CHEMISTRY

JEE (MAIN AND ADVANCED) CHEMISTRY

ACYCLIC HYDROCARBONS

Problems

1. Draw Newman projection formulae staggered forms of butane and compare their stability.

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2. Predict the alkanes that are formed when ethyl bromide and n-propyl bromide react with sodium in dry ether solvent.

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3. Sodium salt of which fatty acid is needed to prepare butane? Give the equation.

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4. Which alkane can be obtained by the electrolysis of the aqueous solution of sodium propanoate?

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5. Predict the alkane formed when C_2H_5OH is treated with methyl magnesium halide. Write the equation.

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6. What hydrocarbon is formed as byproduct during the chlorination of methane? Explain.

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7. Arrange n-hexane, 3-methyl pentane and 2,2-dimethyl butane in the increasing order of their boiling points and discuss.

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8. Why do the C-C bonds rather than the C-H bonds break during pyrolysis of alkanes?

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9. Arrange n-hexane, 3-methyl pentane and 2,2-dimethyl butane in the increasing order of their boiling points and discuss.

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10. Write structures and IUPAC names of different structural isomers of alkenes corresponding to C_5H_{10}.

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11. Predict the major product formed when 2 - methyl-3-pentanol is dehydrated with alumina.

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12. Write the structures of major and minor products when 2-bromo-3-methylbutane is heated with potassium hydroxide in ethanol.

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13. Give the equation for the formation of main product when hydrogen iodide is added to isobutylene.

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14. Why peroxide effect is not applicable to HCl and HI?

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15. Write IUPAC names of the products obtained by addition reactions of HBr to but-l-ene:

(i) in the absence of peroxide and

(ii) in the presence of peroxide.

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16. Give the IUPAC name of the product formed when isobutylene is treated with a few drops of concentrated sulphuric acid.

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17. Write the reaction products of 2-pentene when oxidised with acidified potassium permanganate at $100^{\circ} C$.

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18. The reductive ozonolysis of an alkene gave butanone and ethanal. Give the structure of alkene and its IUPAC name.

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19. Write the structure of all the isomers of dichloroethene. Which one of them will have zero dipole-moment?

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20. Ethene on treating with bromine in presence of sodium chloride forms a mixture of CH_2ClCH_2Br and CH_2BrCH_2Br. Give reason.

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21. Give the equation for the ozonolysis products of 2,3-dimethyl-2-pentene.

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22. Isoprene is a diene. How are the positions of double bonds located?

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23. Write the structures of different isomers corresponding to the 5^{th} member of alkyne series. Write their IUPAC names.

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24. How does water add on to propyne? Give the equations and explain.

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25. Write the ozonolysis reaction of 2-butyne.

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26. The ozonolysis product of an alkyne is 2-oxopentanal. Then the alkyne is_____

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27. Acetylene is acidic but it does not react with sodium hydroxide or potassium hydroxide. Give reason.

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28. How 3-hexyne can be prepared form acetylene?

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29. Based on reductive ozonolysis reaction, how do you distinguish between an alkene and alkyne?

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30. How would you carry out the following conversion? Write equations.

i)

$$H_3C - CH_2 - CH = CH_2 \rightarrow H_3C - CH_2 - CH_2 - CH_2OH$$

ii)

$H_3C - CH_2 - CH = CH_2 \rightarrow H_3C - CH_2 - CH(OH) - CH_2OH$

iii) $Br_2CH - CHBr_2 \rightarrow HC \equiv CH$

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31. How to convert methyl acetylene to dimethylketone?

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32. Arrange benzene, n-hexane and ethyne in decreasing order of acidic behaviour. Give reason for this behaviour.

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Subjective Exercise 1 Long Answer Questions

1. Describe any two methods of preparation of ethane with equations, give any three reactions of ethane.

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2. Explain the halogenation of methane with the help of equations and name the products formed in the reaction.

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3. Explain the free radical substitution of halogens in ethane with mechanism.

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4. Why is Wurtz reaction not preferred for the preparation of alkanes containing odd number of carbon atoms ? Illustrate with one example.

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Subjective Exercise 1 Short Answer Questions

1. Discuss the conformations of ethane.

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2. Explain Wurtz reaction with one example.

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3. How ethane is prepared by Kolbe's electrolysis.

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4. Write a short note on the physical properties of alkanes.

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5. How do you account for the formation of ethane during chlorination of methane?

