)**

**B-2.**

| **Column-I (Class of compound)** | **Column-II (General formula)** |
|---|---|
| (A) Alkyl alkanoate | (p) $C_nH_{2n}O_2$ |
| (B) Alkanol | (q) $C_nH_{2n}O$ |
| (C) Alkanal | (r) $C_nH_{2n+2}O$ |
| (D) Alkanoic acid | (s) $C_nH_{2n-2}O_2$ |

### Section (C) : ONE OR MORE THAN ONE OPTIONS CORRECT

**C-1.^** Which of the following are not represent Ethyl ethanoyloxyethanoate ?

(1) $CH_2$(COOCH$_3$)(COOC$_2$H$_5$) (2) $CH_2$(OC$_2$H$_5$)(COOC$_2$H$_5$) (3) $CH_2$(OCOC$_2$H$_5$)(COOC$_2$H$_5$) (4) $CH_2$(OCOCH$_3$)(COOC$_2$H$_5$)

**C-2.^** The compounds which is/are isomeric with diethyl ether :
(1) n-Propyl methyl ether (2) Butanol-1
(3) 2-Methyl propan-1-ol (4) Butanone

**C-3.^** The formula $C_3H_6O_2$ represents
(1) Methyl ethanoate (2) Propanoic acid
(3) Ethyl methanoate (4) Propane-1,2-diol

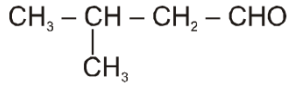
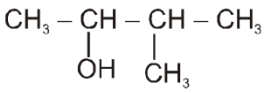
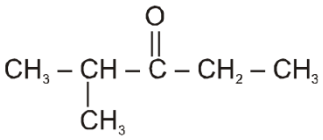
**C-4.^** What is true for 1,2-pentadiene ?
(1) It is functional isomers of pentyne. (2) It is position isomer of 1,3-pentadiene.
(3) It is chain isomer of 3-methyl-1-butyne. (4) It is homologue of 1-butyne.

**C-5.^** Which of the following is/are isomer of allyl alcohol ?
(1) Acetone (2) 2-Propanol (3) 1,2-Epoxypropane (4) Cyclopropanol

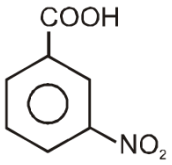
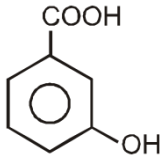
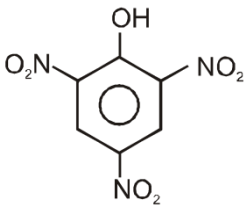
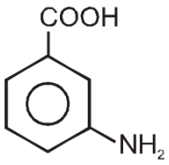
# Exercise-3

## PART - I : JEE (MAIN) / AIEEE PROBLEMS (PREVIOUS YEARS)

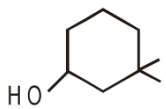
**1.** In which of the following species, the underlined carbon having $sp^3$ hybridisation? **[AIEEE- 2002, 3/225]**
(1) $CH_3\underline{C}OOH$ (2) $CH_3\underline{C}H_2OH$ (3) $CH_3\underline{C}OCH_3$ (4) $CH_2=\underline{C}H-CH_3$

**2.** Which of the following compounds has wrong IUPAC name: **[AIEEE- 2002, 3/225]**
(1) $CH_3-CH_2-CH_2-COO-CH_2CH_3$ → Ethyl butanoate
(2)  → 3-Methylbutanal
(3)  → 2-Methyl-3-butanol
(4)  → 2-Methyl-3-pentanone

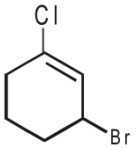
**3.** The functional group, which is found in amino acid is **[AIEEE- 2002, 3/225]**
(1) – COOH group (2) – $NH_2$ group (3) – $CH_3$ group (4) both (1) and (2).

**4.** Pricric acid is : **[JEE-Main 2002]**
(1)  (2)  (3)  (4) 

**5.** The general formula $C_nH_{2n}O_2$ could be for open chain **[AIEEE- 2003, 3/225]**
(1) diketones (2) carboxylic acids (3) diols (4) dialdehydes.

