CHEMISTRY

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

ALKANES

Exercise 1

1. The IUPAC name of compound

A. 4-methyloctane

B. 2-propylhexane

C. 2-butylpentane

D. None of the above

Answer: A

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2. Which of the following is a 3 methyl butyl group.

A. $CH_3CH_2CH_2CH_2CH_2-$

B. $(CH_3)_2CHCH_2CH_2-$

C. $(CH_3CH_2)_2CH-$

D. $(CH_3)_3CCH_2-$

Answer: B

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3. What is the correct IUPAC name of the alkyl group shown ?

`{:(" "CH_(2)CH_(3)),(" "|),(-

CHCH_(2)CH(CH_(3))_(2)):}

A. 1-ethyl-3-methylbutyl

B. 1-ethyl-3,3-dimethyl propyl

C. 4-ethyl-2-methylbutyl

D. 5-methylhexyl

Answer: A

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4. Choose the response that best describes the following compounds

A. 1,3 and 4 represent the same compound

B. 1 and 3 are isomers of 2 and 4

C. 1 and 4 are isomers of 2 and 3

D. All the structures represent the same compound

Answer: A

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5. Which of the following substances is not an isomer of 3-ethyl 2-methyl pentane?

A. 

B. 

C. 

D. None of these

Answer: B

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6. Eclipsed from of ethane has higher energy due to

A. Torsional strain

B. Steric strain

C. Angle strain

D. Both a and b

Answer: D

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7. Most stable conformation of n-butane is :

A. 

B. 

C. 

D. 

Answer: C

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8. The order of stability for the conformations of n-butane among these is

anti	I
gauche	II
$\text{eclipsed (partial)}$	III
eclipsed (fully)	IV

A. I>II>III>IV

B. IV>III>II>I

C. III>II>I>IV

D. II>III>I>IV

Answer: A

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9. Which of the following conformation has maximum energy ?

A. Eclipsed

B. Staggered

C. Gauche

D. Equal

Answer: A

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10. Select the correct statement (s)

A. Staggered and aclipsed conformers cannot be physically separated because the energy difference between them is so small that they readily interconvert at room temperature

B. Conformers are their existence to the tetrahedral nature of carbon bonding

and the fact that the σ - bond is cylindrically symmetrical

C. Both a and b are correct

D. None of the above

Answer: A

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11. Which of the alkane is synthesised from single alkyl halide ?

A. 

B. 

C. 

D. 

Answer: B

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12. Both CH_4 and C_2H_6 can be prepared in one step by the reaction of

A. CH_3Br

B. CH_3CH_2OH

C. CH_3OH

D. CH_3COCH_3

Answer: A

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13. $C_5H_{11}Cl$ by Wurtz reaction forms 2,2,5,5-tetramethylhexane as the main product . Then , what is the IUPAC name of the reactant ?

A. 2,2-dimethyl-1-chloropropane

B. 2-methyl-1-chlorobutane

C. Both a and b are correct

D. None of the above

Answer: A

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14. $C_6H_{12}(A)$ has two types of alkenes that can be reduced to one type of $C_6H_{14}(B)$. B is

A. 

B. 

C. 

D. 

Answer: B

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15. Select the correct statement (s)

A. In the chlorination of n-butane , 2-chlorobutane is formed faster than 1-chlorobutane

B. Bromine is less reactive towards alkanes in general than chlorine but bromine is more selective at the site of attck when it does react.

C. Reactivity of halogens forward alkanes is in order

$F_1 > Cl_2 > Br_2 > I_2$

D. All of the above

Answer: D

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16. $(CH_3)_3COH + CH_3MgBr \rightarrow$

hydrocarbon (A), (A) is

A. $(CH_3)_3\mathbb{C}H_3$

B. $(CH_3)_3CH$

C. CH_4

D. None of the above

Answer: C

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17. Iso-butyl magnesium bromine with dry ehter and ethyl alcohol gives

A.

$$CH_3\underset{\underset{CH_3}{|}}{C}HCH_2OH \text{ and } CH_3CH_2MgBr$$

B. $CH_3\underset{\underset{CH_3}{|}}{C}HCH_3$ and $MgBr(OC_2H_5)$

C.

$$CH_3\underset{\underset{CH_3}{|}}{C}HCH=CH_2 \text{ and } Mg(OH)Br$$

D. $CH_3\underset{\underset{CH_3}{|}}{C}HCH_3$ and CH_3CH_2OMgBr

Answer: B

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18. In the following reaction ,

$$R_2CuLi \xrightarrow{R'X} R-R'+Rcu+LiX$$

Nature of R and R' should be

A. Any alkyl, 2° alkyl

B. Any alkyl, methyl/1° alkyl/2° cycloalkyl

C. 1° alkyl, methyl/1° alkyl/2° cycloalkyl

D. 2° alkyl, any alkyl

Answer: C

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19. Consider the following reaction

$$(CH_3)_2CHBr \xrightarrow[(iii)\ (CH_3)_2CHCH_2Br]{(i)\ Li,\ (ii)\ \underline{C}} A$$

This is corey - house method of synthesis of A which is

A. $(CH_3)_2CHCH_2CH(CH_3)_2$

B. $(CH_3)_2CHCH_2CH_2CH_3$

C. $(CH_3)_2CHCH_2CH_2CH_2CH_3$

D. None of the above

Answer: A

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20. The product formed by heating sodium propionate with sodalime is

A. Acetone

B. Propyl amine

C. Ethane

D. Acetaldehyde

Answer: C

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21. As branching in alkane increases, boiling point decreases due to

A. Decreased surface area for intermolecular attraction

B. Dipole - dipole interactions

C. Both a and b are correct

D. None of the above

Answer: A

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22. Which of the following has maximum boiling point?