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6. In the alkane $H_3C - CH_2 - C(CH_3)_2 - CH_2 - CH(CH_3)_2$, identify $1^0, 2^0, 3^0$ carbon atoms and give the number of H atoms bonded to each one of these.

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Subjective Exercise 1 Very Short Answer Questions

1. What is decarboxylation? What product is formed when sodium propionate is heated with soda lime?

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2. Give one example each for isomerisation and aromatisation.

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3. Calculate the volume of carbondioxide formed at STP when one litre of ethane is completely burnt in excess oxygen,

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4. What is pyrolysis? Give one example.

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5. Draw Newman projection formulae (staggered and eclipsed) of ethane.

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6. Give the reaction for controlled oxidation of ethane with manganese acetate catalyst.

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7. Write the conformations of ethane.

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8. What effect does branching of an alkane chain has on its boiling point?

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Subjective Exercise 2 Long Answer Questions

1. Describe any two methods of preparation of ethylene. Give the equations for the reactions of ethylene with :

A. Hypochlorous acid

B. Ozone

C. Cold and dilute alkaline $KMnO_4$

D. Oxygen at high temperature and high pressure

Answer:

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2. Describe any two methods of preparation of ethylene. How does ethylene react with the following? Give equations.

(a) Hydrogen,

(b) Chlorine,

(c) Hydrogen bromide,

(d) Water and

(e) Oxygen in presence of Ag at $200^\circ C$

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3. Explain electrophilic addition reactions of ethylene with mechanism.

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4. Discuss Markovnikov's rule and Kharash effect.

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5. Addition HBr to propene yields 2-bromopropane, while in the presence of benzoyl peroxide, the same reaction yields 1-bromopropane. Explain and give mechanism.

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6. An alkene 'A' oz ozonolysis gives a mixture of ethanoal and pentan-3-one. Write the reaction, structure of the products and alkene-A. Give the IUPAC name of alkene-A.

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7. An alkene-A contains three C - C, eight C - H bonds and one C = C bond. A on ozonolysis give two moles of an aldehyde of molar mass 44u. Write IUPAC name of A.

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Subjective Exercise 2 Short Answer Questions

1. What is dehydrohalogenation? How ethylene is formed from ethyl bromide?

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2. Explain the formation of ethylene from ethyl alcohol.

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3. Explain ozonolysis with one example.

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4. Explain the addition of HBr to propene by electrophilic addition mechanism and free radical addition mechanism.

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5. Write the structural formula and IUPAC names for all possible isomers having the number of double or triple bond as indicated :

1) C_4H_8 (one double bond)

2) C_5H_8 (one triple bond)

3) C_5H_{12} (no multiple bond)

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6. Write the equations for the conversion of

(i) ethylene to ethyl chloride and

(ii) ethylchloride to ethane

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7. Write chemical equations for combustion reaction of the following hydrocarbons

1) Butane

2) Pentane and

3) Hexyne

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Subjective Exercise 2 Very Short Answer Questions

1. How ethylene is obtained from ethyl alcohol? Write the reaction.

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2. Discuss polymerisation with one example.

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3. Write the names of the products A and B in the following reaction.

$$CH_3CH_2Cl \xrightarrow[KOH]{Alc.} A \xrightarrow{Br_2 / CCl_4} B$$

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4. Complete the reaction and balance

Ethylene $\xrightarrow[CCl_4]{Br_2} A \xrightarrow[KOH]{Alc.} B \xrightarrow{Br_2} C$

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5. Give one example for geometrical isomerism.

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6. Give equation for the oxidation reactions of ethylene with cold, dilute alkaline $KMnO_4$.

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7. Name the product formed when 2-butene is oxidised with acidic $KMnO_4$ or $K_2Cr_2O_7$.

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8. Name the ozonolysis products of 2-methyl-2-butene.

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Subjective Exercise 3 Long Answer Questions

1. Describe any two methods of preparation of acetylene. How does acetylene react with :

A. Water

B. Bromine

C. Ozone

D. Ammonical $AgNO_3$

Answer:

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2. Give any two methods of preparation of acetylene. Give the corresponding equations when acetylene reacts with the following.

A. Hydrogen

B. Acetic acid

C. Halogens and

D. Hydrogen halide

Answer:

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Subjective Exercise 3 Short Answer Questions

1. How does acetylene react with :

A. Na in NH_3

B. Hydrogen cyanide

C. Chromic acid

D. Chromic acid

Answer:

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2. Explain the acidic nature of acetylenic hydrogen.

