CHEMISTRY

BOOKS - R SHARMA CHEMISTRY (HINGLISH)

NOMENCLATURE OF ORGANIC COMPOUNDS

Example

1. How many sigma (σ) and pi (π) bonds are present in each of the following molecules?

(i) $CH_2 = C = CH_2$

(ii) $CH_3 - CH = CH - C \equiv C - CH_3$

Strategy: Every single covalent bond is a sigma(σ) bond, every double covalent bond consists of one sigma (σ) and one pi (π) bond, and every triple covalent bond consists of one sigma (σ) and two pi (π) bonds.

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2. Find the type of hybridization of each carbon in the following molecules.

(i) CH_3F , (ii) CH_3CHO

(iii) CH_3CH_2CN , (iv) CH_3CONH_2

(v) $CH_3C \equiv CCH_3$, (vi) $CH_3CH \equiv CH_2$

Strategy: Carbon atom forming four sigma bonds but no pi bond is always sp^3 htbridized, carbon atom forming three sigma bonds and one pi bond is always sp^2 hybridized, and carbon atom forming two sigma bonds and two pi bonds is always sp hybridized.

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3. Predict the geometry and shape of each of the following molecules.

(i) $HC \equiv CH$

(ii) CH_3Cl

(iii) $H_2C = O$

Strategy: sp^3 hybridization can always be correlated

to tetrahedral geometry, sp^2 hybridization to trigonal planar geometry, and sp hybridization to linear geometry.

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4. Convert each of the following Lewis structures into complete structural formulas:

(i) $H:\underset{\cdot\cdot}{\overset{\cdot\cdot}{O}}:\underset{\cdot\cdot}{\overset{\cdot\cdot}{C}}:O:H$

(ii) $H:C\vdots\vdots N:$

(iii) $H:\underset{\cdot\cdot}{\overset{\cdot\cdot}{C}}:\underset{\cdot\cdot}{\overset{\cdot\cdot}{Cl}}:$ (with H above and below C)

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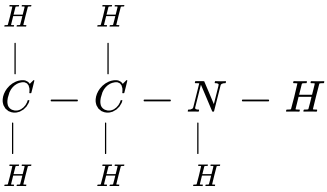
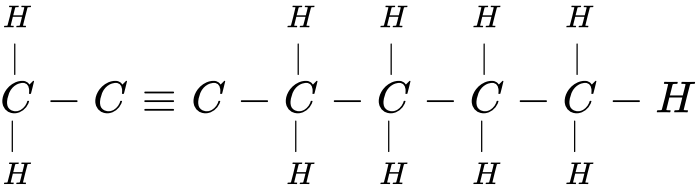
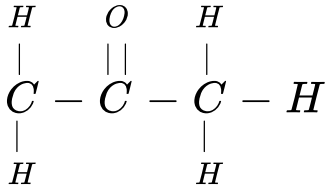
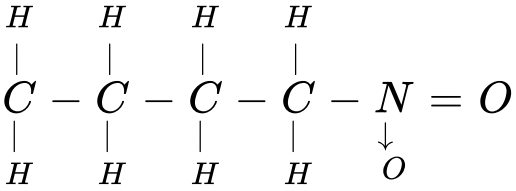
5. Convert each of the following complete structural formula into condensed formulas.

(i) 

(ii) 

(iii) 

(iv) 

Strategy: Omit some or all of the dashes (covalent bonds) and indicate the number of identical atoms/groups by a suitable subscript.

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6. For each of the following condensed formulas, write the corresponding bond-line formula.

(i) $(CH_3)_2CH(CH_2)_2CH_2OH$

(ii) $CH_3(CH_2)_4CHICH_2CHO$

(iii) $(CH_3)_2CHCHCH_3(CH_2)_3NO_2$

(iv) $(CN)_2CHCH_2COCl$

Strategy: In a bond-line formula, carbon and hydrogen atoms (except those that are part of the functional group) are not shown. First outline the carbon skeleton in a zig-zag fashion and show only hetero atoms and H atoms bonded to them.

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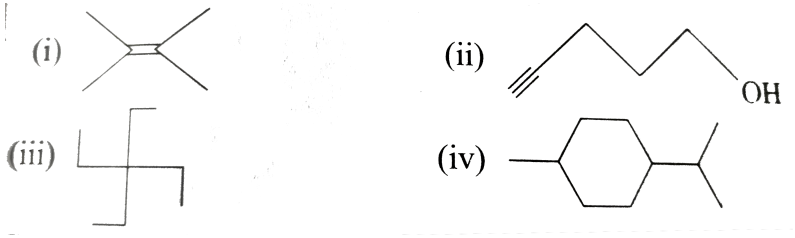
7. Expand each of the following bond-line formulas to show all the possible atoms including carbon and hydrogen.



(i)

Strategy: Each intersection of two or more lines and the end of a line represent a C atoms unless some other atom is written.

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8. Draw all the possuble bond-line formulas for the cyclic compound, C_5H_{10}.

Strategy: Start with the maximum number of carbon atoms in the ring and move towards the ring of 3 carbon atoms. Explore all sorts of possibilities on this route:

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9. Classify each of the following alkyl groups as primary, secondary, or tertiary: butyl, isoprophyl, isobutyl, sec-butyl and tert-butyl.

Strategy: Draw the structure and lock at the C atom at the point of attachment.

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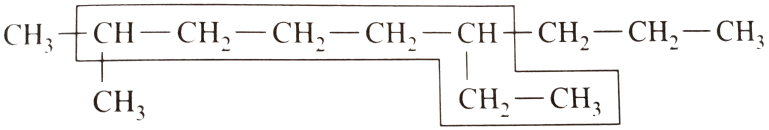
10. Is the following selection of the parent chain correct? Comment.



Strategy: Parent chain is always the longest possible continuous carbon chain.

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11. Write the $IUPAC$ names of the following alkanes:

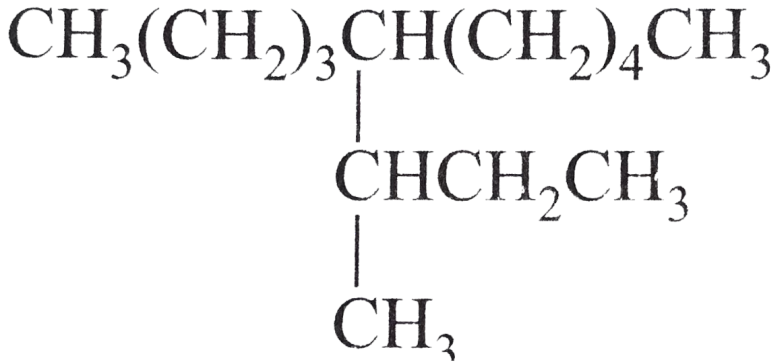
(i) $(CH_3)_2CHCH_2CH_3$

(ii) $(CH_3)_2CH-CH(CH_3)_2$

(iii) $(CH_3CH_2)_2CH-CH(CH_3)_2$ ltbr (iv)

(v) $(CH_3)_2CHCH_2CHCH_3CH(CH_3)_2$

(vi) $(CH_3)_3CCH_2C(CH_3)_2$

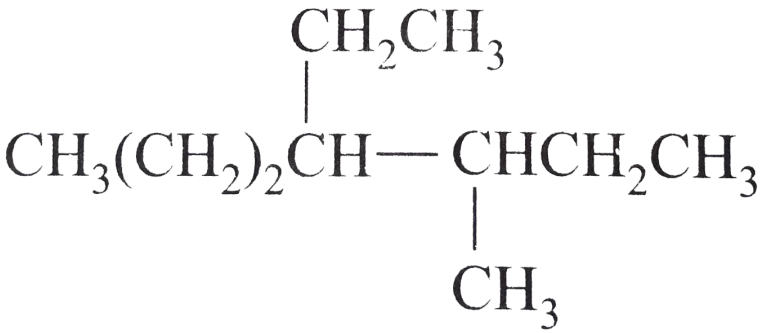


(vii)

(viii) Isobutane

(ix) Neopentane

(x) Isooctane



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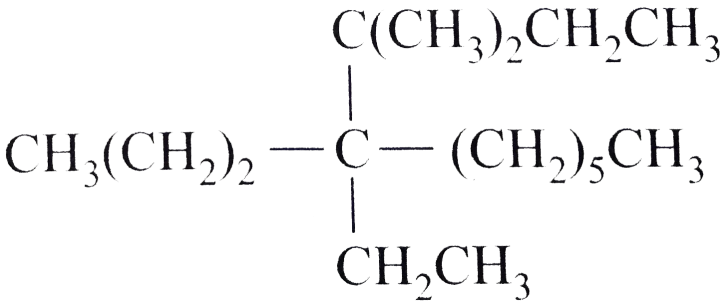

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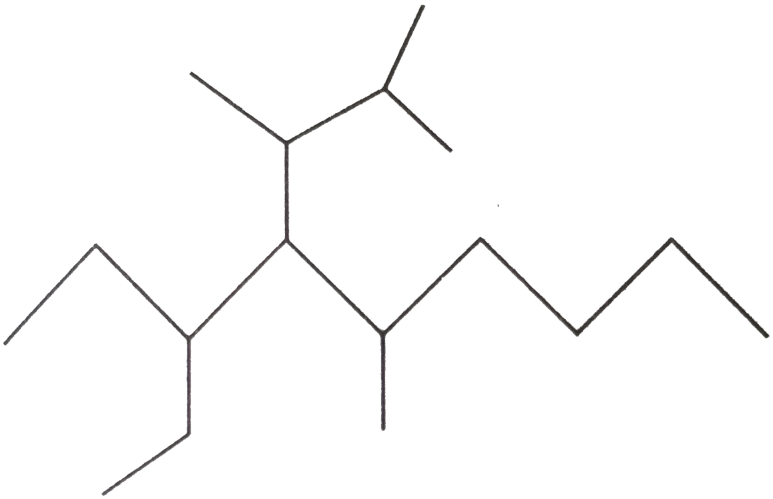

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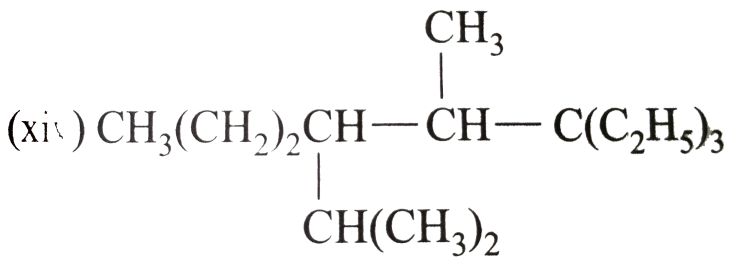

(xiv)

(xv) 4-tert-Butyloctane

Strategy: Open up the structure if brancehes are

present. Select the longest possible continous C chain carrying the maximum number of branches as the parent chain. Number the parent chain using the smallest possible number or lowest set of locants for the substituents (s). Assign the name and position number to each and every substituents. Write the name as a single word. Use hyphens to seperate numbers and letters. Do not leave any spaces.

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12. Explain why the following names are incorrect? ,

(i) $3, 4, 7$- Trimethylbutyl)-3-ethyldecane

(ii) $5 - (2, 2$-Dimenthylvutyl)-3-ethyldecane

(iii) 5-Ethyl-3-methylheptane

Strategy: First write down the structure of the alkane according to the given name. Then rename it according to the prescribed $IUPAC$ rules. Any mismatch will help to identify the error.

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13. Which of the following pentanes has only mary hydrogen atoms? ltbr? (i) n-pentane , (ii) Isopentane (iii) Neopentane

Strategy: Write down the structure of every alkane. The presence of $1^{\circ} H$ atoms is indicated by the

presence of CH_3 groups, CH_2 units contain $2^\circ H$ atoms, and CH units consits of a $3^\circ H$ atom.

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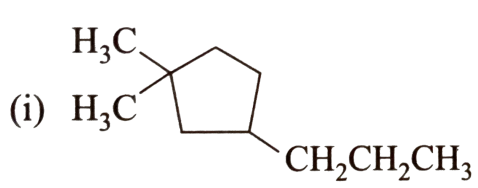
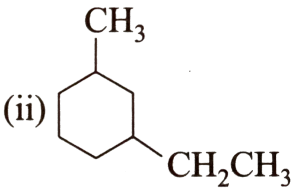
14. Give the $IUPAC$ names for the following mono-cyclic compounds:

(i) 

(ii) 

(i)

(iii) tert-butylcyclopentane

(iv) Isopropyl -3-methlcyclohexane

Strategy: Substituted cycloalkanes are named is exactly the same way as branched chain alkanes.

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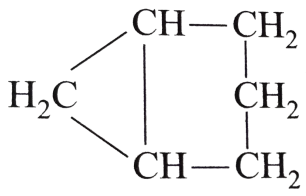
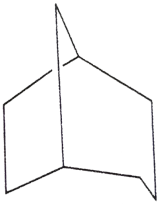
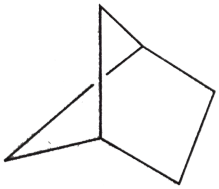
15. Give the IUPAC names for each of the following bicyclic alkanes:

(i) 

(ii) 

(iii) 

(i)

Strategy: Combine the prefix bicyclo-with a pair of square brackets enclosing numbers separated by periods. It is then followed by the name of the alkane whose number of $C's$ equals the number of $C's$ in th rings. The bracketed numbers show how many $C's$ are in each bridge and are cited in decreasing order.

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16. Give the $IUPAC$ names for the following

(i) $CH_2 = CH - \underset{\displaystyle CH_3}{\underset{|}{C}}H - CH_3$

(ii)

$(CH_3)_2CH - CH = CH - CH_2 - \quad CH_2$

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad \|$

$\qquad\qquad\qquad\qquad\qquad H_3C - CH - CH$

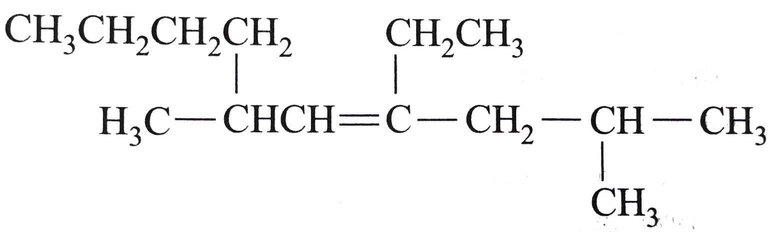
$\qquad\qquad\qquad\qquad\qquad\qquad\qquad |$

$\qquad\qquad\qquad\qquad\qquad\qquad CH_2CH_3$

(iii)

(iii)

(iv) $CH_2 = C(CH_2CH_2CH_3)_2$



(v)

(vi) $H_2C{=}CH{-}\underset{\displaystyle CH{=}CH_2}{\underset{|}{CH}}{-}CH_2{-}CH_2{-}CH_3$

(vi)

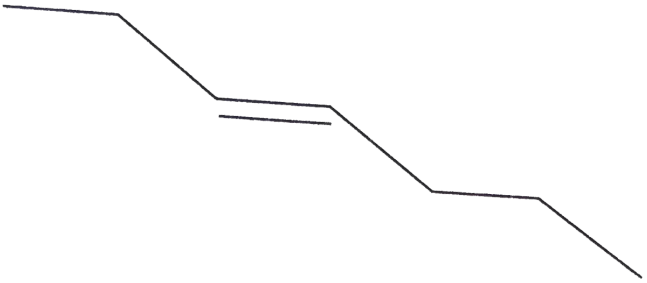
(vii) $CH_2 = CH - CH_2\overset{\displaystyle CH_3}{\overset{|}{C}}HCH_3$

(viii) $CH_2 = CH - \underset{\displaystyle CH_2CH_2CH_3}{\underset{|}{CH}}(CH_2)_4CH_3$

(ix) $CH_3CH_2CH_2CH_2 - \overset{\displaystyle H_3C}{\overset{|}{C}} = \overset{\displaystyle CH_2CH_3}{\overset{|}{C}}(CH_2)_3CH_3$

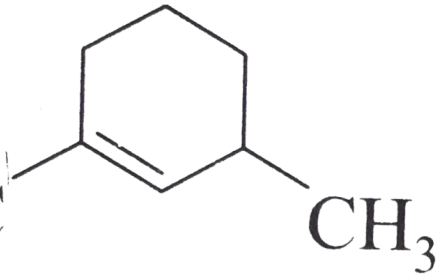
(x)

(xi)

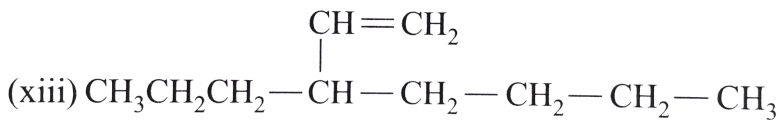


(xi)

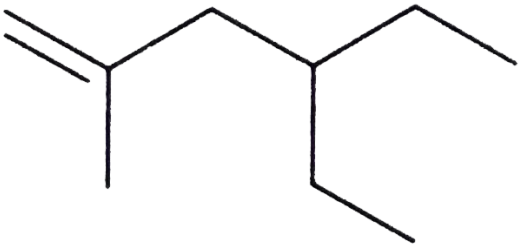
(xii)

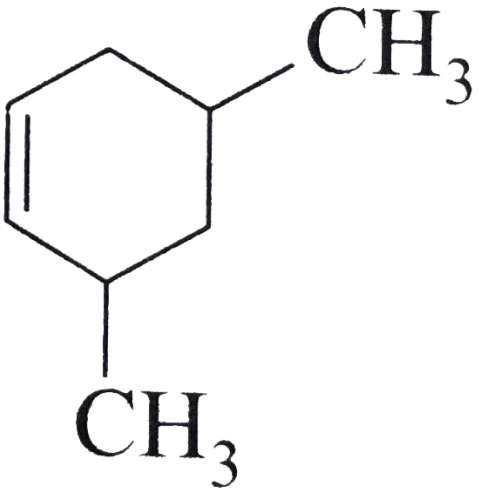


(xii)

(xiii) 

(xiv) Tetramethylethlene

(xv) 

(xvi) 

Strategy: Select the longest possible continuous carbon chain or ring containing the largest number

of double bonds and carrying the maximum number of side chains. Change the suffix of the parent alkane from -ane to -ene. The parent chain is numbered from the end closer to $C = C$, whoese position is indicated by assigning the lower possible number to the first doubly bonded C. Subsitituents are designated in exactly the same way as done for branched alkanes.

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17. Write the structure formulas for the following:

(i) cis-Oct-3-ene

(ii) 2, 4-Dimethylpent-2-ene

(iii) 3, 4-Dimethylcyclopentene

(iv) 1, 3-Dimethylcyclohexene

(v) Vinylcyclopentane

Strategy: first write down the parent C chain. Then introduce the double bond between the suitable C atoms. Finally attach the substituents and the suitable number of H atoms to satisfy the valency of $C's$. In cycloalkenes, one can write down the double bonds anywhere in the ring but the position of substituents is fixed by the position of double bonds.