A. 

B. 

C. 

D. 

Answer: B

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23. The compound with the highest boiling point is:

A. n-hexane

B. n-pentane

C. 2,2-dimethylpropane

D. 2-methylbutane

Answer: A

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24. Which has maximum boiling and metling point out of

A. I in both case

B. Both I and II

C. Both I and III

D. Both II and I

Answer: C

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25. Consider the following statements

(I) In a group of isomeric acyclic compounds, normal compound always has the highest boiling and melting points.

(II) Greater the branching in alkanes, tower is the boiling point .

(III) Melting point of alkanes depend upon the packing of molecules in the crystalline lattice .

Select the correct statements

A. Both I and II

B. Both II and III

C. Both I and III

D. All of these

Answer: D

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26. An alkyl bromine , RBr of molecular weight 151 is the exclusive product of bromination of which hydrocarbon ?

A. Dodecane

B. 2,2-dimethylpropane

C. 2,2-dimethylhexane

D. 2,2,3-trimethyltheptane

Answer: B

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27. On mixing certain alkane with chlorine and irradiating it with ultravilet light, it forms only one monochloroalkane. The alkane is

A. Neo-pentane

B. Propane

C. Pentane

D. Iso-pentane

Answer: A

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28. The reaction conditions leading to the best yield of C_2H_5Cl are

A. $C_2H_6(\text{excess}) + Cl_2 \xrightarrow[\text{light}]{h\nu}$

B. $C_2H_6 + Cl_2 \xrightarrow[\text{light}]{h\nu}$

C. $C_2H_6 + Cl_2(\text{excess}) \xrightarrow[\text{light}]{h\nu}$

D. None of the above

Answer: A

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29. Which of the following alkane on mono chlorination produces racemic mixture ?

A. Neo-pentane

B. N-butane

C. 2,3-dimethylbutane

D. 2,2,3,3-tetramethylbutane

Answer: B

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30. The major product of reaction between n-butane and bromine at $130^{\circ} C$ is

A. $CH_3CH_2CH_2CH_2Br$

B. $CH_3CH_2\underset{\underset{CH_3}{|}}{CH}Br$

C. $CH_3-\underset{\underset{CH_2Br}{|}}{C}H_2CH_2Br$

D. $CH_3CH_2-\underset{\underset{CH_3}{|}}{C}HBr$

Answer: B

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31. In the iodination of alkane, some HIO_3 is also added so that

A. Reaction is made faster

B. Reaction is made reversible

C. HI formed is oxidised to I_2

D. Reaction is selective

Answer: C

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32. Which of the following reactions of methane is incomplete combustion:

A. $2CH_4 + O_2 \xrightarrow[100atm]{Cu\ /\ 523K} 2CH_3OH$

B. $CH_4 + O_2 \xrightarrow{MO_2O_3} HCHO + H_2O$

C. $CH_4 + O_2 \rightarrow C(s) + 2H_2O(l)$

D. $CH_4 + 2O_2 \rightarrow CO_2(g) + 2H_2O(l)$

Answer: C

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33. Rank the following substances in decreasing order heats of combustion (most

exothermic $\rightarrow$ least exothermic).

A. 2gt1gt3

B. 2gt3gt1

C. 3gt1gt2

D. 3gt2gt1

Answer: A

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34. Cracking of ethane gives mixture of

A. C_2H_4 and H_2

B. C_2H_4, H_2 and CH_4

C. H_2 and CH_4

D. CH_4

Answer: B

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35. $CH_3CH_2CH_3 \xrightarrow{400-6000^\circ C} X + Y$

X and Y are

A. Hydrogen, methane

B. Methane, ethylene

C. Hydrogen, ethylene

D. Ethylene, ethane

Answer: B

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Exercise 2

1. The hydrocarbon which is a liquid at room temperature is:

A. pentane

B. Butane

C. Propane

D. Ethane

Answer: A

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2. C_8H_{18} with two quanternary carbon aoms will have

A. one $-CH_2$ and six $-CH_3$ groups

B. one $-CH_2$ and five $-CH_3$ groups

C. two $-CH_2$ and four $-CH_3$ groups

D. six CH_3 groups

Answer: D

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3. The correct IUPAC name of the following alkane is

A. 3,6-diethyl-2-methyloctane

B. 5-isopropyl-3-ethyloctane

C. 3-ethyl-5-isopropyloctane

D. 3,3-isopropyl-6-ethyloctane

Answer: A

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4. Following reaction is of the type

A. Nucleophillic addition

B. Nucleophillic substitution

C. Electrophillic addition

D. Electrophillic substitution

Answer: C

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5. The increasing order of reduction of alkyl halides with zinc and dilute HCl is

A. R-ClltR-IltR-br

B. R-ClltR-BrltR-I

C. R-IltR-BrltR-Cl

D. R-BrltR-IltR-Cl

Answer: B

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6. Arrange the halogens $F_2, Cl_2, Br_2, I_2,$ in order of their increasing reactivity with alkanes.