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3. Complete the following reaction and name the product X, Y and Z.

$$CaC_2 \xrightarrow{H_2O} X \xrightarrow{\text{hot metal tube}} Y \xrightarrow[CH_3Cl]{AlCl_3} Z$$

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4. Complete the following reaction and name the product A, B and C. Give the equations for the reactions.

Ethylene $\xrightarrow[CCl_4]{Br_2} A \xrightarrow{Alc.KOH} B \xrightarrow{Br_2} C$

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Subjective Exercise 3 Very Short Answer Questions

1. How do you distinguish acetylene from ethylene?

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2. When acetylene gas is passed through dilute H_2SO_4 in presence of Hg^{2+} ions, compound A is formed, which then undergoes rearrangement to give the product B. Write the complete equation and name the products A and B.

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3. Name the molecule which does not react with ammonical $AgNO_3$ solution but decolourises alkaline $KMnO_4$ from Methane, Ethane, Ethene and Ethyne

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4. Discuss the structure of carbon - carbon triple bond in alkynes.

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5. Discuss the formation of acetylene from ethylene bromide and ethylidene bromide.

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6. Give the equation for the formation of acetylene from potassium maleate or fumarate by Kolbe's electrolysis.

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7. Write the equation for the reaction between iodoform and silver powder.

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8. Discuss the addition of hydrogen to substituted acetylene under different conditions.

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9. What is the cycle polymerisation product of acetylene.

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10. Write any two reactions of acetylene which explain the acidic character of acetylene.

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11. Write any two uses of acetylene.

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12. How do you get vinyl cyanide from acetylene? Give equation for the raction.

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13. What is Tollers' reagent $>$ Mention the active species in it.

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14. Write a test useful to identify acidic nature of acetylene.

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15. Write the ozonolysis product of acetylene. Write chemical equation.

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Objective Exercise 1

1. In Alkanes, the hybridisation of all carbons is

A. sp or sp^2

B. sp^2 or sp^3

C. sp or sp^3

D. only sp^3

Answer: D

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2. Alkanes are also known as

A. Olefins

B. Paraffins

C. Unsaturated aliphatic hydrocarbons

D. Saturated aromatic hydrocarbons

Answer: B

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3. (A) : Boiling point of neopentane is more than n-pentane.

(R) : Increase in van der Waals forces increases boiling point.

A. A and R are true, R explains A

B. A and R are true, R does not explain A

C. A is true, but R is false

D. A is false, but R is true'

Answer: D

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4. The four sp^3 hybrid orbitals of carbons in alkanes are directed towards the corners of

A. Regular tetrahedron

B. Equilateral triangle

C. Regular octahedron

D. Square plane

Answer: A

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5. The reducing agents commonly used for the reduction of alkyl halides to get alkanes are

A. $Zn - CH_3COOH$

B. $Zn - Cu / C_2H_5OH$

C. $Na - C_2H_5OH$

D. All the above

Answer: D

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6. Agent in the decarboxylation of fatty acids to get alkanes is

A. Conc. H_2SO_4

B. Al_2O_3

C. Soda time

D. Alcoholic KOH

Answer: C

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7. Alkane obtained by the decarboxylation of fatty acid contains

A. One carbon atom more than the acid

B. One carbon atom less than the acid

C. Same number of carbon atoms as the cid

D. Two carbon atoms less than the acid

Answer: B

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8. Catalytic hydrogenataion of unsaturated hydrocarbons to get alkanes is known as

A. Wurtz reaction

B. Sabatier - Senderens reaction

C. Kolbes electrolysis

D. Frankland reaction

Answer: B

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9. By the reduction of alkyl halides, we get alkanes. The best alkyl halide is

A. Fluoride

B. Bromide

C. Chloride

D. Iodide

Answer: D

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10. The products formed when the sodium salt of a fatty acid is heated with soda lime are

A. Alkane & $NaOH$

B. Alkane & CaO

C. Alkane & Na_2CO_3

D. Alkene & Na_2SO_4

Answer: C

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11. The gases liberate at anode in the electrolysis of aqueous sodium acetate are

A. $CO_2 \& H_2$

B. $C_2H_6 \& CO_2$

C. $H_2 \& C_2H_6$

D. $H_2 \& O_2$

Answer: B

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12. Both methane and ethane may be obtained separately in one step from