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18. Give the $IUPAC$ names for the following:

(i) $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - C \equiv CH$

(ii) $CH_2 = CH - CH_2 - C \equiv CH$

(iii) $CH_3C \equiv CCH_2 \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - CH_2CH_3$

(iv) $(CH_3)_3C - C \equiv C(CH_3)_3$

Strategy: Alkynes are named in much the same way as alkanes. Unbranched alkynes are named by replacing the -ane of the name of the correponding alkane with the ending -yne. The chain is numbered fo as to give the C atoms of the triple bond the lower possible numbers. The lower number of the two C atoms of the triple bond is used to designate the location of

the triple bond. The locationa of side chains of branched alkynes are also indicated with lower numbers.

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19. Draw the structures for the following compounds.

(i) Hexa-1, 3-dien-5-yne

(ii) Cyclodec-1-en-4-yne

(iii) 5-Ethynyl-1, 3, 6-heptatriene

Strategy: First write down the parent chain or ring. Then introduce the multiple bonds at suitable locations.

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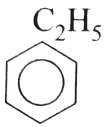
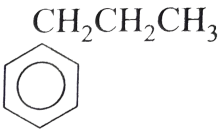
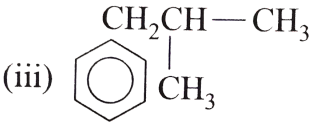
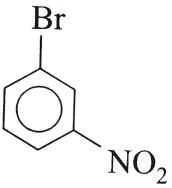
20. Write the systematic names of the following aromatic compounds:

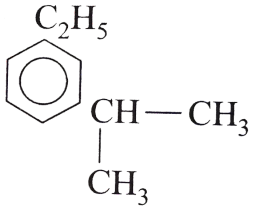
(i) 

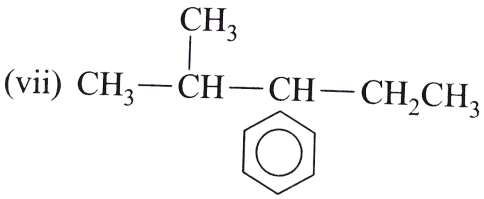
(ii) 

(iii) 

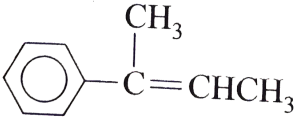
(iv) 

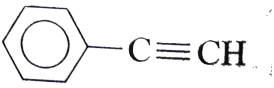
(v) 

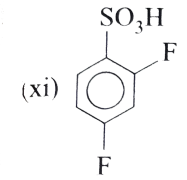
(vi) 

(vii) 

(viii) Allylbenzene

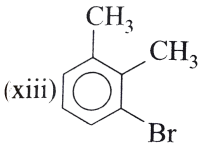
(ix) 

(x) 



(xi)

(xii) *p*-Ethylisopropylbenzene



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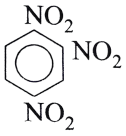

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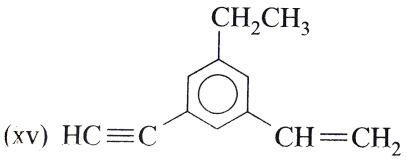

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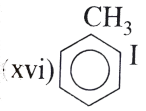

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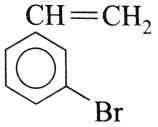

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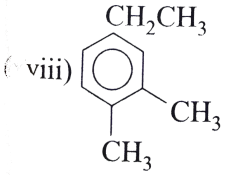

(viii)

(ii)

(xix) para-Bromo - tert-butylbenzene

Strategy: If there is only one group on the ring, no number is needed to designate its position. If there are two groups, we use the traditional designations (1, 2-for ortho, 1, 3-for meta, and 1, 4-for para). If there are three or more goups on the ring then location

numbers are assigned to give the lowest set of locants.

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21. Draw the structures of the following compounds.

(i) m-Bromochlorobenzene (or 1-Bromo-3-Chlorobenzene)

(ii) p-Chlorotoluene

(iii) 4-Bromo-o-Xylene

(iv) p-Iodo-o-cresol(or 4-Iodo-2-methylphenol)

(v) 3-Bromo -p-hydroxybenzoic acid (or 3-Bromo-4-hydroxybenzoic acid)

(vi) 2-Nitro-p-toluidine or 4-amino--3-nitrotoluence or

1-amino-4-methyl -2-nitrobenzene

(vii) 2-Chloro -1-metyl-4-nitrobenzene

Straregy: First draw the strucuture of the parent compound. Then place the substituents at their positiions.

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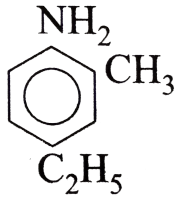
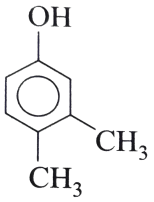
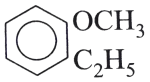
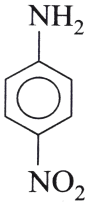
22. Give the $IUPAC$ names of the following aromatic compounds:

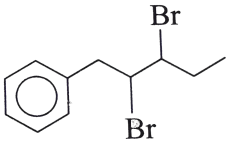
(i) 

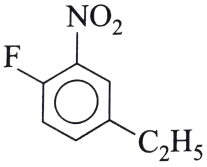
(ii) 

(iii) 

(iv) 

(v) 

(vi) 

(vii) 

Strategy: If there are three or more groups on the ring, location numbers are assigned to give the lowest set of locants. If one of the groups can impart a special name, then the compound should be named as its derivative.

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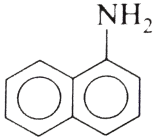
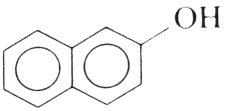
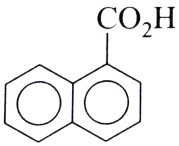
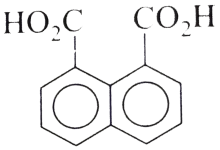
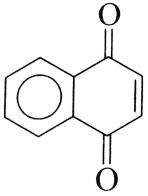
23. Name the following compounds systematically

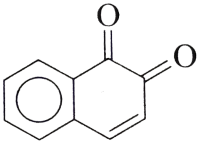
(i) 

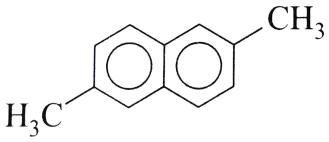
(ii) 

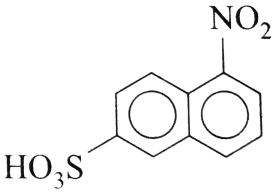
(iii) 

(iv) 

(v) 

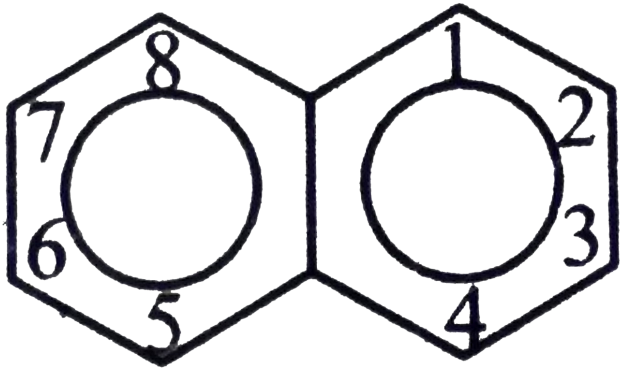
(vi) 

(vii) 

(viii) 

Strategy: Use the following designation of positions

in the naphthalence ring system:



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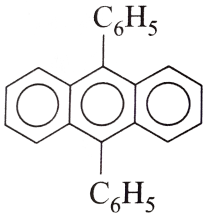
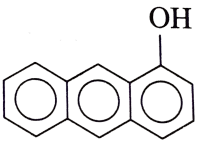
24. Name the following compunds systematically:

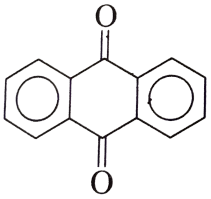
(i)



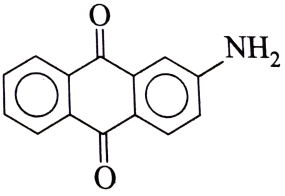
(ii)



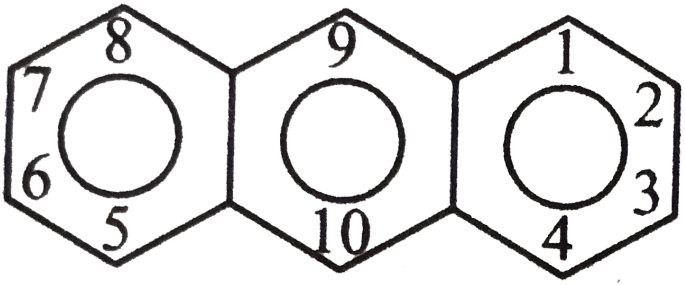
(iii)



(iv)



Strategy: Use the following designation of positions in the ant-hracene ring system:



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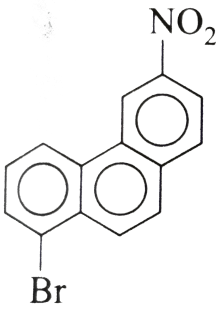
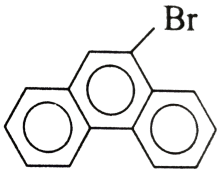
25. Give the $IUPAC$ names for the following:

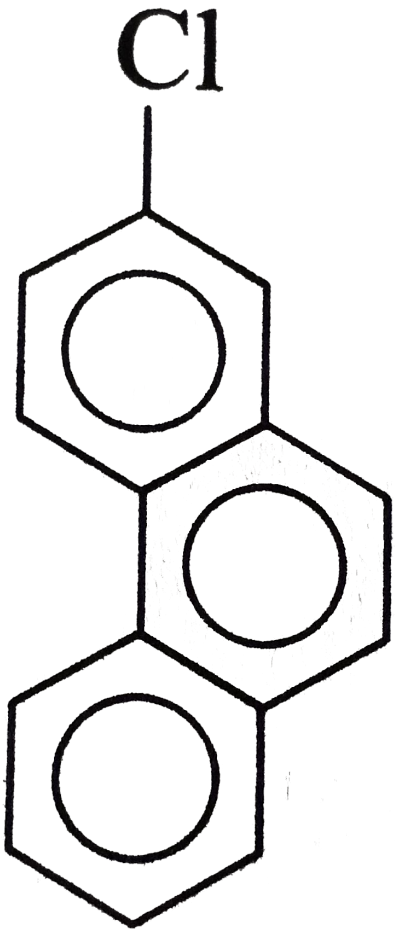
(i)



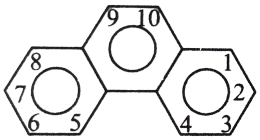
(ii)

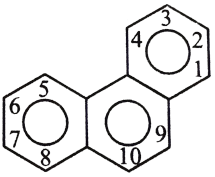


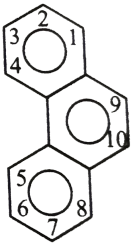
(iii)



Strategy: The formula of phenanthrene may be written in three different ways:







The pattern of numbering can be reversed so as to give lower numbers to the C atoms carrying the substituents.

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26. Draw the structure of the following:

(i) α-Naphthol , (ii) 1-Methylanthracene

(iii) 9-Methylphenanthrene

Strategy: Follow the numbering system pf

polynuclear hydrocarbons. Each system has its own numbering system around the periphery.

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27. Draw the structure of 5-Butyl-3-chloro-2, 2, 3-trimethyldecane.

Strategy: First write down the C skeleton of the parent alkane. Then attach different substituents at their locations, and finally attach suitable number of H atoms to fulfill the valency of C atoms.

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28. Given the $IUPAC$ names of the following haloalkanes and label them as primary (1°), secondary (2°), or tertiary (3°)

(i) tert-pentylioddie

(ii) $CH_3CH_2\underset{\underset{Cl}{|}}{CH}\overset{\overset{CH_3}{|}}{C}HCH_3$

(iii) Isobutyl chloride

(iv) n-butyl bromide

(v) $CH_3CH_2-\overset{\overset{CH_3}{|}}{\underset{\underset{Br}{|}}{C}}-CH_2-\overset{\overset{CH_3}{|}}{CH}-CH_3$

Isopropyl chloride

Strategy: For common names, first write the sturucture of the alkyl group, and then attach the halgon atom to the free valency.

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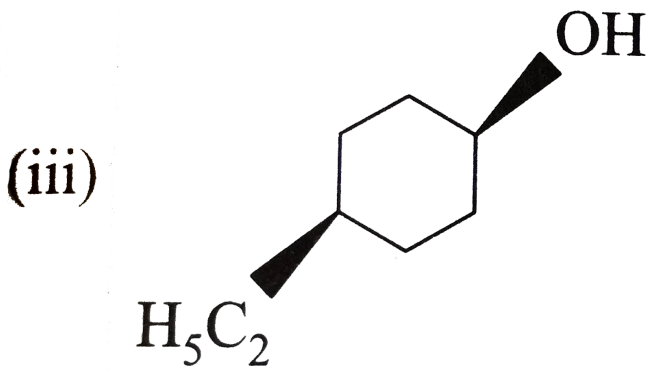
29. Name the following compounds:

(i) $CH_3\underset{\underset{Br}{|}}{C}H\underset{\underset{Cl}{|}}{C}HCH_2OH$

(ii) $CH_3\underset{\underset{CH_3}{|}}{C}HCH_2\underset{\underset{OH}{|}}{C}HCH_3$

(iii)



(iii)

(iv) Benzyl alcohol

Strategy: Give the lowest possible number to the C atom carrying the $-OH$ group.

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30. Draw the structure of the following compouds:

(i) Neopentyl alcohol

(ii) trans-2-bromocyclopentanol

(iii) 3-Methylhexan-3-ol

(iv) 4-Phenylpentan-2-ol

Strategy: First write down the parent chain or ring, and then attach the $-OH$ group and other sustituents to it according to their locants.

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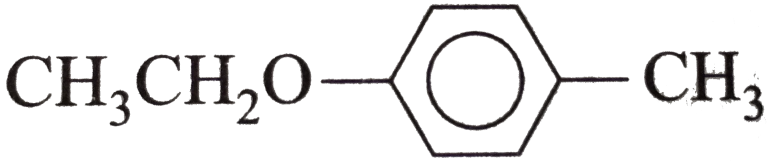
31. Give the $IUPAC$ names for the following ethers:

(i) tert-Butylphenyl ether

(ii) $CH_3\,\underset{\underset{OCH_3}{|}}{CH}\,CH_2CH_2CH_3$

(iii) 

(iv) sec-Butyl isopropyl ether

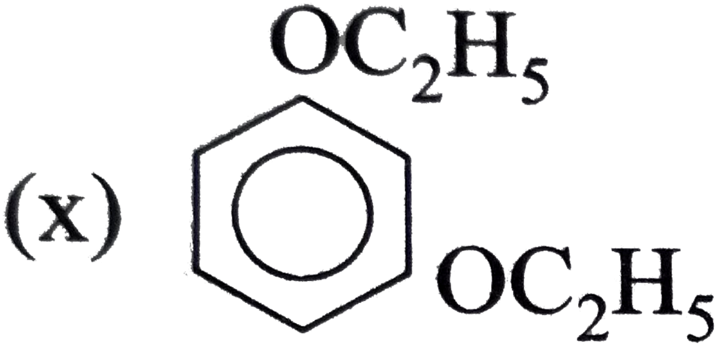
(v) β-Chloroethyl methyl ether

(vi) Ethyl p-nitrophenyl ether (p-nitrophenetole)

(vii) cyclohexy n-propyl ether

(viii) Benzy vinyl ether

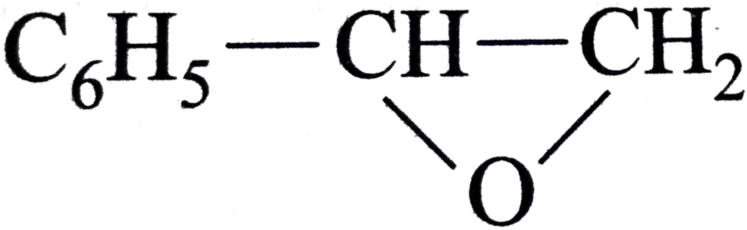
(ix) Cyclopentyl t-butyl ether



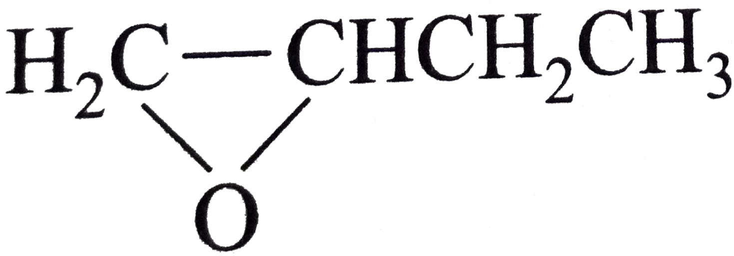
(x)

(xi) $\overset{1}{C}H_3\underset{\underset{OH}{|}}{\overset{2}{C}}HCH_2CH_2\overset{5}{C}H_2OCH_3$

(xii) 3-Cyclohexenylisopropyl ether



(xiii)



(xiv)

Strategy: In the $IUPAC$ system, ethers are named as

alkoxyalanes. To write the $IUPAC$ names of the commonly named ethers, first with the structure.