A. $I_2 < Br_2 < Cl_2 < F_2$

B. $Br_2 < Cl_2 < F_2 < I_2$

C. $F_2 < Cl_2 < Br_2 < I_2$

D. $Br_2 < I_2 < Cl_2 < F_2$

Answer: A

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7. $\underset{A}{C_5H_{11}Br} \xrightarrow[(ii)\ D_2O]{(i)\ Mg\,/\,ether} \underset{B}{C_5H_{11}D}$

only one type of B is formed . Thus , A is

A. $CH_3CH_2\underset{Br}{\underset{|}{C}}HCH_2CH_3$

B. $CH_2\underset{Br}{\underset{|}{C}}H\ \underset{CH_3}{\underset{|}{C}}\ HCH_3$

C. $CH_3-\overset{CH_3}{\overset{|}{\underset{CH_3}{\underset{|}{C}}}}-CH_2Br$

D. $CH_3CH_2\ \underset{CH_3}{\underset{|}{C}}\ HCH_2Br$

Answer: C

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8. A mixture of ethyl iodide and n-propyl iodide is subjected to Wurtz reaction. The hydrocarbon that will not be formed is

A. Butane

B. Propane

C. Pentane

D. Hexane

Answer: B

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9. The reagent used for the conversion

$CH_3CH_2COOH \rightarrow CH_3CH_2CH_3$, is

A. $LiAlH_4$

B. Sodalime

C. Red P and concentrated HI

D. Amaigamated zinc and concentrated HCl

Answer: C

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10. Both methane and ethane may be obtained by suitable one step reaction from

A. CH_3l

B. C_2H_5l`

C. CH_3OH`

D. C_2H_5OH

Answer: A

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11. Arrange the following in decreasing order of their boiling points.

(A). N-butane

(B). 2-methylbutane

(C). N-pentane

(D). 2,2-dimethylpropane

A. AgtBgtCgtD

B. BgtCgtDgtA

C. DgtCgtBgtA

D. CgtBgtDgtA

Answer: D

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12. Pure methane can be prepared by

A. Wurtz reaction

B. Kolbe's electrolytic method

C. Sodalime decarboxylation

D. Reduction with H_2

Answer: C

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13. The highest boiling point is expected for:

A. Iso-octane

B. n-octane

C. 2,2,3,3-tetramethyl butane

D. n-butane

Answer: B

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14. Of the five isomeric hexanes, the isomer which can give two monochlorinated compounds is

A. 2-methylpentane

B. 2,2-dimethylbutane

C. 2,3-dimethylbutane

D. n-hexane

Answer: C

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15. On mixing certain alkane with chlorine and irradiating it with ultravilet light, it forms only one monochloroalkane. The alkane is

A. Propane

B. Pentane

C. Iso-pentane

D. Neo-pentane

Answer: D

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16. Which of the following reaction is not correct ?

A. $CH_3\underset{Cl}{|} \xrightarrow{LiAlH_4} CH_3CH_2CH_3$

B. $(CH_3)_3CCl \xrightarrow{LiAlH_4} (CH_3)_3CH$

C. $(CH_3)_3CCl \xrightarrow{NaBH_4} (CH_3)_3CH$

D. $CH_3l + HI \xrightarrow{420K} CH_4 + I_2$

Answer: B

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17. Which of the following alkanes can be easily sulphonated?

A. n-butane

B. iso-butane

C. n-pentane

D. n-hexane

Answer: D

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18. Using C_2H_5Cl/Na by Wurtz reaction in addition to C_4H_{10}, C_2H_4 and C_2H_6 are also formed. It is due to

A. Oxidation

B. Reduction

C. Disproportionation

D. Auto-oxidation

Answer: C

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19. The alkane is not obtained from

A. Hydroxylation of ethyne

B. $C_2H_5OH \xrightarrow[150^\circ C]{HI / RedP}$

C. butanone $\xrightarrow[Reflux]{Zn / Hg - HCl}$

D. Electrolysis of sodium propanoate solution

Answer: A

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20. $\overset{O}{\overset{||}{R}}CCH_3$ (ketone) can be reduced to RCH_2CH_3 (alkane) be

I. $LiAlH_4$

II. P/HI

III. Zn(Hg)/conc. HCl

IV. $N_2H_4 / C_2H_5\overset{-}{O}\overset{+}{N}a$

Select the correct reagents

A. I, II and III

B. I, III and IV

C. I, II and IV

D. II, III and IV

Answer: D

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