A. C_2H_4

B. CH_3I

C. CH_3OH

D. C_2H_5OH

Answer: B

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13. On heating sodium propanoate with sodium hydroxide and quicklime the gas evolved is

A. C_2H_2

B. C_2H_6

C. CH_4

D. C_2H_4

Answer: B

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14. In Wurtz reaction, in the preparation of alkanes, metallic sodium acts as

A. Oxidising agent

B. Reducing agent

C. Dehydrogenating agent

D. Dehydrohalogenating agent

Answer: A

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15. A solution of sodium salt of fatty acid was electrolysed during Kolbe's reaction. The solution left after electrolysis is

A. Richer in NaOH

B. Richer in H_2SO_4

C. Richer in Sodium salt

D. Only in Sodium salt

Answer: D

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16.

List - 1	List - 2
A) Sabatier Senderens reaction	1) Anhydrous $AlCl_3$
B) Friedel Crafts	2) Ni/H_2
C) Wurtz reaction	3) Sodium acetate
D) Kolbe's electrolysis	4) Na/Dry ether
	5) CH_4

The correct match is

A.

A	B	C	D
2	5	2	1

B.

A	B	C	D
3	4	2	1

C.

A	B	C	D
1	2	5	4

D.

A	B	C	D
2	1	4	3

Answer: D

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17. $-\overset{|}{\underset{|}{C}}-\overset{|}{\underset{|}{C}}$ bond length and bond energy in alkanes are

A. $1.34A^{\circ}\ \&80KCalMol^{-1}$

B. $1.54A^{\circ}\ \&140KCalMol^{-1}$

C. $1.54A^{\circ}\ \&200KCalMol^{-1}$

D. $1.54A^{\circ}\ \&80KCalMol^{-1}$

Answer: D

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18. Carbon-hydrogen bond distance in alkanes is

A. $1.54A^{\circ}$

B. $1.34A^{\circ}$

C. $1.20A^{\circ}$

D. $1.09A^{\circ}$

Answer: D

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19. With increase in number of carbon atoms in alkanes, the physical state changes

A. Solid, liquid, gas

B. Gas, liquid, solid

C. Solid, gas, liquid

D. Gas, solid, liquid

Answer: B

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20. Methane and Ethane are ------ than water

A. Heavier

B. Lighter

C. Heavier or lighter

D. Methane is lighter and ethane is heavier

Answer: B

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21. Substitution reactions of alkanes are carried out at

A. High temperature

B. Low temperature

C. Moderate temperature

D. Very low temperature

Answer: A

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22. When ethane is heated to high temperature in absence of air or oxygen, it gives

A. CO_2 and H_2O

B. C and H_2O

C. CO and H_2

D. H_2 and C_2H_4

Answer: D

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23. Combustion of methane and ethane respectively are

A. Exothermic & Endothermic

B. Endothermic & Exothermic

C. Both are endothermic

D. Both are exothermic

Answer: D

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24. In Wurtz reaction, n-hexane is obtained by

A. n-Propyl chloride

B. n-Butyl chloride

C. Ethyl chloride

D. Isopropyl chloride

Answer: A

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25. The alkane that yields two isomeric monobromo derivatives

A. Neopentane

B. Ethane

C. Methane

D. Propane

Answer: D

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26. In Wurtz reaction, the reagent used is

A. Na

B. Na/liq NH_3

C. `Na/dry ether

D. Ca/dry ether

Answer: C

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27. n-octane and n-nonane have

A. Same molecular formula

B. Same molecular weight

C. Similar chemical properties

D. Same boiling points

Answer: C

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28. Wurtz reaction of methyl iodide yields an organic compound X.

Which one of the following reactions also yields X?