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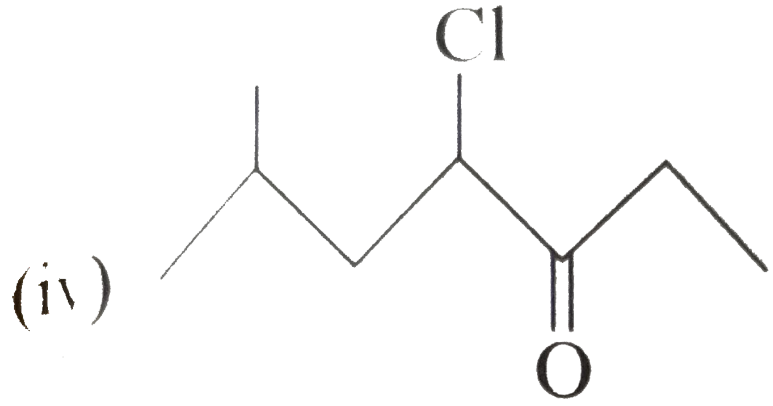
32. Give the $IUPAC$ names of the following compounds:

(i) o-Bromobenzaldehyde

(ii) Diethyl ketone

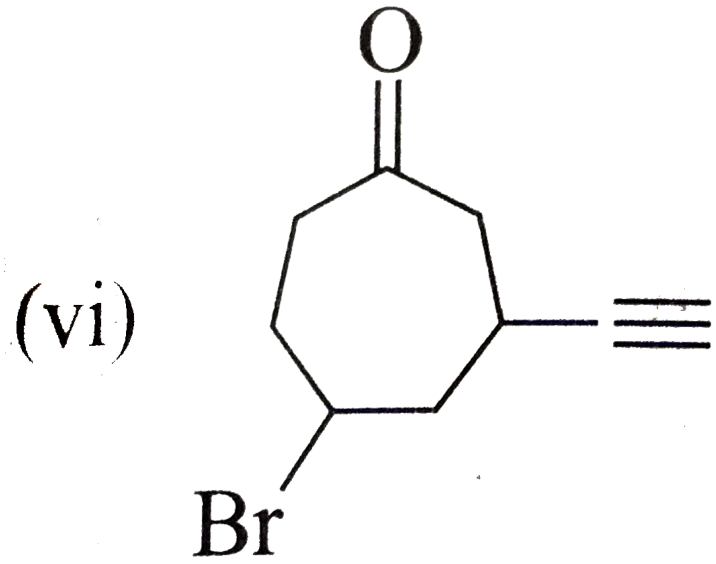
(iii) 4-Hydroxy-3-methoxybenzaldehyde

(iv)



(v) Propargyladehyde

(vi)

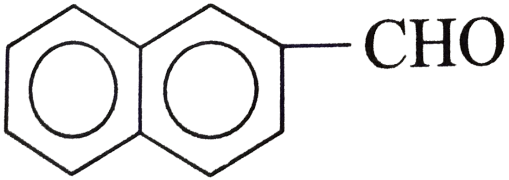


(vi)

(vii) $ClCH_2CH_2CH_2CH_2 - \overset{O}{\overset{||}{C}}H$

(viii) Phenylacetadehyde

(ix)



(ix)

(x) Allymethyl ketone

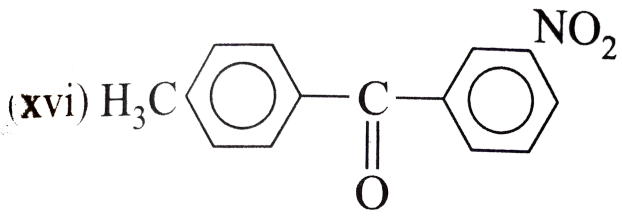
(xii) Salicyladehyde (o-hydroxybenzaldehyde)

(xiii) p-nitrobenzaldehyde

(xiv) Isopropyl methyl ketone

(xv) Benzyl methyl ketone

(xvi)



Strategy: The $IUPAC$ names of aldehydes and ketones are derived from the name of the parent hydrocarbon. The suffix-al is added to the characteristic stem in aldehydes while the suffix -one is added in ketones

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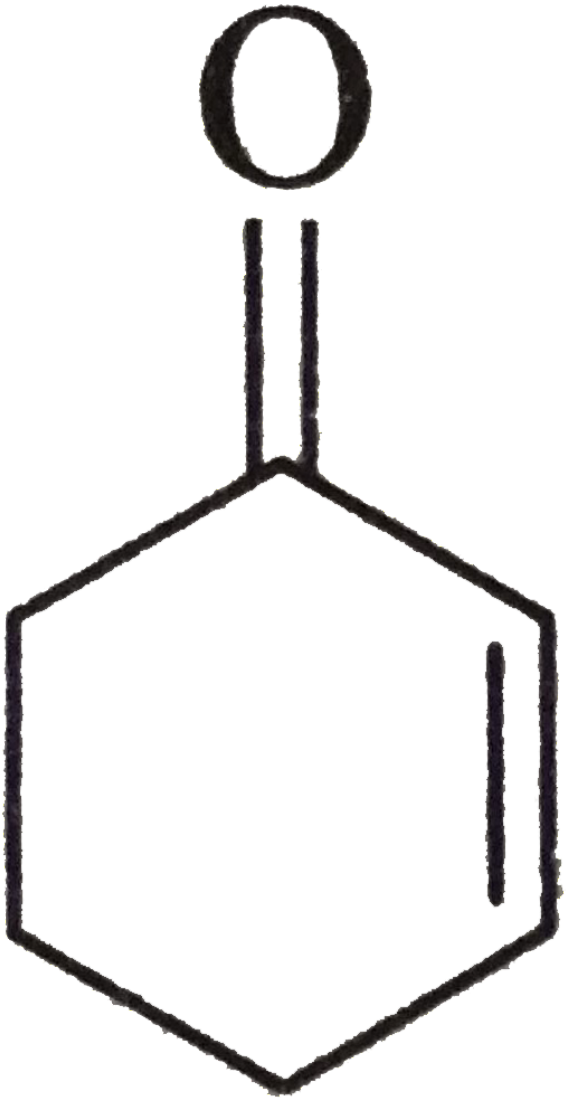
33. Name and//or draw the structures of the following compounds:

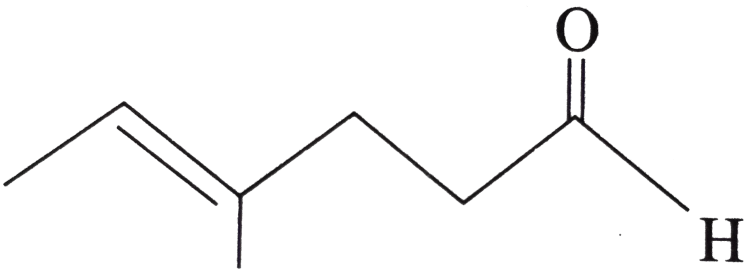
(i) Cinnamaldehyde (β-phenylacraldehyde)

(ii) Anisaldehyde (p-methaoxybenzaldehyde)

(iii) 4-Bromocyclohexanone



(iv)



(v)

(vi) 3-Hydroxybutanal

Strategy: Writing the structures of specific names is a bit problem as they have no relationship with the strycture. Thus, we must be familiar with these names and structures.

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34. Write the common names for each of the following structures:

(i) $CH_3\underset{Cl}{\underset{|}{C}}H\underset{CH_3}{\underset{|}{C}}HCO_2H$

(ii) $CH_3CH_2\overset{\beta}{\underset{CH_3}{\underset{|}{C}}}H - \overset{\alpha}{\underset{CH_3}{\underset{|}{C}}}HCO_2H$

(iii) $\underset{Cl}{\underset{|}{C}}H_2CH_2\underset{CH_3}{\underset{|}{C}}HCO_2H$

Strategy: Use Greek letters (α, β, γ,etc.) to designate the position of the substituents and side-chains attached to the parent chain.

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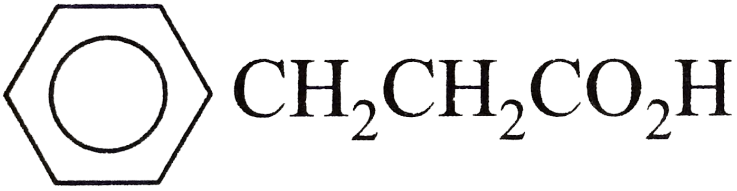
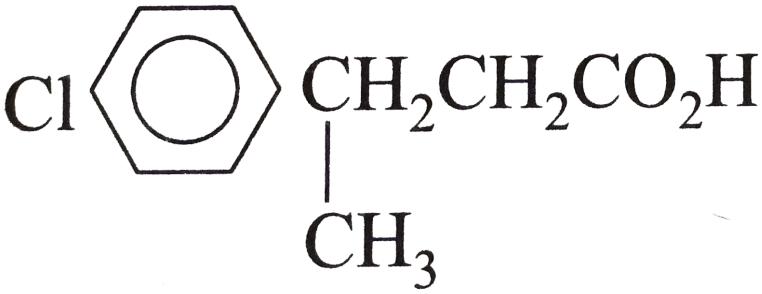
35. Give the $IUPAC$ names for the following:

(i) $CH_3CH_2\underset{CH_3}{\underset{|}{C}}HCO_2H$



(ii)



(iii)

(iv) $CH_3CH(CH_3)CH(CH_3)CH_2CO_2H$

Strategy: The $IUPAC$ name of saturated aliphatic monocarboxylic acids is alkanoic acid. The carboxyl carbon atom is always numbered one while other substituents and side-chains get the lowest possible numbers. To avoid any mistake, it is always advised to open up the structure so that every possible substituent and side-chain is counted.

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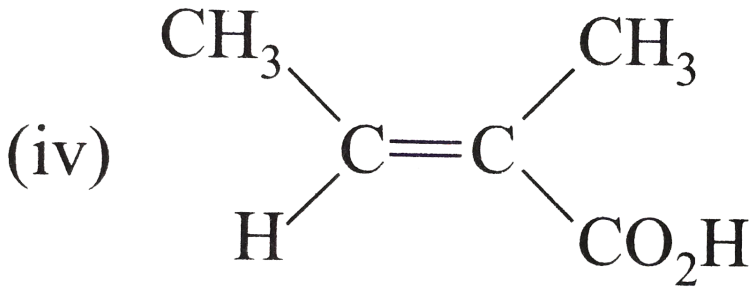
36. Give the $IUPAC$ names of the following:

(i) $CH_3CH = CHCH_2CO_2H$

(ii) $CH_3CH = CHCH_2CH_2CO_2H$

(iii) $CH_3CH = \underset{\displaystyle CH_3}{\underset{|}{C}}HCHCO_2H$

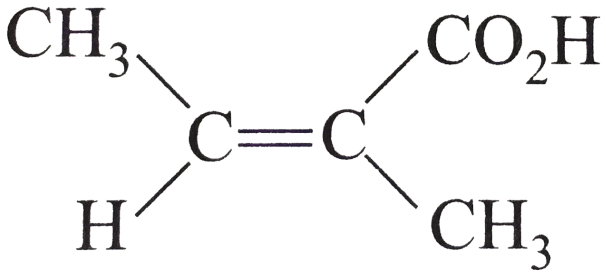
(iv)



(Tiglic acid)

(iv)

(v)



Angelic acid

(v)

Strategy: Carboxylic acids with double bonds are alkenoic acids with the carboxyl C atom numbered as carbon number 1.

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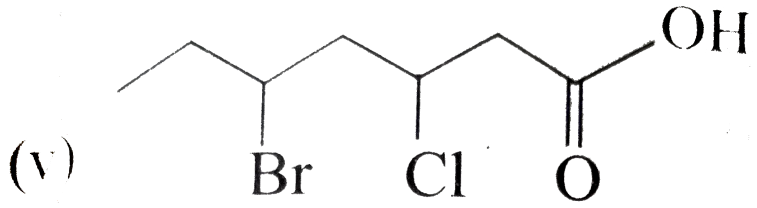
37. Give the $IUPAC$ names or write the structure, as appropriate, of the following compounds:

(i) $HO_2CCH_2\underset{\displaystyle NO_2}{\underset{|}{C}}HCHCO_2H$

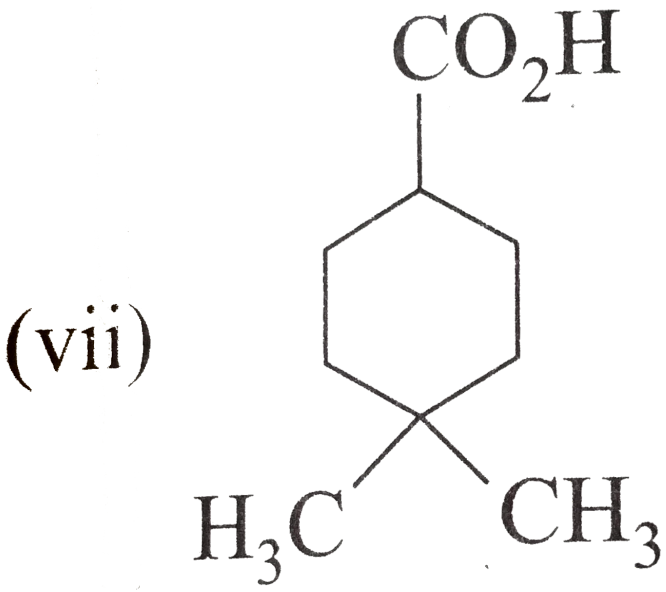
(ii) Benzoic acid

(iii) $CH_3CH(NH_2)-\overset{O}{\overset{\|}{C}}-O^-Na^+$

(iv) 4-hydroxypentanoic acid

(v) 

(vi) 2, 2-Dibromohexanedioc acid

(vii) 

(viii) $4-(1,$ 1-Dimethylwthyl)benzoic acid

(ix) $HCOONH_4$

(x) $\underset{\underset{Br}{|}}{CH_2} - \underset{\underset{Br}{|}}{CH} - COOK$

(xi) α, β-Dimethylvaleric acid

(xii) Phthalic acid

(xiii) Isophthalic acid

(xiv) Terephthalic acid

Strategy: We need prior knowledge to write down the structures of specific names The class suffix of caroboxylic acids is -oic acid and the carnoxyl C atom is numbered as 1.

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Follow Up Test 1

1. Which of the following compounds are not studied under organic chemistry?

(i) CO

(ii) CO_2

(iii) CS_2 (iv) HCN

A. (1) (i), (ii), (iii), (iv)

B. (2) (i), (ii), (iii)

C. (3) (ii), (iii), (iv)

D. (i), (ii)

Answer: A

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2. Organic chemistry is the chemistry of compounds that contain.....bonds.

(i) $C-C$

(ii) $C-H$

(iii) $C-O$ (iv) $C-N$

A. (1) (i), (iii)

B. (2) (i), (ii)

C. (3) (i), (ii), (iii)

D. (4) (i), (ii), (iii), (iv)

Answer: D

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3. One entire branch of chemistry is devoted to the behaviour of the compounds of just one element carbon because

(i) there are many more compounds that contain carbon than there are compounds that do not.

(ii) the molecuels containing carbon can be so simple, so the much larger, and more complex.

(iii) organic compounds have been divided into families which generally have no counterparts among the inorganic compounds.

(iv) the arrangement of atoms in even relatively small molecules can be very complicated.

A. (1) (i), (ii), (iii), (iv)

B. (2) (i), (ii)

C. (3) (i), (ii), (iii)

D. (4) (i), (iii), (iv)

Answer: A

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4. Which of the following is wrong?

A. (1) The word organic was originally used by the $18th$ century chemists to describe the compounds of plant or animal origin (living

sources) whereas inorganic was used to describe the compounds from minerals.

B. (2) The $18th$ century chemists believed that nature possessed a certain vital force and that only living things could produce organic compounds.

C. (3) This romantic notion was disproved in 1828 by Friedrich Wohler, a German chemist, who synthesized urea (an organic compound) by boiling ammonium cyanide (an inorganic compound) with water.

D. (4) We encounter organic chemistry in every aspect of our lives. All life is based on a complex interrelationship of thousances.

Answer: C

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5. Urea (NH_2CONH_2) was first obtained from urine, where it occurs from the breakdoun of

A. (1) carbohydrates

B. (2) protenis

C. (3) fats

D. (4) hormones

Answer: B

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6. The only common characteristic of compunds from living sources is that all contain the element

A. (1) hydrogen

B. (2) oxygen

C. (3) nitrogen

D. (4) carbon

Answer: D

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7. Although millions of organic compounds are known, the elements they contain are very few: C (always), H(almost), N, O a halogen, S, P (often), and sometimes another element. The great number and variety of organic compounds are a result of which of the followcwing?

(i) Carbon is in group 14 of the periodic table and forms bonds with almost every other element(other

than the noble gases).

(ii) Carbon atoms have the ability to bond to other carbon atoms in single and multiple bonds, forming long chains, branched chains, and rings (that may also have chains attached to them) of various lengths.

(iii) The existanece of different carbon compounds with identical molecular formulas called isomers.

(iv) Other kinds of atoms such as nitrogen, oxygen, and sulphur may be attached to the carbon atoms by single and//or multiple bonds.

A. (1) (i), (ii), (iii)

B. (2) (i), (ii), (iv)

C. (3) (i), (ii), (iii), (iv)

D. (4) (i), (iii), (iv)

Answer: C

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8. We encounter many organic compounds every day.

Which of following is used as a nail polish remover?

A. (1) Ethanol

B. (2) Ethylene glycol

C. (3) Acetone

D. (4) Both (2) and (3)

Answer: C

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9. Which of the following is a large resrvoir of organiv material from which simple organic compounds are obtained?

(i) Sea water

(ii) Petroleum

(iii) Biomass

(iv) Caol

A. (1) (i), (ii)

B. (2) (ii), (iv)

C. (3) (ii), (iii)

D. (4) (iii), (iv)

Answer: B

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Follow Up Test 2

1. Which of the following is incorrect regarding the alkanes?

A. (1) All the bonds in the molecules of alkanes are sigma bonds.

B. (2) The hybridization of every C atoms in alkanes is sp^3.

C. (3) The bond angles at the C atoms of all alkanes are tetrahedral, i.e., 109.5°.

D. (4) The rotation of group joined by a single bond usually requires a large amount of energy.

Answer: D

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2. Which of the following is incorrect regarding the alkanes?

A. (1) All the bonds in the molecules of alkanes are pi π) bonds.

B. (2) The hybridization of two C atoms in alkanes is sp^2.

C. (3) There is a large energy barrier to rotation associated with groups joined by a double bond.

D. (4) The restricted rotation of groups joined by a double bond causes cis-trans isomerism.

Answer: A

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3. Which of the following alkanes can exhibit cis-trans isomerism?

(i) $CH_2 = CHCH_2CH_3$, (ii) $CH_2 = C(CH_3)_2$

(iii) $CH_3CH = CHCH_3$, (iv) $CH_3CH_2CH = CHCl$

A. (1) (i), (ii)

B. (2) (ii), (iii)

C. (3) (iii), (iv)

D. (4) (i), (iv)

Answer: C

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4. Which of the following is incorrect regarding the alkanes?

A. (1) All alkynes contain just one triple bond.

B. (2) The hybridization of two C atoms is sp hybridization.

C. (3) The carbon-carbon triple bond of alkynes consists of two pi (π) bonds and one sigma (σ) bond.

D. (4) There is resitricted rotation of groups joined by a triple bond.

Answer: D

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5. Which of the following molecules contains the shortest $C - H$ bonds?

A. (1) Ethyne

B. (2) Ethene

C. (3) Ethane

D. (4) Methane

Answer: A

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6. Which of the following molecules has the maximum number of π bonds?

A. (1) CH_6H_{12}

B. (2) C_6H_6

C. (3) $CH_2 = C = CH_2$

D. (4) $HCONHCH_3$

Answer: B

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7. Which of the following compounds contains one sp hybridized C atom?

A. (1) $(CH_3)_2CO$

B. (2) C_6H_6

C. (3) $CH_2 = C = O$

D. (4) $CH_3 - CH = CH_2$

Answer: C

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8. Which of the following is incorrect about the structural formulas?

A. (1) They indicate the way the atoms are attached to each other.

B. (2) They are representation of the actual shaps of the molecule.

C. (3) They show what is called the connectively of the atoms.

D. (4) Dot structure shows all of the valence electrons.

Answer: B

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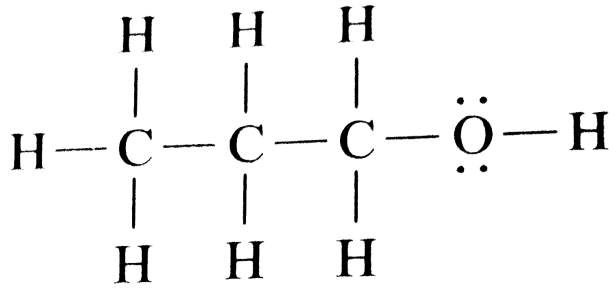
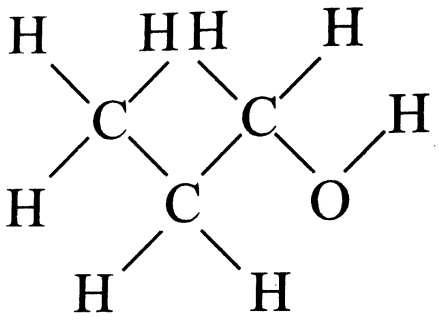
9. Which of the following is the correct dash formula for n-propyl alocohol?