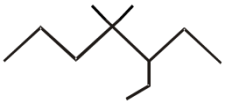
**6.** The IUPAC name of the compound  is **[AIEEE- 2004, 3/225]**
(1) 3,3-dimethyl-1-hydroxy cyclohexane (2) 1, 1-dimethyl-3-hydroxy cyclohexane
(3) 3, 3-dimethyl-1-cyclohexanol (4) 1, 1-dimethyl-3-cyclohexanol

**7.** Which one of the following does not have $sp^2$ hybridized carbon? **[AIEEE- 2004, 3/225]**
(1) acetone (2)acetic acid (3) acetonitrile (4) acetamide

**8.** The IUPAC name of the compound shown below is  **[AIEEE- 2006, 3/165]**

(1) 2 - Bromo-6-chlorocyclohex-1-ene (2) 6-Bromo-2-chlorocyclohexene

(3) 3-Bromo-1-chlorocyclohex-1-ene (4) 1-Bromo-3-chlorocyclohexene

**9.** The IUPAC name of  is : **[AIEEE-2007, 3/120]**

(1) 5, 5-Diethyl -4, 4-dimethylpentane (2) 3-Ethyl-4,4-dimethylheptane

(3) 1, 1-Diethyl-2, 2-dimethylpentane (4) 4, 4-Dimethyl-5, 5-diethylpentane

**10.** The correct decreasing order of priority for the functional groups of organic compounds in the IUPAC system of nomenclature is **[AIEEE-2008, 3/105]**

(1) $-SO_3H$, $-COOH$, $-CONH_2$, $-CHO$ (2) $-CHO$, $-COOH$, $-SO_3H$, $-CONH_2$

(3) $-CONH_2$, $-CHO$, $-SO_3H$, $-COOH$ (4) $-COOH$, $-SO_3H$, $-CONH_2$, $-CHO$

**11.** The IUPAC name of neopentane is : **[AIEEE-2009, 4/144]**

(1) 2, 2-dimethylpropane (2) 2-methylpropane

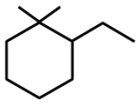
(3) 2, 2-dimethylbutane (4) 2-methylbutane

**12.** Aspirin is known as : **[AIEEE 2012, 4/120]**

(1) Acetyl salicylic acid (2) Phenyl salicylate

(3) Acetyl salicylate (4) Methyl salicylic acid

**13.** The IUPAC name of the following compound is : **[ONILINE_08-04-2017- JEE-Main-2017]**



(1) 1, 1-Dimethyl-2-ethylcyclohexane (2) 2-Ethyl-1,1-dimethylcyclohexane

(3) 2, 2-Dimethyl-1-ethylcyclohexane (4) 1-Ethyl-2,2-dimethylcyclohexane

## PART - II : JEE (ADVANCED) / IIT-JEE PROBLEMS (PREVIOUS YEARS)

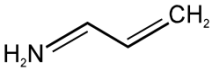
*** Marked Questions may have more than one correct option.**

**1.** Allyl isocyanide has : **[IIT-JEE 1995(S)]**

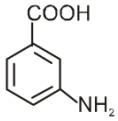
(A) 9σ and 4π bonds (B) 8σ and 5π bonds

(C) 9σ, 3π and 2 non-bonded electrons (D) 8σ, 3π and 4 non-bonded electrons

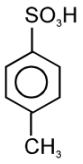
**2.** Which of the following represent the given mode of hybridisation $sp^2$–$sp^2$–sp–sp from left to right. **[IIT-JEE 2003(S), 3/144]**

(A) $H_2C=CH-C\equiv N$ (B) $HC\equiv C-C\equiv CH$ (C) $H_2C=C=C=CH_2$ (D) 

**3.** Write IUPAC name of the following **[IIT-JEE 2004]**



**4.** Write IUPAC name of the following **[IIT-JEE 2005]**




**5.** The IUPAC name of $C_6H_5COCl$ is : **[IIT-JEE-2006, 3/184]**

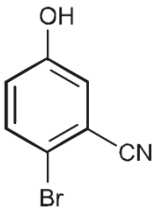
(A) Benzoyl chloride (B) Benzene chloro ketone

(C) Benzene carbonyl chloride (D) Chloro phenyl ketone

**6.** The number of structural isomers for $C_6H_{14}$ is : **[IIT- JEE 2007]**

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

**7.** The IUPAC name of the following compound is : **[IIT-JEE 2009, 3/160]**




(A) 4-Bromo-3-cyanophenol (B) 2-Bromo-5-hydroxybenzonitrile

(C) 2-Cyano-4-hydroxybromobenzene (D) 6-Bromo-3-hydroxybenzonitrile

**8.** The total number of cyclic isomers possible for a hydrocarbon with the molecular formula $C_4H_6$ is / are : **[IIT-JEE 2010, 3/163]**

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

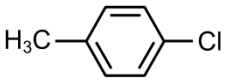
**9.** In allene ($C_3H_4$), the type(s) of hybridisation of the carbon atoms is (are) : **[IIT-JEE 2012, 3/162]**