A. $C_2H_5Cl + Mg \xrightarrow{\text{Dry ether}}$

B. $C_2H_5Cl + LiA/H_4 \rightarrow$

C. $C_2H_5Cl + C_2H_5ONa \rightarrow$

D. $CHCl_3 \overset{\text{Ag powder}}{\underset{\Delta}{}}$

Answer: B

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29. The chemicals and the reaction conditions required for the preparation of ethane are

A. C_2H_5I, $Zn - Cu$, C_2H_5OH

B. CH_3Cl, Na, H_2O

C. $KOOC - CH = CH - COOK$, electrolysis

D. CH_3CO_2Na, $NaOH$, CaO, Δ

Answer: A

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30. The number of possible theoretical conformations of ethane is

A. Two

B. Three

C. Four

D. Infinite

Answer: D

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31. The spatial arrangement of atoms that characterises a particular stereoisomer is called

A. Configuration

B. Conformation

C. Tautomer

D. Metamer

Answer: A

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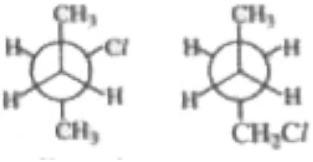
32. The pair of structures given below represent



A. Enantiomers

B. Diastereomers

C. Structural isomers

D. Two molecules of the same compound

Answer: C

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33. The fully eclipsed conformation of n-butane is least stable due to the presence of

A. bond opposition strain only

B. steric strain only

C. bond opposition strain as well as steric strain

D. no strain is present in the molecule

Answer: C

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34. Two isomers A and B can be separated from their mixture if energy barrier will be

A. 0.6 Kcal/mole

B. 9 Kcal/mole

C. 16 Kcal/mole

D. 12 Kcal/mole

Answer: C

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35. Energy barrier between staggered and eclipsed ethane is

A. 0.6 Kcal/mole

B. 2.9 Kcal/mole

C. 12 Kcal/mole

D. 16 Kcal/mole

Answer: B

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36. The general formula of alkenes is

A. C_nH_{2n+2}

B. C_nH_{2n}

C. C_nH_{2n-2}

D. C_nH_{2n-4}

Answer: B

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37. Alkenes are also known as

A. Olefins

B. Paraffins

C. Aliphatic saturated hydrocarbons

D. Arenes

Answer: A

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38. Double bonded carbons are involved in

A. sp^3 hybridisation

B. sp^2 hybridisation

C. sp hybridisation

D. sp or sp^2 or sp^3 hybridisation

Answer: B

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39. Specific reagent for dehydrohalogenation of alkyl halides to get alkenes is

A. Aqueous KOH

B. Anhydrous $ZnCl_2$

C. Alcoholic KOH

D. Conc. H_2SO_4 at $140^\circ C$

Answer: C

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40. Zinc dust in alcoholic solution is a specific reagent in the preparation of alkenes as a

A. Dehydrohalogenating agent

B. Dehydrating agent

C. Dehydrogenating agent

D. Dehalogenating agent

Answer: D

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41. In dehalogenation reaction of dihalides to get alkenes, the dihalide to be taken is

A. Gem dihalide

B. Vicinal dihalide

C. Isolated dihalide

D. Any dihalide

Answer: B

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42. Ethene is obtained from ethyne by

A. Catalytic hydrogenation

B. Controlled hydration

C. Catalytic hydration

D. Controlled hydrogenation

Answer: D

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List - 1 (Reagents)	List - 2 (uses)
A) Sodalime	1) Dehalogenation
B) Alcoholic KOH	2) Dehydrogenation
C) Zinc dust	3) Dehydration
D) $Al_2O_3/350^\circ C$	4) Dehydrohalogenation
E) $Cu/300^\circ C$	5) Decarboxylation

43. The correct match is

A. a)

A	B	C	D	E
5	4	1	3	2

B. b)

A	B	C	D	E
3	4	1	2	3

C. c)

A	B	C	D	E
5	2	1	4	3

D. d)

A	B	C	D	E
5	1	2	3	4

Answer: A

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44. The conversion of ethylene to ethyl alcohol is known as

A. a)Elimination

B. b)Substitution

C. c)Hydrogenation

D. d)Hydration

Answer: D

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45. Identify the correct match from the following lists

List-1	List-2
I) Dehydrohalogenation	a) Alc. KOH
II) Dehydration	b) Con. $H_2SO_4 / 170^\circ C$
III) Unsaturation	c) Any HX
IV) Epoxidation	d) Br_2 water

A. I - b, II - d, III - c, IV - a

B. I - b, II - c, III - d, IV - a

C. I - d, II - a, II - c, IV - b

D. I - a, II - b, III - d, IV - c

Answer: B

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46. Chloroethane is treated with alcoholic potassium hydroxide. The product formed is

A. C_2H_6O

B. C_2H_6

C. C_2H_4

D. C_2H_4O

Answer: C

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47. Which of the following reaction conditions are used for the conversion of ethanol to ethylene?