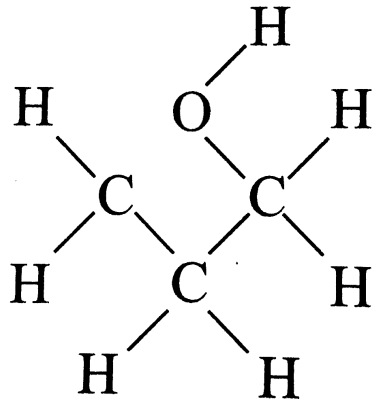
(i)



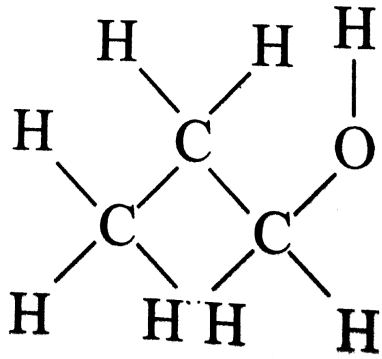
(ii)



(iii)



(iv)



A. (1) (i)

B. (2) (i), (ii)

C. (3) (i), (iv)

D. (4) (i), (ii), (iii), (iv)

Answer: D

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10. Which of the following is not correct for condensed structure formulas ?

A. (1) They are easier to write than dash formulas.

B. (2) They impart all the information that is contained in the dash structure once we become familiar with them.

C. (3) In condensed formulas all of the H atoms are usually written before the carbon.

D. (4) In fully condensed formulas, all of the atoms that are attached to the carbon are usually written immediately after carbon, listing hydrogens first.

Answer: C

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11. The condensed forlmula for isoprophyl alcohol can be written in.....different ways.

A. (1) just one

B. (2) four

C. (3) two

D. (4) three

Answer: B

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12. Which of the following is incorrect regarding bond-line formulas ?

A. (1) It is the slowest of all structural repesentations to write.

B. (2) The number of H atoms necessary to fulfill the C atoms' valencies are assumed to be present, but we do not write them.

C. (3) Other atoms, such as O, N, and Cl, called hetero atoms are written.

D. (4) Each intersection of two or more lines and the end of a line represent a C atoms unless

some other atom is written.

Answer: A

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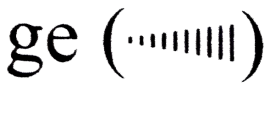
13. Which of the following is not correct regarding the wedge-and-dashed representation?

A. (1) Bonds that project upwards out of the plane of the paper are indicated by a wedge  .

B. (2) Bonds that lie behind the plane are indicated with a dashed wedge  .

C. (3) Bonds that lie in the plane of the page are indicated by a line $(-)$.

D. (4) For tetrahedral C atoms, we draw the two bonds that are in the plane of the page with an an angle of approximately 111° between them.

Answer: D

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Follow Up Test 3

1. Which of the following is not an aliphatic compound ?

A. (1) Ethylene oxide

B. (2) Isobutylene

C. (3) Neopentane

D. (4) Acetaldehyde

Answer: A

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2. Which of the following are unsaturated hydrocarbons?

(i) Alkanes , (ii) Alkenes

(iii) Alkynes , (iv) Arenes

A. (1) (ii), (iii)

B. (2) (ii), (iii), (iv)`

C. (3) (i), (ii), (iii)

D. (4) (iii), (iv)

Answer: B

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3. Which of the following is incorrect regarding alkanes?

A. (1) Natural gas and petroleum are the principal sources of alkanes.

B. (2) Some living organisms (called methanogens) produces methane from CO_2 and H_2.

C. (3) On the earth, methane is the major component of natural gas.

D. (4) Alkanes are saturated cyclic hydrocarbons.

Answer: D

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4. Which of the following is an alkene?

(i) $CH_3 - CH = CH_2$

(ii) $CH_2 = C = CH_2$

(iii) $CH_2 = CH - CH = CH_2$

(iv) $CH_2 = CH - (CH_2)_2 - CH = CH_2$

A. (1) (i), (ii)

B. (2) (i), (ii), (iii)

C. (3) (i)

D. (4) (i), (ii), (iii), (iv)

Answer: C

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5. Alkynes are unsaturated acyclic hydrocarbons containing

A. (1) two π bonds

B. (2) two double bonds

C. (3) triple bonds

D. (4) just one triple bond

Answer: D

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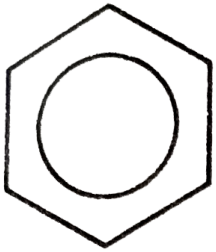
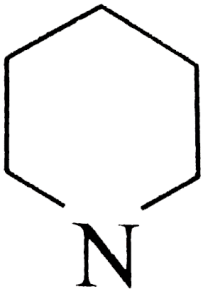
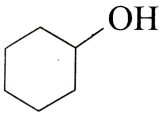
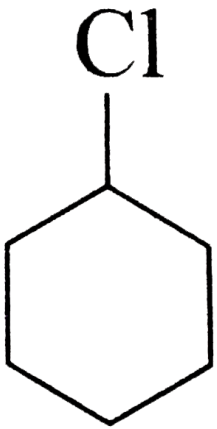
6. Which of the following is not a carbocyclic or homocyclic compound?

A. (1) 

B. (2) 

C. (3) (3) 



D. (4)

Answer: B

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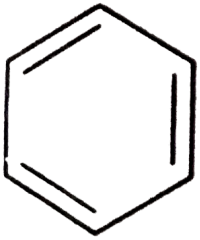
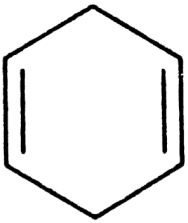
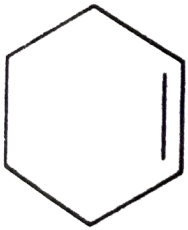
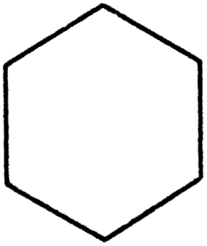
7. Which of the following is not an alicyclic compound?

A. (1) 

B. (2) 

C. (3) 

D. (4) 

Answer: A

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8. Which of the following is a benzenoid aromatic compound?

A. (1) Azulene

B. (2) Tropone

C. (3) Tropolone

D. (4) Phenanathrene

Answer: D

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9. Which of the following benzenoid aromatic hydrocarbons consists of isolated benzene rings?

A. (1) Naphthalene

B. (2) Anthracene

C. (3) Phenanthrene

D. (4) Biphenyl

Answer: D

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10. Which of the following is not a heterocyclic aromatic compound?

A. (1) Pyridine

B. (2) Pyrrolidine

C. (3) Pyrrole

D. (4) Furan

Answer: B

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11. A compound with molecular formula C_4H_4S has all four C atoms and S atoms in the ring. It has two double bonds in the ring. The compound is

A. (1) heterocyclic but not aromatic

B. (2) homocyclic but not aromatic

C. (3) heterocyclic and aromatic

D. (4) homocyclic and aromatic

Answer: C

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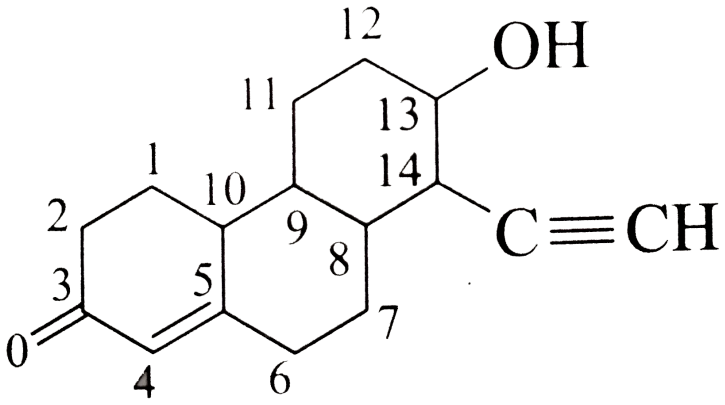
12. A functional group of an organic compound is an atom or a group of atoms in the compound that determines its chemical properties and in most cases is one of the sites of its chemical reactions. How many functional groups are present in the following compound?



A. (1) Two

B. (2) Three

C. (3) Five

D. (4) Four

Answer: D

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13. Which of the following instrumental technique can be used to demonstrate the presence of a particular functional group in the molecules of an organic compound?

A. (1) Infared spectroscopy

B. (2) Mass spectrometry

C. (3) Raman spectroscopy

D. (4) NMR spectroscopy

Answer: A

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14. Members of a homologous series have

A. (1) same physical properties

B. (2) same general formula

C. (3) same chemical properties

D. (4) same molecular masses

Answer: B

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15. The general formula $C_nH_{2n-2}O_3$ is valid for

A. (1) alkanamides

B. (2) Alkanamines

C. (3) alkane carboxylic acids

D. (4) Alkanoic anhydrides

Answer: D

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16. Which of the following is incorrect about homologues?

A. (1) They have a difference of $-CH_2$ group between any two successive members.

B. (2) They can be prepared by general methods of preparation.

C. (3) They are all unbranched compounds.

D. (4) They contain the same functional group.

Answer: C

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Follow Up Test 4

1. Which of the following is commonly referred to as adipic acid?

A. (1) $HO_2C - CO_2H$

B. (2) $HO_2CCH_2CO_2H$

C. (3) $HO_2C(CH_2)_2CO_2H$

D. (4) $HO_2C(CH_2)_2CO_2H$

Answer: D

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2. The $IUPAC$ name 2-methylpropyl corresonds to the

A. (1) butyl group

B. (2) tert-butyl group

C. (3) isobutyl group

D. (4) sec-butyl group

Answer: C

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3. How many five-carbon groups are possible?

A. (1) Eight

B. (2) Seven

C. (3) Six

D. (4) Five

Answer: A

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4. Which of the following $IUPAC$ name is incorrect?

(i) 2-Methyl-3-ethylpentane

(ii) 2-Ethyl-3-methylpentane

(iii) 3-Methyl-2-ethylpentane

(iv) 3-Ethyl-2-methylpentane.

A. (i), (ii),(iii), (iv)

B. (ii), (iii), (iv)

C. (i), (ii), (iii)

D. (i), (iv)

Answer: C

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5. Which of the following is correct?

(i) 2-Methylpentane has one isopropyl group.

(ii) 3-Methylhexane contains only one methyl, one ethyl, and one n-propyl group.

(iii) 3- Ethylpentane is the lowest molecular mass alkane which has ethyl group as the subsitituent.

(iv) 2, 3-Dimethylbutane has two isopropyl groups.

A. (1) (i), (ii),(iii), (iv)

B. (2) (i), (iii),(iv)

C. (3) (i), (ii), (iii)

D. (4) (ii), (iii), (iv)

Answer: A

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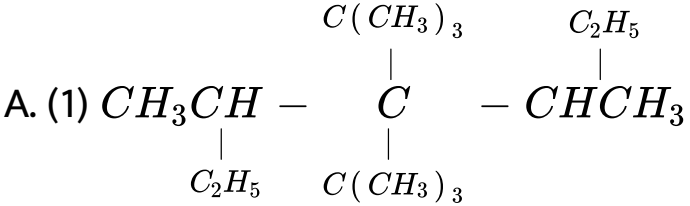
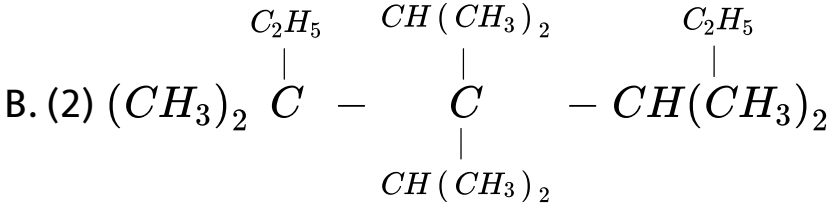
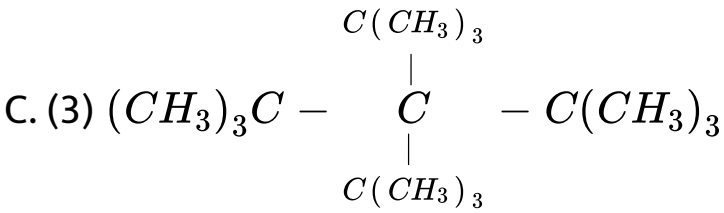
6. The correct structure for 3, 3-bis (1, 1-dimethylethyl)-2, 2, 4, 4-tetramethylpentane is

A. (1) 

B. (2) 

C. (3) 

D. (4)

$$CH_3CH_2CH_2CH-\underset{C(CH_3)_3}{\overset{C(CH_3)_3}{\underset{|}{\overset{|}{C}}}}-CHCH_2CH_2CH_3$$

Answer: C

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7. The cycloalkane homologous series with only one ring consists of hydrocarbons with the general formula........where the $C-C$ bonds form a ring.

A. (1) C_nH_{2n+2}

B. (2) C_nH_{2n}

C. (3) C_nH_{2n-2}

D. (4) C_nH_{2n-4}

Answer: B

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8. Which of the following compounds is incorrectly named?

A. (1) 1-Cyclobutyl-3methylcyclopentane

B. (2) 3-Cyclopropyl-2-methylheptane

C. (3) 1, 1, 2, 3-Tetramethylcyclobutane

D. (4) $3,3$-Dimethyl-1-isopropylcyclopentane

Answer: D

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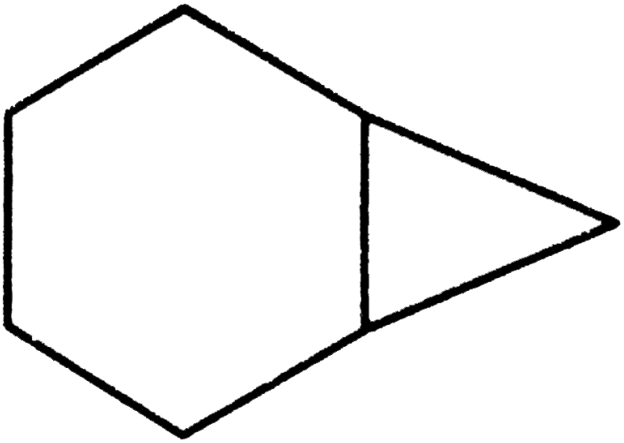
9. The $IUPAC$ name of the compound is



A. (1) bicyclo $[0.1.4]$ heptane

B. (2) bicyclo $[4.1.0]$ heptane

C. (3) bicyclo $[0.4.1]$ heptane

D. (4) bicyclo $[1.4.0]$ heptane

Answer: B

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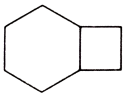
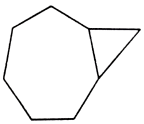
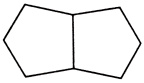
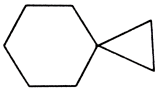
10. Which of the following compounds is bicyclo $[3.3.0]$ oct-ane?

(1) 

A. (1)

B. (2) (2) 

C. (3) (3) 

D. (4) (4) 

Answer: C

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11. Spiranes are polycyclics that share

A. (1) two carbon atoms

B. (2) three carbon atoms

C. (3) zero carbon atoms

D. (4) only one carbon atom

Answer: D

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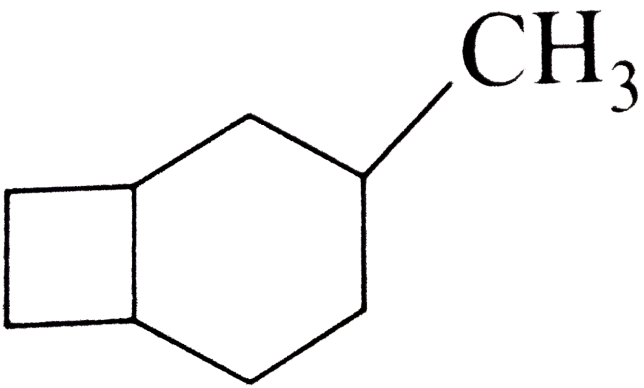
12. The $IUPAC$ name of the compound is



A. (1) 1-methylbicyclo $[4.2.0]$ octane

B. (2) 3-methylbicyclo $[0.2.4]$ octane

C. (3) 3-methylbicyclo $[4.2.0]$ octane

D. (4) 1-methylbicyclo $[0.2.4]$ octane

Answer: C

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13. Which of the following compound is the isomer of bicycle $[2.2.0]$ hexane?

A. (1) Bicycle $[3.1.0]$ hexane

B. (2) Bicycle $[4.0.0]$ hexane

C. (3) Bicycle $[2.1.1]$ hexane

D. (4) Bicycle $[2.0.2]$ hexane

Answer: A::C

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14. The correct $IUPAC$ name of the compound

$$CH_3CH_2CH_2\underset{\underset{CH=CH_2}{|}}{CH}CH_2CH_2CH_3$$

is

A. (1) 4-ethenylheptane

B. (2) 3-n-propyl-1-hexene

C. 3-(1-propyl) hex-1-ene

D. (4) $4-n$-propyl-5-hexene

Answer: C

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15. Which of the following $IUPAC$ names is not correct?