(A) sp and $sp^3$ (B) sp and $sp^2$ (C) only $sp^3$ (D) $sp^2$ and $sp^3$

**10.** The carboxyl functional group (– COOH) is present in : **[IIT-JEE 2012, 3/162]**

(A) picric acid (B) barbituric acid (C) ascorbic acid (D) aspirin

**11.** The IUPAC name(s) of the following compound is (are) **[JEE-Advanced 2017, 3/122]**




(A) 4-methylchlorobenzene (B) 4-chlorotoluene

(C) 1-chloro-4-methylbenzene (D) 1-methyl-4-chlorobenzene

# Answers

## EXERCISE - 1

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **A-1.** | (1) | **A-2.** | (1) | **A-3.** | (2) | **A-4.** | (1) | **A-5.** | (2) |
| **A-6.** | (2) | **A-7.** | (3) | **A-8.** | (4) | **B-1.** | (1) | **B-2.** | (2) |
| **B-3.** | (1) | **B-4.** | (3) | **B-5.** | (4) | **B-6.** | (3) | **B-7.** | (3) |
| **B-8.** | (4) | **C-1.** | (3) | **C-2.** | (3) | **C-3.** | (2) | **C-4.** | (4) |
| **C-5.** | (4) | **C-6.** | (3) | **C-7.** | (1) | **C-8.** | (3) | **D-1.** | (4) |
| **D-2.** | (3) | **D-3.** | (3) | **D-4.** | (1) | **D-5.** | (2) | **D-6.** | (2) |
| **D-7.** | (2) | **D-8.** | (2) | **E-1.** | (3) | **E-2.** | (2) | **E-3.** | (3) |
| **E-4.** | (1) | **E-5.** | (2) | **E-6.** | (1) | **E-7.** | (2) | **E-8.** | (3) |
| **F-1.** | (1) | **F-2.** | (1) | **F-3.** | (2) | **F-4.** | (2) | **F-5.** | (2) |
| **F-6.** | (2) | **F-7.** | (4) | **F-8.** | (1) | **G-1.** | (2) | **G-2.** | (3) |
| **G-3.** | (3) | **G-4.** | (3) | **G-5.** | (4) | **G-6.** | (2) | **G-7.** | (2) |
| **G-8.** | (2) | **H-1.** | (1) | **H-2.** | (4) | **H-3.** | (3) | **H-4.** | (2) |
| **H-5.** | (2) | **H-6.** | (4) | **H-7.** | (1) | **H-8.** | (3) | **I-1.** | (3) |
| **I-2.** | (2) | **I-3.** | (4) | **I-4.** | (2) | **I-5.** | (2) | **I-6.** | (3) |
| **I-7.** | (1) | **I-8.** | (1) | **J-1.** | (3) | **J-2.** | (1) | **J-3.** | (2) |
| **J-4.** | (1) | **J-5.** | (1) | **J-6.** | (3) | **J-7.** | (3) | **J-8.** | (1) |
| **J-9.** | (1) | **J-10.** | (3) | **J-11.** | (4) | **J-12.** | (3) | **J-13.** | (4) |
| **J-14.** | (1) | **J-15.** | (2) | **J-16.** | (3) | **J-17.** | (2) | **J-18.** | (2) |
| **J-19.** | (4) | **J-20.** | (2) | **K-1.** | (3) | **K-2.** | (2) | **K-3.** | (2) |
| **K-4.** | (2) | **K-5.** | (2) | **K-6.** | (4) | **K-7.** | (2) | **K-8.** | (4) |
| **K-9.** | (4) | **K-10.** | (1) | | | | | | |

## EXERCISE - 2

### PART - I

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **1.** | (3) | **2.** | (4) | **3.** | (3) | **4.** | (4) | **5.** | (2) |
| **6.** | (1) | **7.** | (1) | **8.** | (4) | **9.** | (4) | **10.** | (3) |
| **11.** | (3) | **12.** | (2) | **13.** | (4) | **14.** | (2) | **15.** | (4) |
| **16.** | (4) | **17.** | (3) | **18.** | (3) | **19.** | (2) | **20.** | (1) |
| **21.** | (4) | **22.** | (1) | **23.** | (2) | **24.** | (2) | **25.** | (2) |
| **26.** | (1) | **27.** | (4) | **28.** | (3) | | | | |

### PART - II

**A-1.** (4) **A-2.** (1) **A-3.** (2) **A-4.** (2) **A-5.** (1)

**B-1.** (A → q) ; (B → q) ; (C → q) ; (D → p) **B-2.** (A → p) ; (B → r) ; (C → q) ; (D → p)

**C-1.** (1,2,3) **C-2.** (1,2,3) **C-3.** (1,2,3) **C-4.** (1,2) **C-5.** (1,3,4)

## EXERCISE - 3

### PART - I

**1.** (2) **2.** (3) **3.** (4) **4.** (3) **5.** (2)

**6.** (3) **7.** (3) **8.** (3) **9.** (2) **10.** (4)

**11.** (1) **12.** (1) **13.** (2)

### PART - II

**1.** (C) **2.** (A) **3.** 3–Aminobenzoic acid

**4.** 4–Methylbenzenesulphonic acid **5.** (C) **6.** (C) **7.** (B)

**8.** (A) **9.** (B) **10.** (D) **11.** (BC)