A. con $H_2SO_4 / 70^\circ C$

B. dil $H_2SO_4 / 140^\circ C$

C. dil $H_2SO_4 / 100^\circ C$

D. conc $H_2SO_4 / 170^\circ C$

Answer: D

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48. The reaction conditions used for converting 1,2-dibromoethane to ethylene are

A. Zn, alcohol, Δ

B. KOH, alcohol, Δ

C. KOH, water, Δ

D. Na, alcohol, Δ

Answer: A

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49. The metal used for the debromination reaction of 1, 2 - dibromeothane

A. Na

B. Zn

C. Mg

D. Li

Answer: B

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50. (A) : Propene reacts with HBr to give isopropyl bromide.

(R) : Addition of hydrogen halide to alkenes follows Markownikoff's rule

A. A and R are true, R explains A

B. A and R are true, R does not explain A

C. A is true, but R is false

D. A is false, but R is true'

Answer: A

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51. Baeyer's reagent is

A. Very dilute cold acidified $KMnO_4$

B. Very dilute cold acidified $K_2Cr_2O_7$

C. Very dilute cold alkaline $KMnO_4$

D. Hot and concentrated alkaline $KMnO_4$

Answer: C

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52. Baeyer's reagent oxidises ethylene to

A. Ethylene chlorohydrn

B. Ethyl alcohol

C. CO_2 and H_2O

D. Ethane - 1, 2 - diol

Answer: D

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53. Double bond in unsaturated hydrocarbons can be located by

A. Ozonolysis reaction

B. Baeyer's reagent

C. Br_2 in CCl_4

D. All the above

Answer: A

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54. The products of ozonolysis of an alkene are ethanl and methanal, then that alkene is

A. $CH_3 - C \equiv C - CH_3$

B. $CH_3 - CH = CH - CH_3$

C. $CH_3 - CH = CH_2$

D. $CH_3 - C \equiv CH$

Answer: C

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55. Ethylene on hydration gives

A. Glycol

B. Ethanol

C. Ethane

D. Ethanoic acid

Answer: B

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56. Polytetrafluoroethylene is commercially known as

A. Teflon

B. Freon

C. Lewisite

D. Westron

Answer: A

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57. Ethylene on ozonolysis gives

A. Formaldehyde

B. Ethylene ozonide

C. Acetaldehyde

D. H_2O_2

Answer: A

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58. Ethyl hydrogen sulphate is obtained by reaction of H_2SO_4 on

A. Ethylene

B. Ethane

C. Ethyl chloride

D. Ethanol

Answer: A

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59. The product obtained when propene undergoes addition reaction with HBr in the presence of benzoyl peroxide is

A. 1-bromopropane

B. 2-bromopropane

C. 1, 2-dibromopropane

D. 2, 2-dibromopropane

Answer: A

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60. An olefin 'X' on ozonolysis gave propanal and propanone. Then IUPAC name of 'X' is

A. 2- butene

B. 1- butene

C. 2- methyl -2-pentene

D. 2- methyl -1- butene

Answer: C

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61. $CH_2 = CH_2 + O_3 \xrightarrow[H_2O]{Zn} X \xrightarrow{\text{Reduction}} Y$. Y is

A. CH_4

B. C_2H_5OH

C. CH_3OH

D. $HCOH$

Answer: C

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62. A hydrocarbon 'X' on reduction gives 2-methyl butane. On ozonolysis it gives acetone as one of the products. The hydrocarbon is

A. $CH_3 - CH_2 - CH = CH_2$

B. $CH_3 - \underset{\underset{CH_3}{|}}{C} = CH - CH_3$

C. $CH_3 - CH_2 - C \equiv CH$

D. $CH_3 - CH = CH - CH_2 - CH_3$

Answer: B

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63. Which of the following is most reactive in its reaction with C_2H_4?