A. (1) 3-Ethylpentane-1, 4-diene

B. (2) 2-Isopropylbut-1-ene

C. (3) 3-Methylenecyclopentene

D. (4) 4-Allyl-3-propenylcyclohexa-1, 3-diene

Answer: B

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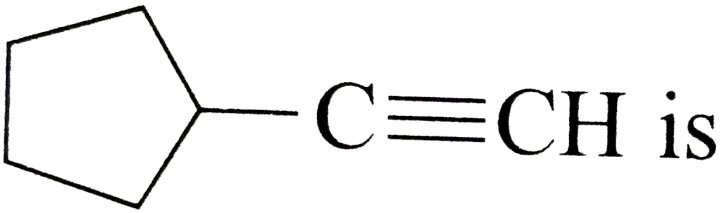
16. The correct $IUPAC$ name of the compound



A. (1) ethylcyclopentane

B. (2) acetylenecyclopentane

C. (3) cyclopentylethyne

D. (4) cyclopentylacetylacetylene

Answer: C

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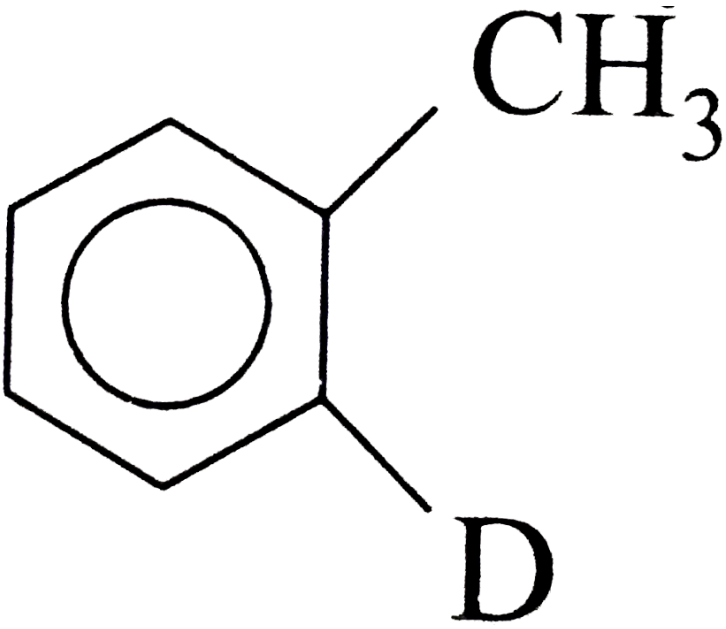
17. The *IUPAC* name of



is

A. (1) o-deuteriotoluene

B. (2) deuterium methyl phenylene

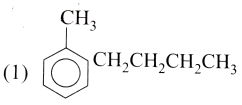
C. (3) 2-deuterio-1-methylbenzene

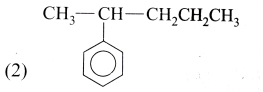
D. (4) 1-deuterio-2-methylbenzene

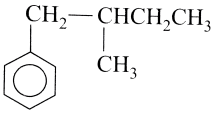
Answer: D

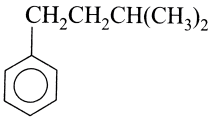
Watch Video Solution

18. The structure of (1-methylbutyl) benzene is

A. (1) 

B. (2) 

C. (3) (3) 

D. (4) (4) 

Answer: B

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19. Which of the following $IUPAC$ name is not correct?

A. (1) 1-Bromo-4-fluuorobenzene

B. (2) 2-fluorobenzenamine

C. (3) 1-Ethenyl-4-nitrobenzene

D. (4) $1,3$-Dichlorobenzene

Answer: C

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20. Which of the following compound is commonly called met-hyene chloride?

A. (1) Tetrachloromethane

B. (2) Trichloromethane

C. (3) Dichloromethane

D. (4) Chloromethane

Answer: C

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21. Which of the following compounds is commonly named is isobutyl iodide?

A. (1) $CH_3CH_2CH_2CH_2I$

B. (2) $(CH_3)_2CHCH_2I$

C. (3) $CH_3CHICH_2CH_3$

D. (4) $(CH_3)_3CI$

Answer: B

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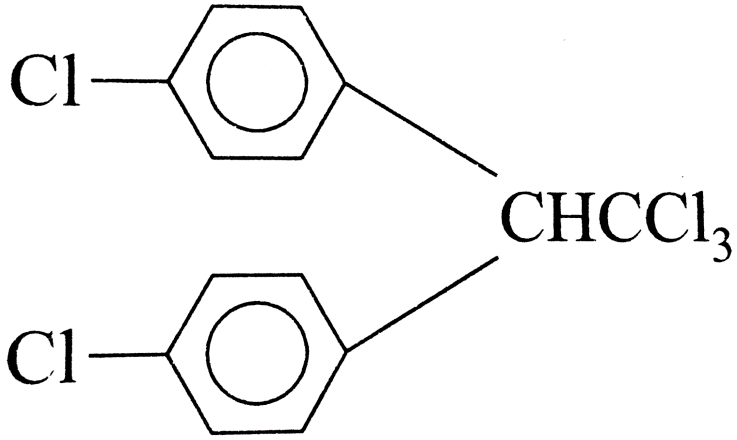
22. The $IUPAC$ name of



A. (1) 1, 1, 1-trichloro-2, 2-bis (p-chlorophenyl)ethane

B. (2) 2, 2-di (p-chlorophenyl)-1, 1, 1-trchloroethane

C. (3) 2, 2-di(p-chlorophenyl)-1, 1, 1-trchloroe thane

D. (4) 1, 1, 1-trichloro-2, 2-di (p-chlorophenyl) ehtane

Answer: A

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23. Which of the following is a tertiary alcohol ?

A. (1) Butan-1-ol

B. (2) Butan-2-ol

C. (3) 2-Methylpropan-2-ol

D. (4) 2-Methylpropan-1-ol

Answer: C

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24. Phenols are usually referred to by their common names. Which of the following are called cresols?

A. (1) Methylphenols

B. (2) Methoxyphenols

C. (3) Hydroxyphenols

D. (4) Carboxyphenols

Answer: A

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25. The $IUPAC$ name of $BrCH_2CH_2CH(OH)C(CH_3)_3$ is

A. (1) 2, 2-Dimethyl-5-bromopentan-2-ol

B. (2) 2, 2-methyl-5-bromopentan-2-ol

C. (3) 5-methyl-5-methylpentan-2-ol

D. (4) 5-Bromo-2, $2-$ dim $ethylpen\tan-2$`-ol

Answer: D

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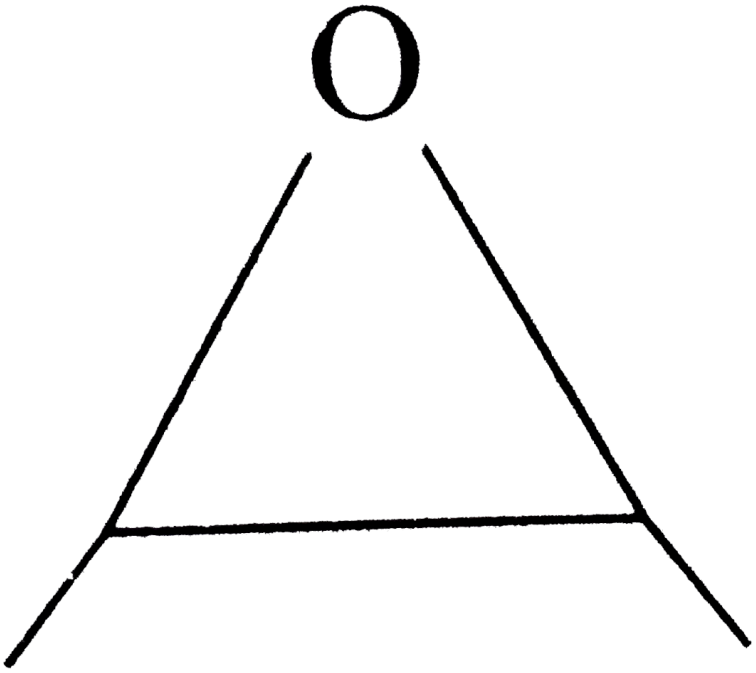
26. The correct $IUPAC$ name of



is

A. (1) 2, 3-epoxypentane

B. (2) 2-ethyl-methyloxirane

C. (3) 1-ethyl-2-methyloxirane

D. (4) 2-methyl-3-ethyloxirane

Answer: B

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27. Which of the following is a symmetrical ether?

A. (1) Methyloxythane

B. (2) Mehtylobenzene

C. (3) Phenoxybenzene

D. (4) Phenetole

Answer: C

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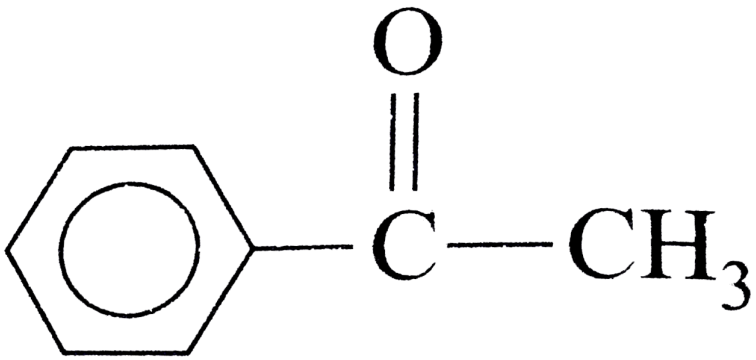
28. The $IUPAC$ name of the compound



is

A. (1) acetophenone

B. (2) methyl phenyl ketone

C. (3) 2-methylethanone

D. (4) 1-phenylethanone

Answer: D

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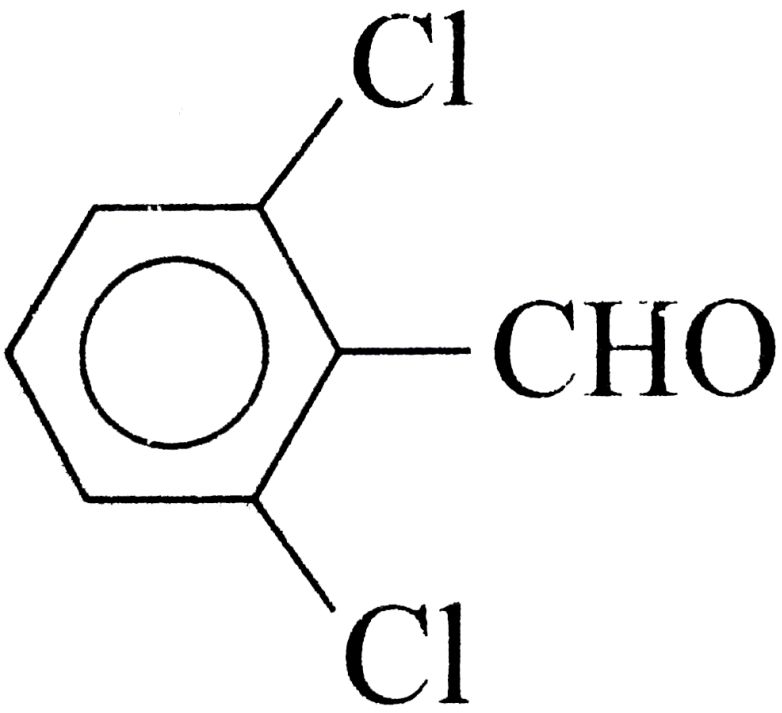
29. The $IUPAC$ name of



is

A. (1) 2, 6-Dichlorobenzenecarbaldenyde

B. (2) 2, 6-Dichlorobenzaldenyde

C. (3) 1, 3-Dichlorobenzenecarbal dehyde

D. (4) 1, 3-Dichlorobenzaldehyde

Answer: A

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30. The $IUPAC$ name of the compound

c is

A. (1) 5-isobutylhept-6-enoic acid

B. (2) 5-sec-butylhept-6-enoic acid

C. (3) 5-tert-butylhept-6-enoic acid

D. (4) 5-butylhept-6-enoic acid

Answer: D

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31. The $IUPAC$ name of the organic acid present in sour milk is

A. (1) 2-hydroxybutanedioic acid

B. (2) 2, 3-dihydroxybutanedioic acid

C. (3) 2-hydroxypropanoic acid

D. (4) 3-hydroxypropane-1, 2, 3-tricarboxylic acid

Answer: C

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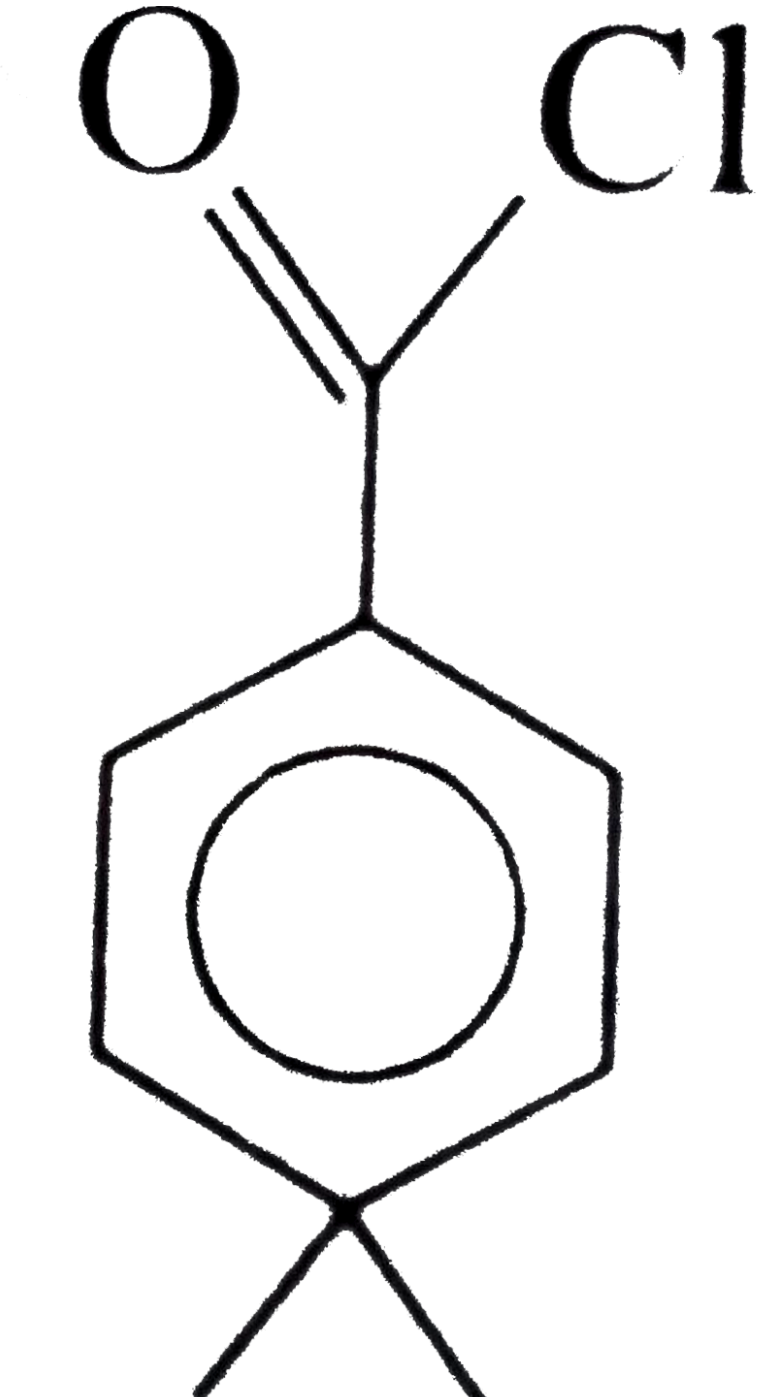
32. The $IUPAC$ naem of the compound



is

A. (1) 4-dimethylbenzoyl chloride

B. (2) 4, 4-dimethylbenzene carbonyl chloride

C. (3) 4, 4-dimethylbenzoyl chloride

D. (4) 4-dimathylbenzene carbonyl

Answer: B

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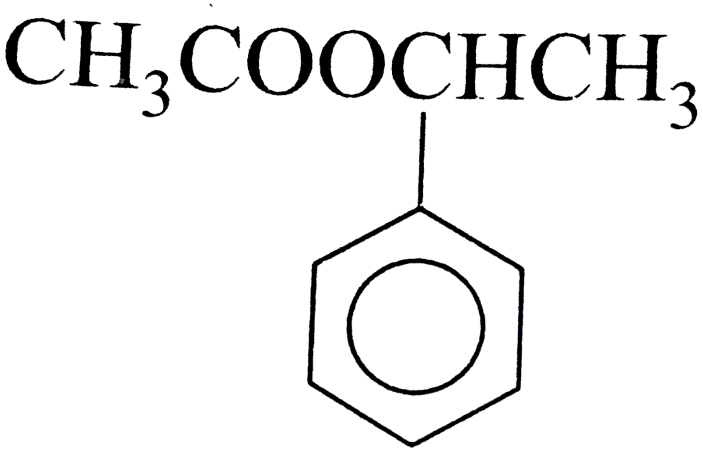
33. The $IUPAC$ name of



is

A. (1) 1-phenylethyl ethanoate

B. (2) 1-acetoxy ethyl benzene

C. (3) 1-methyl benzyl acetate

D. (4) 1-phenyl-1-acetyloxy ethane

Answer: C

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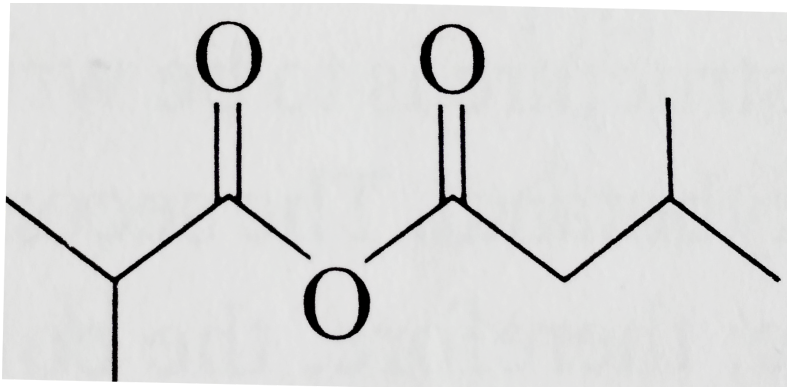
34. The $IUPAC$ name of



is

A. (1) 2, 3-dimethylbutanoic anhydride

B. (2) 2, 3-methylbutanoic anhydride

C. (3) 3-methylbutanoic-2-methyl propanoic anhydride

D. (4) isobutyric isovaleric anhydride

Answer: B

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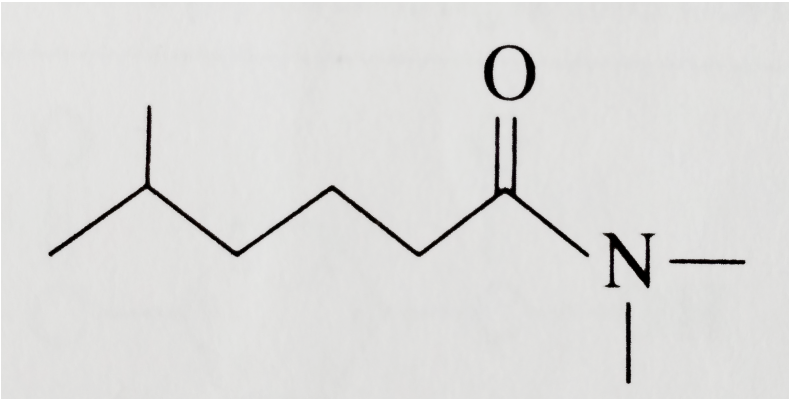
35. The $IUPAC$ name of



is

A. (1) dimethylamino-4-methylpentanone

B. (2) N, N, 4-trimethylpentanamide

C. (3) 2-methyl-5-oxodimathylpentanamine

D. (4) N, N-dimathylamino-4-methylpentanamide

Answer: B

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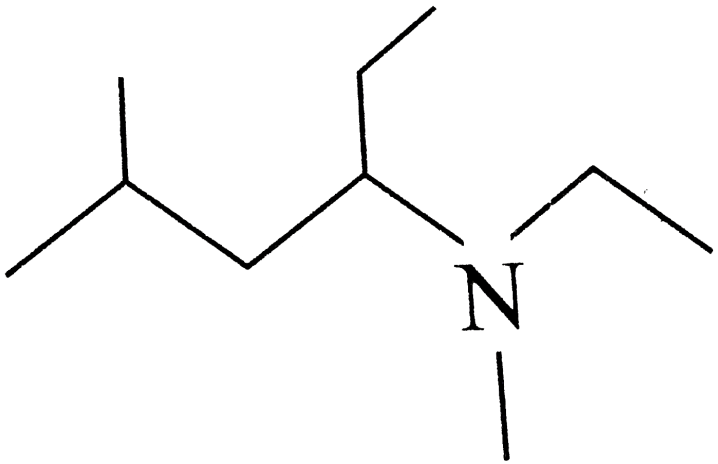
36. The $IUPAC$ name of