A. HI

B. HCl

C. HBr

D. all hae equal reactivity

Answer: A

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64. Carbon atoms show sp^2 hybridisation in compounds A and B. A decolourises alkaline potassium pemanganate solution whereas B

cannot decolourise the solution. Then A and B are

A. Propene and Ethene

B. Ethene and Benzene

C. Benzene and Ethene

D. Ethene and Propene

Answer: B

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65. $CH_2 = CH_2 + Br_2 \xrightarrow{CCl_4} X \xrightarrow{\text{aq KOH}} Z$. Z is

A. Ethane

B. Glycol

C. Ethene

D. Ethanol

Answer: B

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66. Not characteristic of ethene is

A. addition

B. oxidation

C. polymerisation

D. substitution

Answer: D

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67. In the reaction $C_2H_4 \xrightarrow{x}$ Product, if the hybridization of carbon atom (s) in the product is sp^3, X is not

A. H_2 / Ni

B. $HCl / AlCl_3$

C. $O_3 / Zn + H_2O$

D. Br_2 / CCl_4

Answer: C

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68. The test used for identifying carbon-carbon double fond in an alkene is

A. Baeyer

B. Carbylamine

C. Lassaigne

D. Silver mirror

Answer: A

Watch Video Solution

69. What are the reacting conditions used for the formation of ethylene glycol from ethylene?

A. Bromine water

B. Cold alkaline $KMnO_4$

C. dil $H_2SO_4 / 60^\circ C$

D. O_3 / H_2O

Answer: B

Watch Video Solution

70. Which one of the following reagents is used for detection of unsaturation in alkenes?

A. $NaOH + CaO$

B. Cold dilute alkaline $KMnO_4$

C. Cl_2 / hv

D. KOH / C_2H_5OH

Answer: B

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71. In the following reaction, A and B respectively are

$A \xrightarrow{HBr} C_2H_5Br \xrightarrow{B} A$

A. C_2H_4 and alcoholic KOH/Δ

B. C_2H_5Cl and aq. KOH/Δ

C. C_2H_5OH and aq. KOH/Δ

D. C_2H_4 and PBr_3

Answer: A

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72. Consider the following reactions :

$X + HCl \xrightarrow[AlCl_3]{\text{Anhydrous}} C_2H_5Cl \xrightarrow[KOH]{\text{Aqueous}} Y$ Y can be converted to X on heating with ..... At ..... Temperature.

A. $Al_2O_3, 350^\circ C$

B. $Cu, 300^\circ C$

C. $Ca(OH)_2 + CaOCl_2, 60^\circ C$

D. $NaOH / I_2, 60^\circ C$

Answer: A

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73. What are X and Y in the reaction?

$$C_2H_4 + H_2SO_4 \xrightarrow{80^\circ C} X \xrightarrow[\Delta]{H_2O} Y$$

A. C_2H_6, C_2H_5OH

B. C_2H_4, C_2H_6SH

C. $C_2H_2OSO_3H, C_2H_5OH$

D. C_2H_2, CH_3CHO

Answer: C

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74. Which one of the following compounds, decolourises cold alkaline potassium permanganate solution?

A. C_2H_6

B. C_2H_5Cl and aq. KOH / Δ

C. C_2H_4

D. $C_2H_5OCH_3$

Answer: C

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75. $C_2H_4 + 2HCl \rightarrow C_2H_4Cl_2$ is an example of

A. Addition reaction

B. Hydrogenation reaction

C. Substitution reaction

D. Chlorination reaction

Answer: A

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76. A molecule (X) has (i) four sigma bonds formed by the overlap of sp^2 and s orbitals, (ii) one sigma bond formed by sp^2 and sp^2 orbials and (iii) one π bond formed by P_z and P_z orbitals. Which of the following is X?

A. C_2H_6

B. C_2H_3Cl

C. $C_2H_2Cl_2$

D. C_2H_4

Answer: D

Watch Video Solution

77. $C_2H_6 \xrightarrow[\text{Sunlight}]{1\text{Mole}Cl_2} A \xrightarrow{\text{Alc.KOH}} B \xrightarrow[200^\circ C]{H_2/Ni} C$

Here, the final product 'C' is

A. C_2H_6

B. C_2H_5Cl and aq. KOH/Δ

C. C_2H_4

D. C_4H_{10}

Answer: A

Watch Video Solution

78. $CH_3COOK_{(aq)} \xrightarrow{\text{Electrolysis}} A \xrightarrow[1000^\circ C]{\Delta} BB \xrightarrow[KMnO_4]{\text{Alkaline}} C.$ Here compound 'C' is

A. $\begin{array}{l} CH_3 \\ | \\ COOH \end{array}$

B. $\begin{array}{l} CH_2OH \\ | \\ CH_2OH \end{array}$

C. $\begin{array}{l} CHO \\ | \\ CHO \end{array}$

D. $\begin{array}{l} COOH \\ | \\ COOH \end{array}$

Answer: B

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79. (A) : Alkene is more reactive than the corresponding alkane

(R) : Alkenes contain carbon-carbon double bond

A. A and R are true, R explains A

B. A and R are true, R does not explain A

C. A is true, but R is false

D. A is false, but R is true'

Answer: A

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80. (A) : Peroxide effecti is not observed in the addition of HI to unsymmetrical alkene.