is

A. (1) N, 4-diethyl-N, 2-dimethylbutan-4-amine

B. (2) 3-(ethylmethylamino)-5-methylhexane

C. (3) N-ethyl-N, 2-dimethylhexan-4-amine

D. (4) N-ethyl-N, 5-dimethylhexan-3-amine

Answer: D

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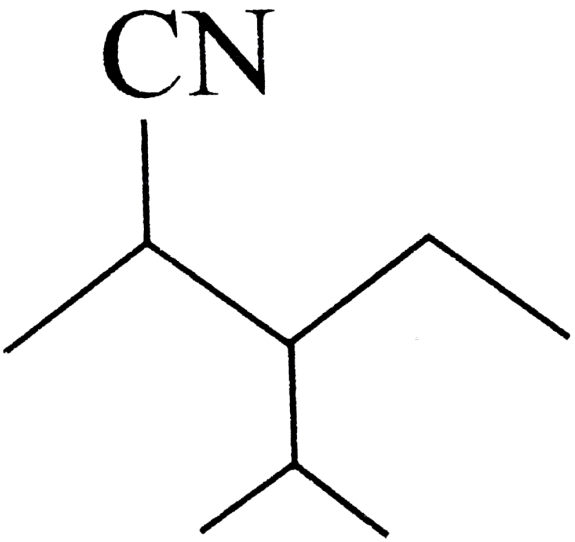
37. The $IUPAC$ name of



is

A. (1) 3-isopropyl-2-pentylcyanide

B. (2) 3-isopropyl-2-methylpentanenitrile

C. (3) 3-ethyl-2, 4-dimethylpentanenitrile

D. (4) 2-cyano-3ethyl-4methylpentane

Answer: C

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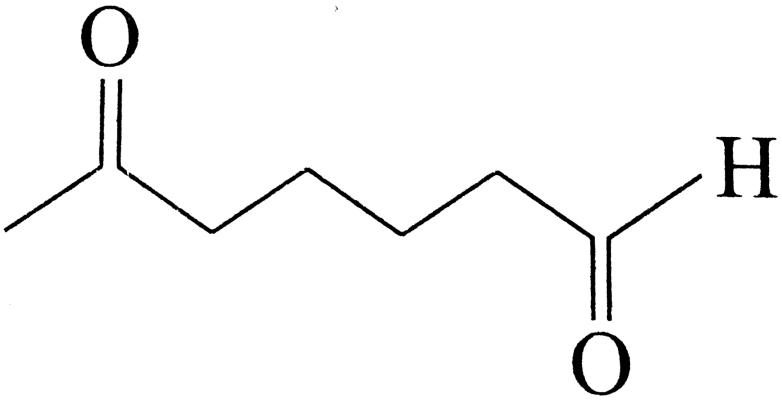
Follow Up Test 5

1. The $IUPAC$ name of



is

A. (1) 6-formylehexan-2-one

B. (2) heptane-2, 7-dione

C. (3) 6-oxoheptanal

D. (4) heptane-1, 6-dione

Answer: C

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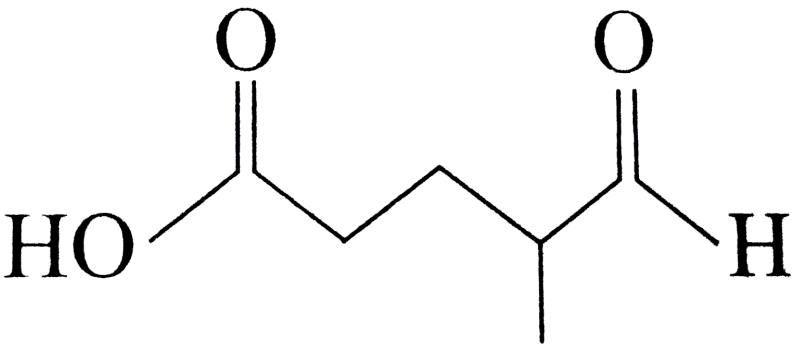
2. The $IUPAC$ name of



is

A. (1) 4-methyl-5-oxopentanoic acid

B. (2) 2-formylpentanoic acid

C. (3) 4-carboxy-2-methylbutanal

D. (4) 4-formylpentanoic acid

Answer: A

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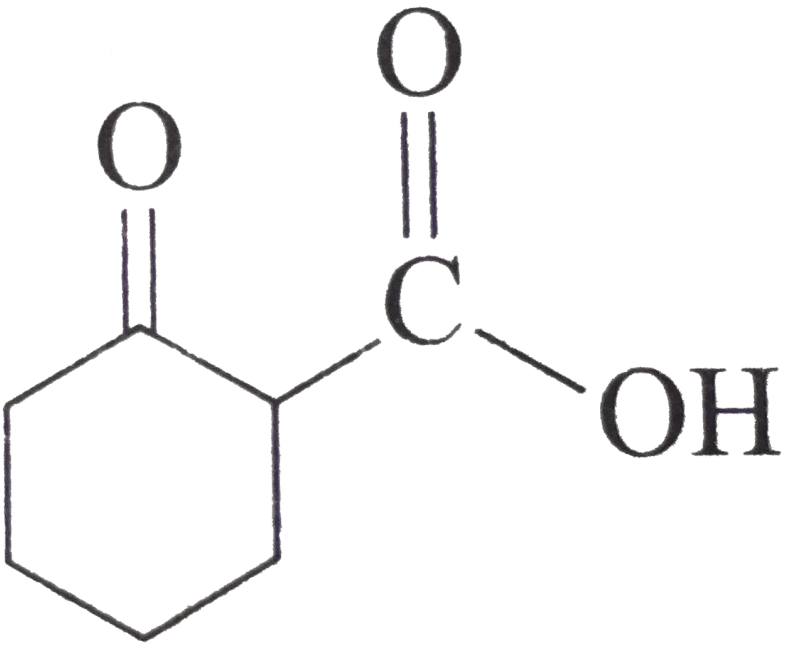
3. The $IUPAC$ name of



is

A. (1) 1-carboxy-2cyclohexanone

B. (2) 2-carboxyclohexanone

C. (3) 2-oxocyclohexanoic acid

D. (4) 2-oxocyclohexane carboxylic acid

Answer: D

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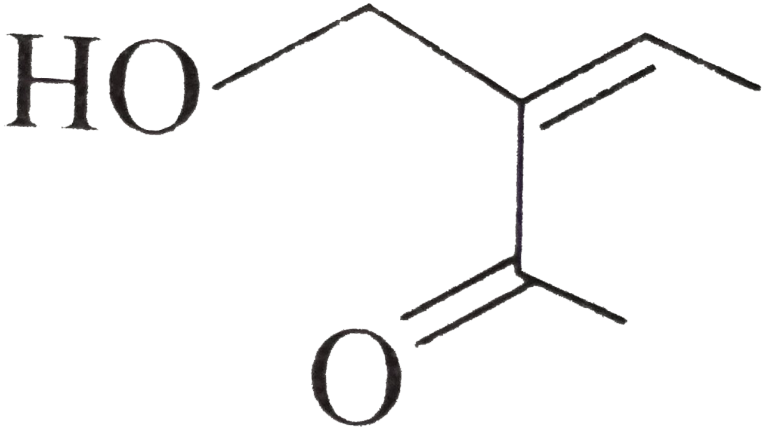
4. The $IUPAC$ name of



is

A. (1) 3-acetyl-2-buten-4-ol

B. (2) 3-ethylidene-4-hydroxy-2-butanone

C. (3) 3-hydroxymethylpent-2-butanone

D. (4) 2-acety-2-buten-1-ol

Answer: C

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5. The $IUPAC$ name of $PhCH = CHCOPh$ is

A. (1)1, 3-diphenylprop-2-en-1-one

B. (2) 1-benzoyl-2-phenylethene

C. (3) 1, 3-diphenyl-1-propen-3-one

D. (4) benzyylideneacetophenone

Answer: A

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6. The $IUPAC$ name of

$$CH_2 = CH - CH = CH - \underset{\underset{CH = CH_2}{|}}{CH} - C \equiv CH$$

is

A. (1) 2-ethyntlhepta-1, 4, 6-triene

B. (2) 5-ethylnyhepta-1, 3, 6-triene

C. (3) 5-ethylnyhepta-1, 3-dien-6-yne

D. (4) 3-ethenylhepta-4, 6-dien-1-yne

Answer: D

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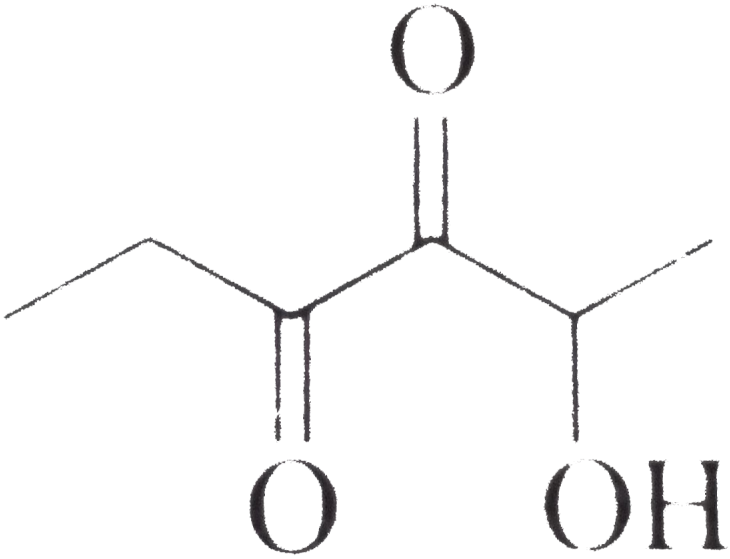
7. The $IUPAC$ name of



is

A. (1) 5-hydroxyhexane-3, 4-dione

B. (2) 3, 4-dioxohexan-2-ol

C. (3) 2-hydroxyhexane-3, 4-dione

D. (4) 2-hydroxy-3, 4-diketohexane

Answer: C

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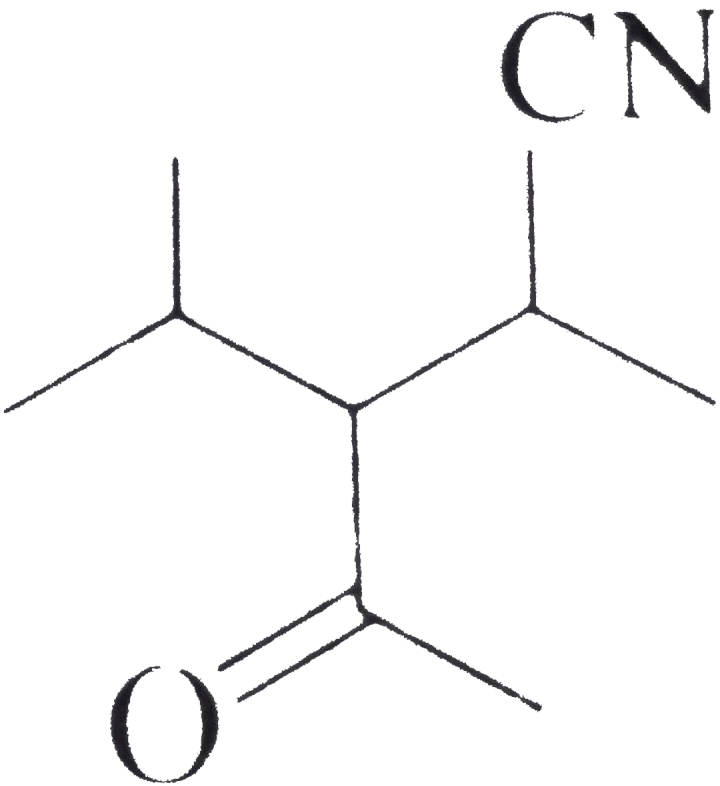
8. The $IUPAC$ name of



is

A. (1) 2-methyl-3-(1-methylethyl)-4-oxopentanenitrile

B. (2) 4-cyano-3-(1-methylethyl)pentan-2-one

C. (3) 3-acetyl-2-cyano-4-methylpentane

D. (4) 3-ethanoyl-2-methyl-3-(1-methylethyl)pentaneni-trile

Answer: A

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9. The $IUPAC$ name of of $CH_3 - \overset{\overset{O}{||}}{C} - O - CH_2 - C \equiv N$ is

A. (1) methyl cyanoethanoate

B. (2) 2-acetoxymethyl cyanide

C. (3) 2-acetyloxyethaenitrile

D. (4) cyanomethyl ethanoate

Answer: D

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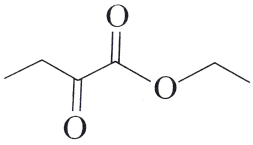
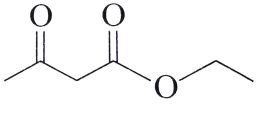
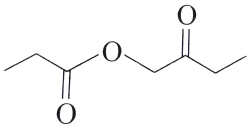
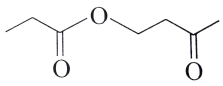
10. Which of the following represents the structure of ethyl-3-oxobutanoate?

A. (1) 

B. (2) 

C. (3) 

D. (4) (4) 

Answer: B

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Question Bank

1. The $IUPAC$ name of neopentane is

A. (1) 2-methylbutane

B. (2) 2-methylpropane

C. (3) 2-ethylpropane

D. (4) 2, 2-dimethylpropane

Answer: D

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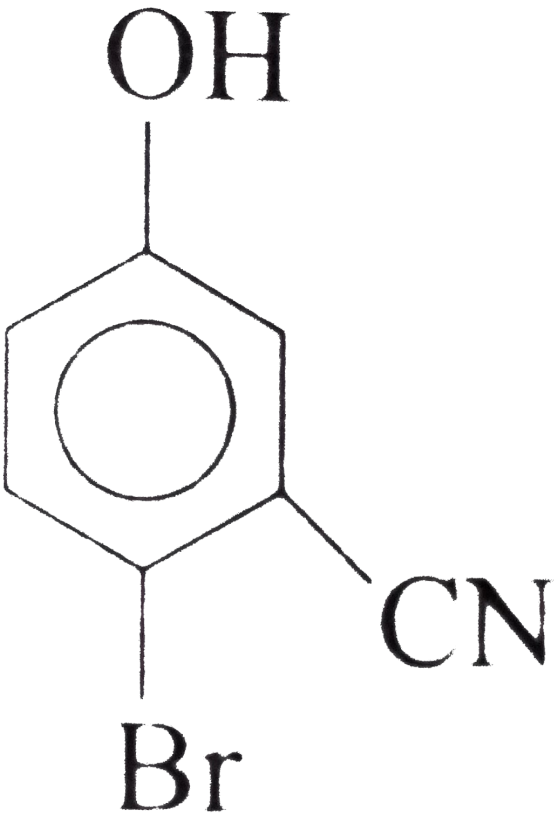
2. The $IUPAC$ name of the compound



is

A. (1) 2-cyano-4-hydroxybromobenzene

B. (2) 4-bromo-3-cyanophenol

C. (3) 2-bromo-5-hydorxybenzonitrile

D. (4) 6-bromo-3-hydroxybenzonitrile

Answer: C

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3. Which of the following os the incorrect name of CH_3NC?

A. (1) Methyl isocyanide

B. (2) Acetoisonitrile

C. (3) Methyl carbylamine

D. (4) Methyl isonitrile

Answer: B

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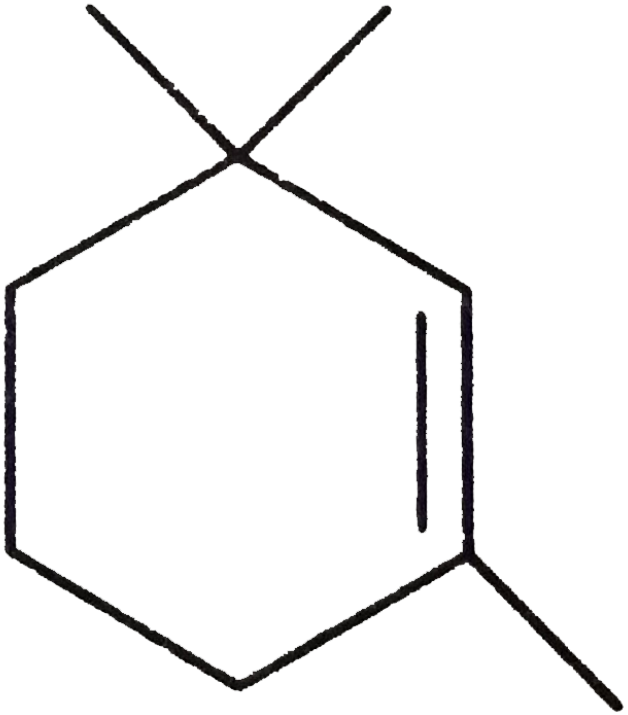
4. The $IUPAC$ name of the compound



is

A. (1) 1, 1, 3-trimethylcyclohex-2-ene

B. (2) 1, 3, 3-trimethylcyclohex-1-ene

C. (3) 1, 1, 5-trimethylcyclohex-5-ene

D. (4) 2, 6, 6-trimethylcyclohex-1-ene

Answer: B

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5. Which of the following is the correct decreasing order of priority for the functional groups ?

A. (1) $-CONH_2,\ -CHO,\ -SO_3H,\ -COOH$

B. (2) $-SO_3H,\ -COOH,\ -CONH_2,\ -CHO$

C. (3) $-COOH, SO_3H,\ -CONH_2,\ -CHO$

D. (4) -$CHO, COOH,\ -SO_3H,\ -CONH_2$

Answer: C

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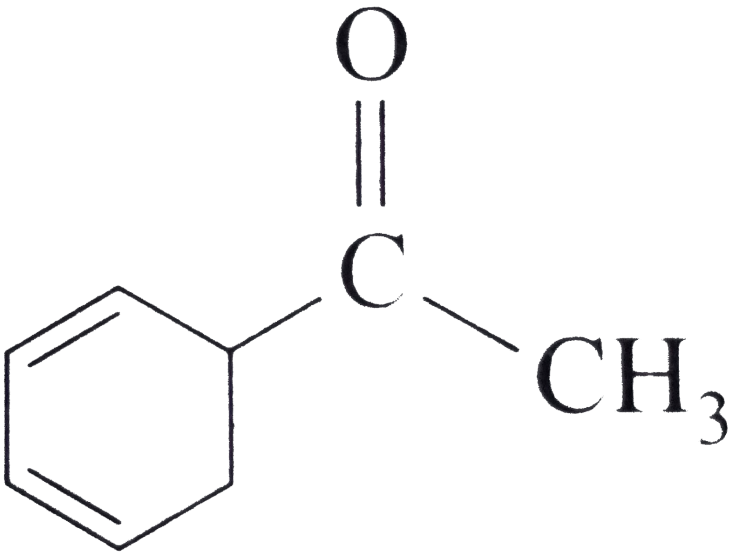
6. The $IUPAC$ name of



is

A. (1) 6-cyclohexa-1, 3-dienylethanone

B. (2) 1-cyclohexa-2, 4-dienylethanone

C. (3) acety cyclohexadiene

D. (4) none of these

Answer: B

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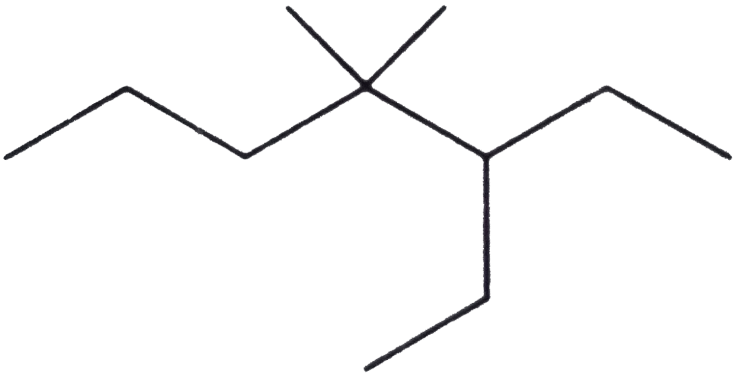
7. The $IUPAC$ name of



is

A. (1) 3-ehthyl-4, 4-dimethylheptane

B. (2) 1, 1-diethyl-2, 2-dimethylpentane

C. (3) 4, 4-dimethyl-5, 5-diethylpentane

D. (4) 5-ethyl-4, 4-dimethylheptane

Answer: A

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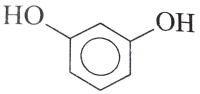
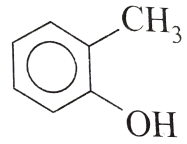
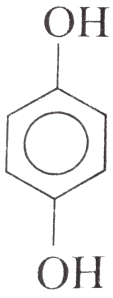
8. The structure formula of catechol is

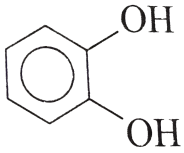
A. (1) (1) 

(2) 

B. (2)

(3) 

C. (3)

(4) 

D. (4)

Answer: D

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9. The $IUPAC$ name of $CH_3CH_2 - C \equiv C - \underset{\underset{O}{||}}{C} - CH_2CH_3$ is

A. (1) 3-oxo-2-heptyne

B. (2) hept-3-yn-4-oxone

C. (3) hept-4-yn-3-one

D. (4) hept-3-en-4-one

Answer: C

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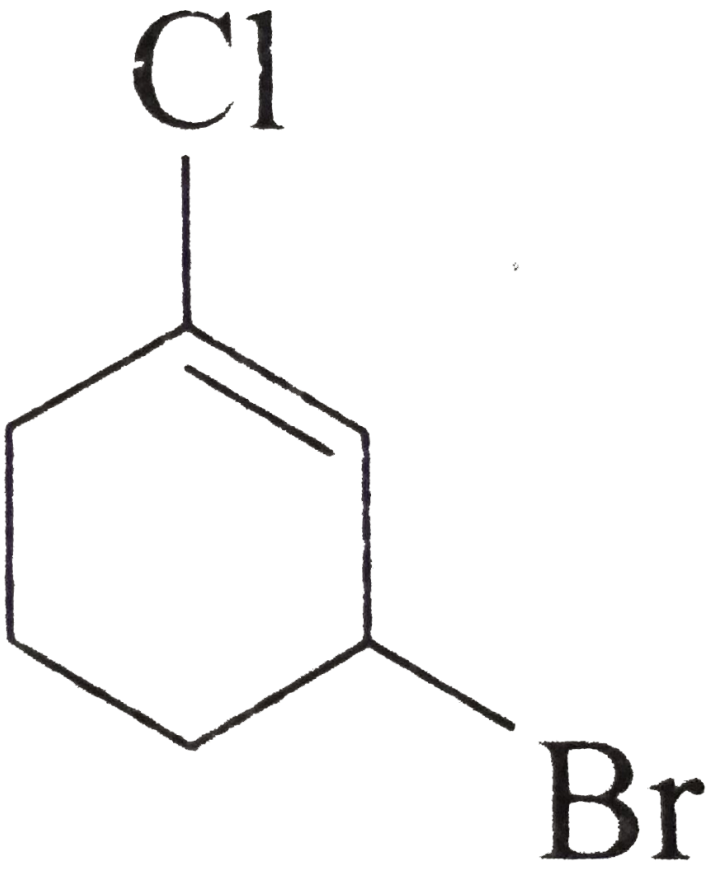
10. The $IUPAC$ name of the compound



is

A. (1) 2-bromo-6-chlorocyclohex-1-ene

B. (2) 6-bromo-2-chlorocyclohexene

C. (3) 3-bromo-1-chlorocyclohexene

D. (4) 1-bromo-3-chlorocyclohexene

Answer: C

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11. The $IUPAC$ name of C_6H_5COCl is

A. (1) chlorobenzyl ketone

B. (2) benzene chloroketone

C. (3) benzenecarbonyl chloride

D. (4) chlorophenyl ketone

Answer: C

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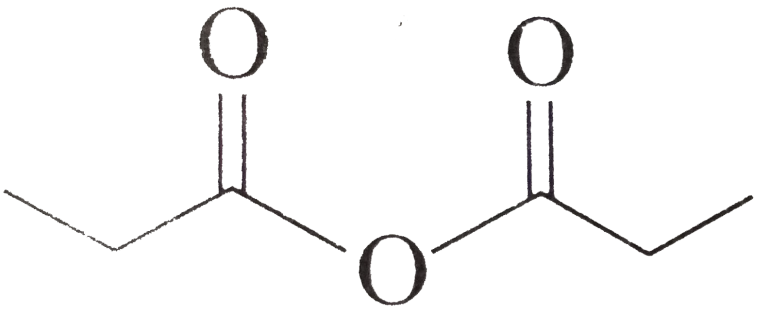
12. The $IUPAC$ name of the following compound



is

A. (1) propionic anhydride

B. (2) dipropanoic anhydride

C. (3) ethoxypropanoic acid

D. (4) propanoic anhydride

Answer: D

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13. The $IUPAC$ name of $CH_2 = CHCH(CH_2CH_3)\underset{\underset{Br}{|}}{C} = CH_2$ is

A. (1) 4-bromo-3-ethylpenta-1, 4-diene

B. (2) 2-bromo-3-ethylpanta-1, 4-diene

C. (3) 2-bromo-3-ethylpenta-1, 5-diene

D. (4) non of these

Answer: B

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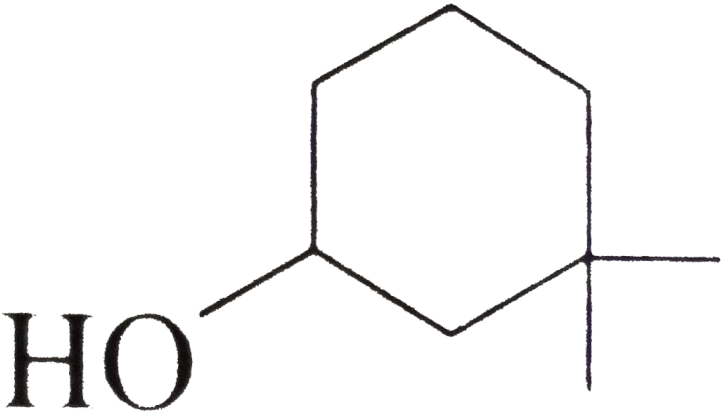
14. The $IUPAC$ name of the compound



is

A. (1) 1, 1-dimethylcyclohexan-3-ol

B. (2) 1, 1-dimethyl-3-hydroxycylohexane

C. (3) 3, 3-dimethylcyclohexan-1-ol

D. (4) 3, 3-dimethyl-1-hydroxycylohexane

Answer: C

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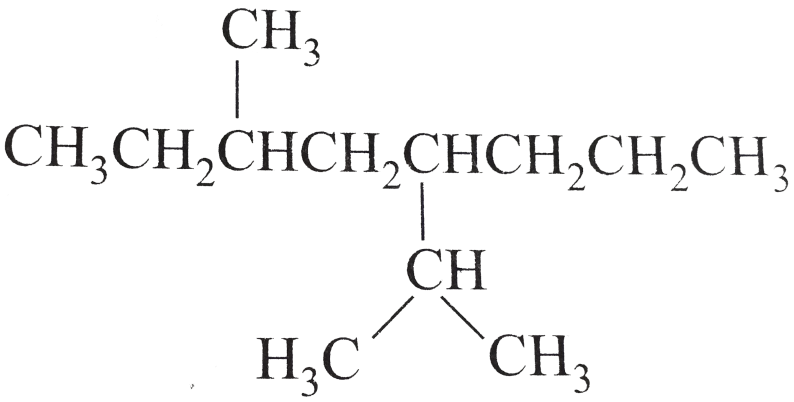
15. The $IUPAC$ name of the compound



is

A. (1) 4-isopropyl-6-methyloctane

B. (2) 3-methyl-5-(1-methylethyl)octane

C. (3) 3-methyl-5-isopropyloctane

D. (4) 6-methyl-4-(1-methylethyl)octane

Answer: B

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16. The $IUPAC$ name of $CH_3COCH(CH_3)_2$ is

A. (1) 2-methylbutan-3-one

B. (2) 4-methylisopropyl ketone

C. (3) 3-methylbutan-2-one

D. (4) Isopropyl methyl ketone

Answer: C

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17. The $IUPAC$ name of $CH_3CH_2CH_2CH(CH_3)COCH_3$ is

A. (1) isohexanone

B. (2) heptanone

C. (3) hexan-5-one

D. (4) 3-methylhexan-2-one

Answer: D

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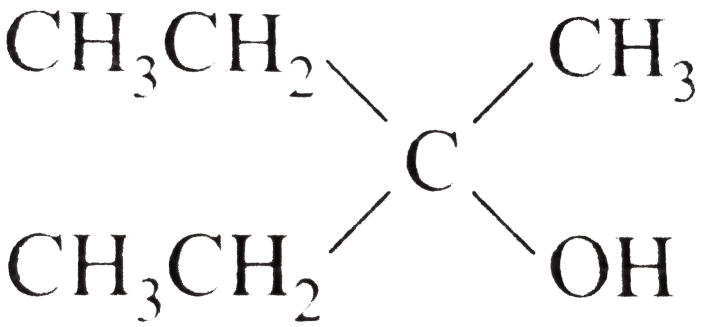
18. The correct nomenclature $(IUPAC)$ for the following alcohol is



A. (1) 2-ethylbutan-2-ol

B. (2) 3-methylpentan-3-ol

C. (3)3-ethyl-3methylpentan-3-ol

D. (4) 1, 1-diethylanol

Answer: B

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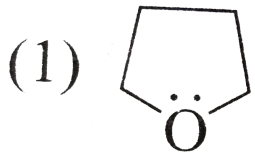
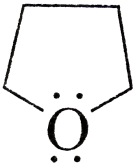
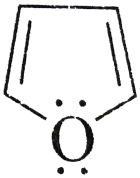
19. Which of the following correctly represents the structure of tetrahydrofuran ?

A. (1) 

B. (2) 

C. (3) 

D. (4) 

Answer: C

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20. Which of the following is commonly known as allyl group ?

A. (1) $CH_2 = CH - CH_2 -$

B. (2) $CH_3 - CH = CH -$

C. (3) $CH_2 = CH -$

D. (4) $CH \equiv C - CH_2 -$

Answer: A

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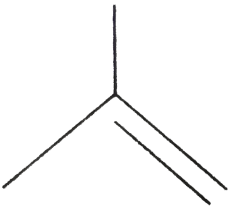
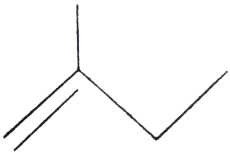
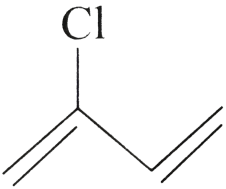
21. Which of the following is commonaly known as isoprene ?

A. (1) 

B. (2) 

C. (3) 

D. (4) $CH_2 = C = CH_2$

Answer: B

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22. The general molecular formula $C_nH_2O_2$ is applicable to

A. (1) alkanoic acids

B. (2) cycloalkanediols

C. (3) alkyl alkanoates

D. (4) all of these

Answer: D

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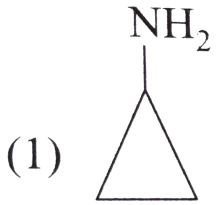
23. Which of the following is a heterocyclic compound ?

A. (1)



(1)

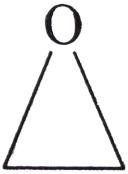
B. (2)

(2)

C. (3)

(3)

D. (4)



(4)

Answer: D

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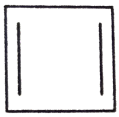
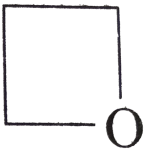
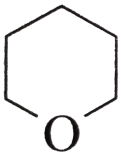
24. Which of the following is an alicyclic compound ?

(1) 

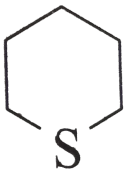
A. (1)

(2) 

B. (2)

(3) 

C. (3)

(4) 

D. (4)

Answer: A

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25. Which of the following compounds is not an amine ?

A. (1) Pyridine

B. (2) Aniline

C. (3) Methylcarbylamine

D. (4) Pyrrole

Answer: C

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26. Which of the following molecules has a regular tetrahedral shape?

A. (1) CCl_4

B. (2) CHCl_(3)`

C. (3) CH_(2)Cl_(2)`

D. (4) CH_3Cl

Answer: A

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27. Which of the following orbital overlaps is involved in the formation of the carbon-carbon signle bond in the molecule

$HC \equiv C - CH = CH_2$?

A. (1) $sp^3 - sp^3$

B. (2) $sp^2 - sp^3$

C. (3) $sp - sp^2$

D. (4) $sp^3 - sp$

Answer: C

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28. Which of the following molecules possesses more than one type of hybridized carbon?

$$\underset{(A)}{CH_3CH_2CH_2CH_3}, CH_3CH = \underset{(B)}{CHCH_3}$$

$$CH_2 = \underset{(C)}{CH} - C \equiv CH, HC \equiv \underset{(D)}{CH}$$

A. (1) (B) and (C)

B. (2) (C) and (D)

C. (3) (A) and (B)

D. (4) (A) and (C)

Answer: A

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29. The hybridization states of carbon atom (1) and carbon atom (2) in the compound

$$N \equiv \overset{1}{C} - \overset{2}{C}H = \overset{3}{C}H_2$$

are, respectively,

A. (1) sp^2 and sp

B. (2) sp and sp^2

C. (3) sp^3 and sp

D. (4) sp and sp

Answer: B

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30. The carbon-carbon bond lengths of the following molecules follow the order

A. (1) $C_2H_6 > C_2H_6 > C_6H_6 > C_2H_2$

B. (2) $C_2H_4 > C_6H_6 > C_2H_2 > C_6H_6$

C. (3) $C_2H_6 > C_2H_2 > C_6H_6 > C_2H_4$

D. (4) $C_2H_2 > C_2H_4 > C_6H_6 > C_2H_6$

Answer: D

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31. The number of σ and π bonds in o-xylene are

A. (1) 12σ and 3π

B. (2) 18σ and 3π

C. (3) 9σ and 3π

D. (4) 15σ and 3π

Answer: B

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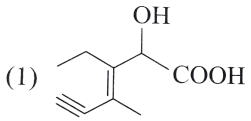
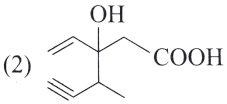
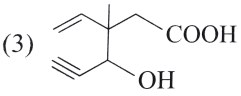
Archives

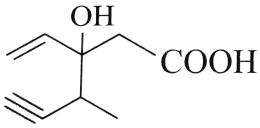
1. Structure of the compund whose $IUPAC$ name is

3-ethyl-2-hydroxy-4-methylhex-3-en-5-ynoic acid is

A. (1) 

B. (2) 

C. (3) 

D. (4) 

Answer:

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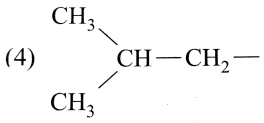
2. The structure of isobutyl group in an organic compound is

A. (1) $CH_3 - \underset{|}{CH} - CH_2 - CH_3$

B. (2) $CH_3 - CH_2 - CH_2 - CH_2 -$

C. (3) $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} -$

D. (4) (4) 

Answer:

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3. The $IUPAC$ name of the compound having the formula $CH \equiv C - CH = CH_2$ is

A. (1) but-1-yn-3-ene

B. (2) but-3-yn-1-ene

C. (3) but-3-en-1-yne

D. (4) but-1-en-3-yne

Answer:

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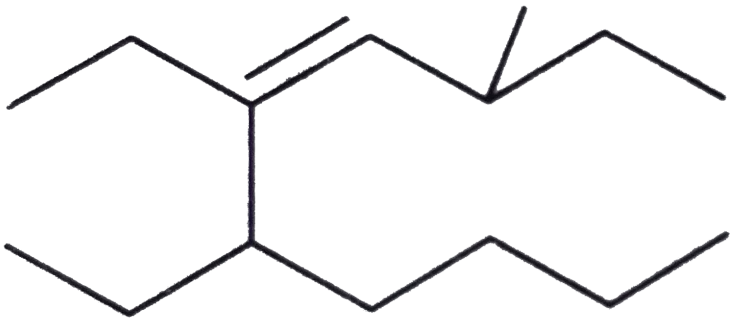
4. Consider the following compound:



The $IUPAC$ name of the this compound is

A. (1) 5, 6-diethyl-3-methyldecane

B. (2) 5, 6-diethyl-3-methyldec-4-ene

C. (3) 3, 5, 6-triethyldec-6-ene

D. (4) 3, 5, 6-trimethyldec-4-ene`

Answer:

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5. The general molecular formula, which represents the homologous series of alkanols is

A. (1) $C_nH_{2n+2}O$

B. (2) $C_nH_{2n}O_2$

C. (3) $C_nH_{2n}O$

D. (4) $C_nH_{2n+1}O$

Answer:

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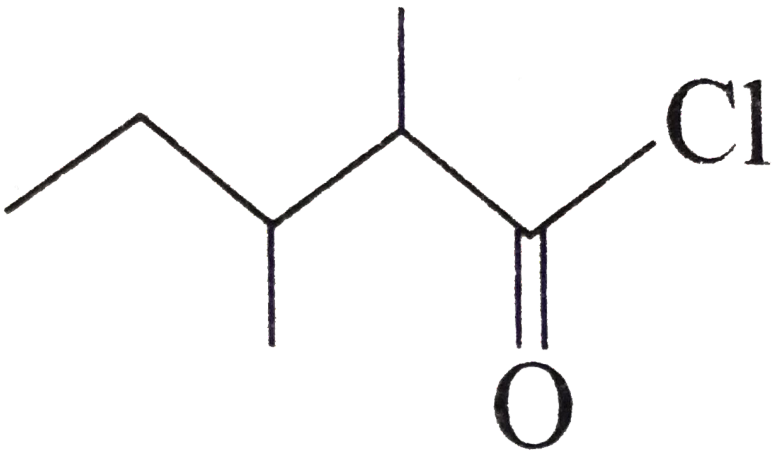
6. The $IUPAC$ name of



is

A. (1) 2, 3-dimethylpentanoy chloride

B. (2) 3, 4-dimethylpentanoy chloride

C. (3) 1-chloro-1-oxo-2, 3-dimethylpentane

D. (4) 2-ethyl-3-methylbutanoyl chloride

Answer:

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7. The names of some compounds are given. Which one not in the $IUPAC$ system?

A. (1) $CH_3CH_2CH_2\underset{\underset{CH_2CH_3}{|}}{CH}\overset{\overset{CH_3}{|}}{C}HCH_2CH_3$

$3-$Methyl-4-ethylheptane

B. (2) $CH_3\underset{\underset{OH}{|}}{C}H\underset{\underset{CH_3}{|}}{C}HCH_2CH_3$

$3-$Methylbutan-2-ol

C. (3) $CH_3CH_2\underset{\underset{CH_2}{||}}{C}-\underset{\underset{CH_3}{|}}{C}HCH_3$

$2-$Ethyl-3-Methylbut-1-ene

D. (4) $CH_3C\equiv CCH(CH_3)_2$

$4-$methylpent-2-yne

Answer:

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8. The $IUPAC$ name of $CH_3CH_2C(Br) = CHCl$ is

A. (1) 4-chloro-3-bromobut-3-ene

B. (2) 2-bromo-1-chlorobutane

C. (3) 2-bromo-1-chlorobut-1-ene

D. (4) 2-bromo-2-ethyl-3-chloropropene

Answer:

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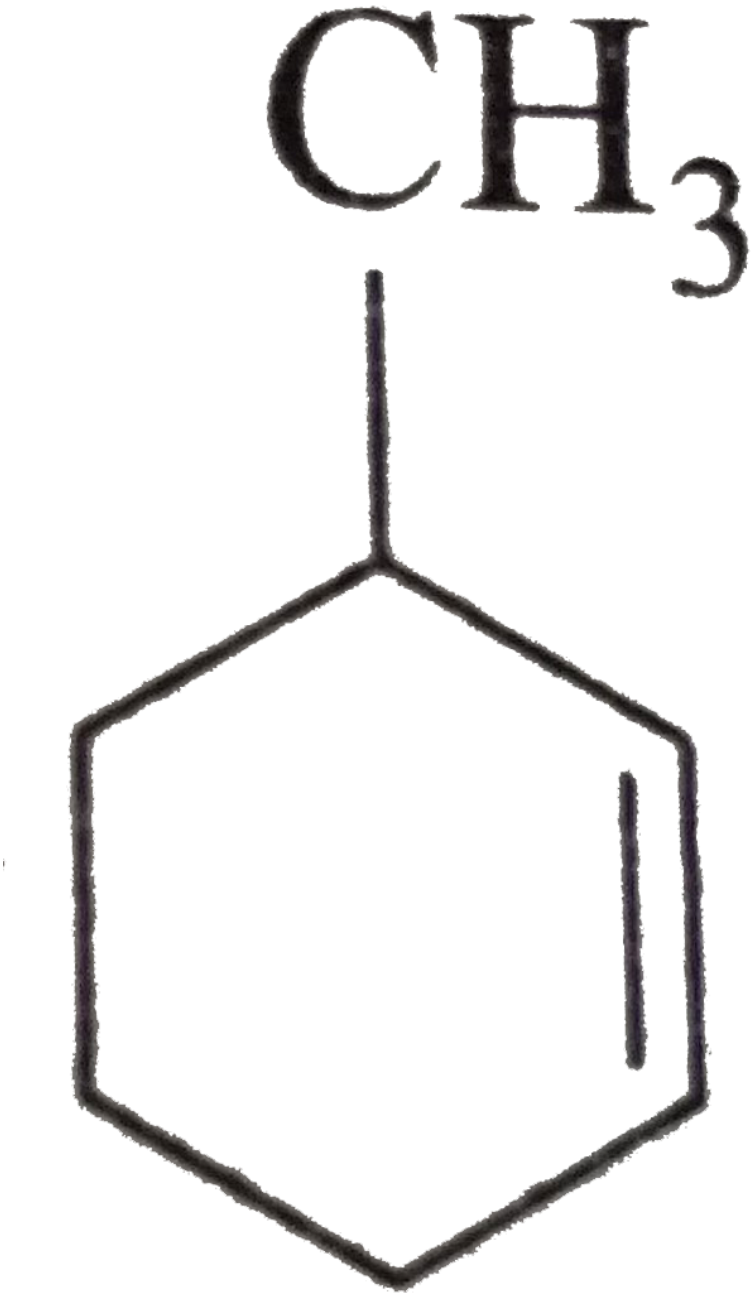
9. The $IUPAC$ name of



is

A. (1) 3-Methylcyclohexene

B. (2)1-Methylcyclohex-1-ene

C. (3) 6-Methylcyclohexane

D. (4) 1-Methylcyclohex-5-ene

Answer: A

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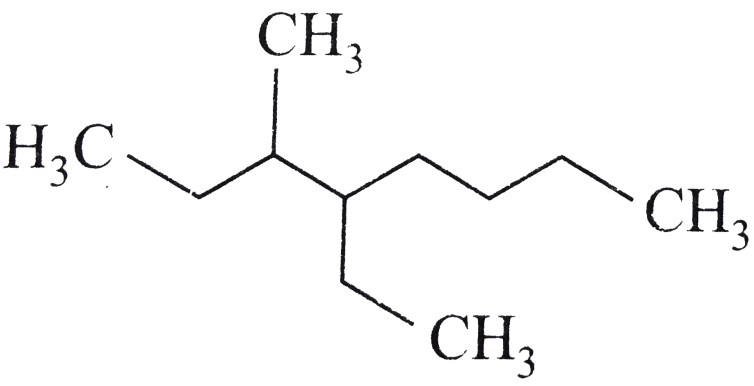
10. Name of the compound given below is



A. (1) 4-ethyl-3-methyloctane

B. (2) 3-methyl-4-ethyloctane

C. (3) 2, 3-diethylheptane

D. (4) 5-ethyl-– 6-methyloctane

Answer: A

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11. The name of $Cl - CH_2 - \underset{\underset{Br}{|}}{C} = \underset{\underset{Br}{|}}{C} - CH_2 - Cl$ according to the $IUPAC$ nomenclature system is

A. (1) 2, 3-dibromo-1, 4-dichlorobut-2-ene

B. (2) 1, 4-dichloro-2, 3-dibromobut-2-ene

C. (3) `dichlorodibromobutene

D. (4) dichlorodibromobutane

Answer: A

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12. The $IUPAC$ name of 4-isopropyl-m-xylene is

A. (1) 1-isopropyl-2, 4-dimethylbenzene

B. (2) 4-isopropyl-m-xylene

C. (3) 1-isopropyl-3, 5-dimethylbenzene

D. (4) 4-isopropyl-3, 5-dimethylbenzene

Answer: A

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13. The $IUPAC$ name of $CH_3C(CH_3)_2CH_2CH = CH_2$ is

A. (1) 2, 2-dimethylpent-4-ene

B. (2) 4, 4-dimethylpent-1-ene

C. (3) 1, 1, 1-trimethylbut-3-ene

D. (4) 4, 4, 4-trimethylbut-1-ene

Answer: B

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14. The correct $IUPAC$ name is

A. (1) $CH_3 - \underset{\underset{O}{||}}{C} - \underset{\underset{CH_3}{|}}{CH} - CH_3$

$2-$Bromo-3-chlorobutane

B. (2) $CH_3 - \underset{\underset{CH_3}{|}}{CH} - \underset{\underset{CH_2CH_3}{|}}{CH}\ CH_3$

$2,3-$Dimethylpentane

C. $CH_3C \equiv CCH(CH_3)_2$

$4-$Methylpent-2pne

D. (4) $CH_3 - \underset{\underset{Cl}{|}}{CH} - \underset{\underset{Br}{|}}{CH} - CH_3$

$2,3-$Bromo-3-chlorobutane

Answer: A

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15. The $IUPAC$ name of

$$CH_3Ch_2 - \underset{\underset{CH_3}{|}}{\overset{\overset{H}{|}}{C}} - \underset{\underset{CH_3}{|}}{\overset{\overset{C_4H_9}{|}}{C}} - CH_3$$

is

A. (1) 3,4,4-trimethylheptane

B. (2) 3,4,4-triemethyloctane

C. (3) 2-butyl-2-methyl-3-ethylbutane

D. (4) 2-ethyl-3, 3-dimethylheptane

Answer: B

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16. The $IUPAC$ name of acraldehyde is

A. (1) prop-2-en-1-al

B. (2) propenyladehyde

C. (3) but-2-en-1-al

D. (4) propenal

Answer: A

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17. The $IUPAC$ name of

$$CH_2\overset{OH}{\overset{|}{C}}HCH_2\overset{CH_3}{\overset{|}{C}}HCHO$$

is

A. (1) 4-hydroxy-2methylpentanal

B. (2) 2-hydroxy-4-methylpentanal

C. (3) 2-methylpent-4-ol-1-al

D. (4) none of these

Answer: A

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18. The $IUPAC$ name of tert-butyl chloride is

A. (1) 4-chlorobutane

B. (2) 2-chlorobutane

C. (3) 1-chloro-3-methylpropane

D. (4) 2-chloro-2-methylpropane

Answer: D

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19. The $IUPAC$ name of $CH_3OC_2H_5$ is

A. (1) methyl ethyl ether

B. (2) ethyl methyl ether

C. (3) methoxyethane

D. (4) ethoxyethane

Answer: C

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20. The $IUPAC$ name of

$$CH_3 - \overset{\overset{O}{||}}{C} - CH_2 - \overset{\overset{OH}{|}}{CH} - CHO$$

is

A. (1) 5-oxo-4-hydroxypentan-2-one

B. (2) 4-hydroxy-5-alpentan-2-one

C. (3) 2-hydroxy-4-oxopentanal

D. (4) 1-al-4-oxopentan-2-ol

Answer: C

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21. The $IUPAC$ name of the compound

$$CH_3\underset{\underset{OH}{|}}{CH} = CHCH_2COOH$$

is

A. (1) hydroxypentenoic acid

B. (2) 4-hydroxypent-3-enoic acid

C. (3) 4-hydroxypent-4-enoic acid

D. (4) 4-hydroxy-4-methyl-3-enepentenoic acid

Answer: B

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22. The $IUPAC$ name of the following compound $Cl_3C - CH_2CHO$ is

A. (1) $3, 3, 3$-trichloropropanal

B. (2) $1, 1, 1$-trichloropropanal

C. (3) $2, 2, 2$-trichloropropanal

D. (4) chloral

Answer: A

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23. The $IUPAC$ name of the following compound

$$CH_3CH = \underset{\underset{CH_2CH_2CH_3}{|}}{C} - CH_2CH_3$$

will be

A. (1) 3-propyl-3-ene

B. (2) 3-propyl-2-ene

C. (3) 3-ethylhex-2-ene

D. (4) 4-ethylhex-4-ene

Answer: C

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24. The $IUPAC$ name of the compound

$$CH_3\underset{\underset{OH}{|}}{C}HCH_2-\overset{\overset{CH_3}{|4}}{\underset{\underset{OH}{|}}{C}}-CH_3$$

is

A. (1) 1, 1-dimethylbutane-1, 3-diol

B. (2) 1, 3, 3-trimathylpropane-1, 3-diol

C. (3) 2-methylpentane-2, 4-diol

D. (4) 1, 3, 3-trimethyl-1, 3-propanediol

Answer: C

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25. The $IUPAC$ name of the compound

$$CH_3 - \overset{\overset{CH_3}{|}}{C} = \overset{\overset{H}{|}}{C} - COOH$$

is

A. (1) 2-methylbut-2-enoic acid

B. (2) 3-methylbut-3-enoic acid

C. (3) 3-methylbut-2-enoic acid

D. (4) 2-methylbut-3-enoic acid

Answer: C

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26. The $IUPAC$ name of $(CH_3)_2)CHCH_2CH_2Br$ is

A. (1) 1-bromo-3-methylbutane

B. (2) 1-bromopentane

C. (3) 2-methyl-4-bromobutane

D. (4) 2-methyl-3-bromopropane

Answer: A

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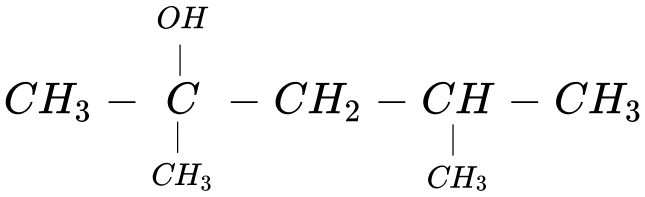
27. The $IUPAC$ name of



is

A. (1) Butanol-2

B. (2) 2, 2-dimethylbutan-2ol

C. (3) 2, 4-dimethylpentan-4-ol

D. (4) 2, 4-dimethylpentan-2-ol

Answer: D

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28. The $IUPAC$ name of

$$CH_3 - \overset{\overset{CH_3}{|}}{CH} - \overset{\overset{O}{||}}{C} - CH_2CH_2OH$$ is

A. (1) 4-methyl-3-oxopentan-1-ol

B. (2) 2-merthyl-5-hydroxypentan-3-one

C. (3)1-hydroxy-4-methylpentan-3-one

D. (4) hexan-1-ol-3-one

Answer: C

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29. Which of the following represents the systematic name of the compound $CH_2 = CH - CH_2Cl$?

A. (1) Allyl chloride

B. (2) 3-Chloroprop-1-ene

C. (3) 1-chloroprop-3-ene

D. (4) Vinyl chloride

Answer: B

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30. The $IUPAC$ name of the compound

$$CH_3CH = CHCH_2\underset{\underset{NH_2}{|}}{C}HCH_2COOH$$

is

A. (1) 5-aminohept-2-enoic acid

B. (2) β-amino-δ-heptanoic acid

C. (3) 5-aminohex-2-enecarboxyxlic acid

D. (4) 3-aminohept-5-enoic acid

Answer: D

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31. The $IUPAC$ name of $(CH_3)_3C - CH = CH_2$ is:

A. (1) 2, 2-dimethylbut-2-ene

B. (2) 2, 2-dimethylpent-3-ene

C. (3) 3, 3-dimethylbut-1-ene

D. (4) hex-1-ene

Answer: C

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32. Which of the following $IUPAC$ name is correct ?

A. (1) 2-Methyl-3-ethylpentane

B. (2) 3-Ethyl-2-methylpentane

C. (3) 2-Ethyl-3-methylpentane

D. (4) 3-Methyl-2-ethylpentane

Answer: B

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33. The $IUPAC$ name of the compound

$$CH_3 - \underset{\underset{CH_3}{|}}{C} - \underset{\underset{CH_2}{||}}{C} - CH_2 - CH_3$$

is

A. (1) 2-ehtyl-3-methylbut-1-ene

B. (2) 2-Isopropylbut-1-ene

C. (3) 2-methyl-3-ethylbut-3-ene

D. (4) 2-(1-methylethyl)but-1-ene

Answer: A

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34. The $IUPAC$ name of

$$CH_3 - \underset{\underset{OH}{|}}{CH} - CH = \underset{\underset{CH_3}{|}}{C} - CHO$$

is

A. (1) 4-hydroxy-1methylpentanal

B. (2) 4-hydroxy-2-methylpent-2-en-1-al

C. (3) 2-hydroxy-4-methylpent-3-en-5-al

D. (4) 2-hydroxy-3-methylpent-2-en-5-al

Answer: B

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35. 2-Methylbut-2-ene will be represented as

A. (1) $CH_3 - \underset{\underset{OH}{|}}{CH} - CH = \underset{\underset{CH_3}{|}}{C} - CHO$

B. (2) $CH_3CH_2\underset{\underset{CH_3}{|}}{C} = CH_2$

C. (3) $CH_3 - \underset{\underset{CH_3}{|}}{C} = CH - CH_3$

D. (4) $CH_3 - \underset{\underset{CH_3}{|}}{CH_2} - CH_2CH_3$

Answer: C

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36. An sp^3 hybrid orbital possesses

A. (1) two-third s character

B. (2) one-fourth s character

C. (3) one-third s character

D. (4) one-half s character

Answer: B

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37. Which of the following molecules has the shortest carbon-carbon bond ?

A. (1) Acetylene

B. (2) Ethane

C. (3) Benzene

D. (4) Diamond

Answer: A

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38. Which of the following molecules possesses only one π bond ?

A. (1) $CH \equiv CH$

B. (2) $CH_2 = CH - CHO$

C. (3) $CH_3CH = CHCOOH$

D. (4) $CH_3CH = CH_2$

Answer: D

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39. Which of the following compounds contains more than one kind of hybridized carbons?

A. (1) $CH_3CH_2CH_2CH_3$

B. (2) $CH_3CH = CHCH_3$

C. (3) $CH_2 = CH - CH_2$

D. (4) $CH_2 \equiv CH$

Answer: B

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40. When the hybridization state of a carbon atom changes from sp^3 to sp^2 and finally to sp, the angle

between the hybridized orbitals

A. (1) decreases gradually

B. (2) decreases considerably

C. (3) is not affected

D. (4) increases progressively

Answer: D

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41. In the straight-chain hydrocarbon C_8H_{10}, the C atoms beginning from one end have the

hybridizations sp^3, sp^2, sp^2, sp^3, sp^2, sp^2, sp, and sp, respectively. The hydrocarbon is

A. (1) $CH_3C \equiv CCH_2CH = CHCH = CH_2$

B. (2)

$$CH_3CH_2CH = CHCH_2C \equiv CCH = CH_2$$

C. (3) $CH_3CH = CHCH_2C \equiv CCH = CH_2$

D. (4) $CH_3CH = CHCH_2CH \equiv CHC = CH$

Answer: N/A

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42. Among the molecules of ethane, ethylene, and acetylene, the $C - H$ bond energy is the

A. (1) highest in ethane

B. (2) highest in ethylene

C. (3) highest in acetylene

D. (4) same in all the three

Answer: C

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43. Which of the following hydrocarbon groups designated as I,II,III,Iv, and V has planar geometry?

$Phenyl$	$Cyclohexyl$	$Cyclopentyl$	$Butyl$	Vinyl
I	II	III	IV	V

A. (1) IV

B. (2) I and V

C. (3) II and III

D. (4) II, III and IV

Answer: B

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44. In which of the following hybridizations does the interorbital angle has the highest value ?

A. (1) sp^3

B. (2) sp^2

C. (3) sp

D. (4) sp^3d

Answer: C

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