(R) : Free radical is unable to break stronger H-I bond.

A. A and R are true, R explains A

B. A and R are true, R does not explain A

C. A is true, but R is false

D. A is false, but R is true'

Answer: C

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81. Which of the following reagent is used to find out carbon-carbon multiple bonds?

A. Grignard reagent

B. Bayer's reagent

C. Sandmayer's reagent

D. Gattrman reagent

Answer: B

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82. (A) : Reaction of 1-butene with HBr gives 1-bromobutane as major product

(R) : Addition of hydrogen halides to alkenes proceeds according to Markovnikov's rule

A. A and R are true, R explains A

B. A and R are true, R does not explain A

C. A is true, but R is false

D. A is false, but R is true'

Answer: D

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83. When 2-methyl butyl bromide is treated with sodium ethoxide I ethanol, what will be the major product?

A. 2-methyl but-2-ene

B. 3-methyl but-1-ene

C. 2-methyl but-1-ene

D. 2-methyl-sodium-butoxide

Answer: A

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84. Which of the following reactions is not correct?

A. $CH_3 - CH = CH_2 + HCl \rightarrow CH_3 - CH - CH_3$

B. $CH_3 - CH = CH_2 \xrightarrow[273\ \mathrm{K}]{KMnO_4 / OH^-} CH_3 - \underset{\underset{OH}{|}}{CH} - CH_3$

C.

$$CH_3 - CH = CH_2 + HBr \xrightarrow{\text{Peroxide}} CH_3 - CH_2 - CH_2 - Br$$

D. $H_2C = CH_2 + Br_2 \xrightarrow{CCl_4} Br - CH_2 - CH_2 - Br$

Answer: B

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85. The general formula of alkynes is

A. C_nH_{2n+2}

B. C_nH_{2n}

C. C_nH_{2n-2}

D. C_nH_{2n-4}

Answer: C

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86. Ethene and ethyne can be distinguished using

A. Tollen's reagent

B. Schiff's reagent

C. Baeyer's reagent

D. Nessler's reagent

Answer: A

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87. The final product formed when acetylene reacts with hydrogen bromide is

A. $CH_2Br - CH_2Br$

B. $CHBr_2 - CHBr_2$

C. $CH_3 - CHBr_2$

D. $CBr_3 - CBr_3$

Answer: C

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88. The final product formed when acetylene gas is passed through dilute sulphuric acid in presence of heavy metal cation at $60 - 65^{\circ} C$ is

A. Vinyl alcohol

B. Ethenol

C. Ethanol

D. Ethanal

Answer: D

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89. The intermediate compound formed when acetylene is hydrated in presence of dil. H_2SO_4 and $HgSO_4$ is

A. Acetaldehyde

B. Ethenol

C. Vinyl chloride

D. Ethenal

Answer: B

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90. The reductive ozonolysis product of acetylene is

A.

B. $H-\underset{\underset{H-C=O}{|}}{C}=O$

C. $H-\underset{\underset{H}{|}}{C}=O$

D. $CH_3-\underset{\underset{H}{|}}{C}=O$

Answer: B

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91. Hybridisation of triply bonded carbons, carbon-carbon triple bond length and bond strength of carbon-carbon triple bond are

A. sp, $1.20A^\circ$ and $600kJMol^{-1}$

B. sp^2, $1.20A^\circ$ and $825kJMol^{-1}$

C. sp, $1.20A^\circ$ and $825kJMol^{-1}$

D. sp, $1.34A^\circ$ and $825kJMol^{-1}$

Answer: C

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92. Alkynes exhibit

A) Chain isomerism

B) Position isomerism

C) Functional group isomerism

A. A only

B. A and B

C. A and C

D. A, B and C

Answer: D

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93. (A) : Acetylene reacts with ammonical cuprous chloride to form red precipitate

(R) : Hydrogen atom bonded to sp hybridised carbon atom is acidic in nature.

A. A and R are true, R explains A

B. A and R are true, R does not explain A

C. A is true, but R is false

D. A is false, but R is true'

Answer: A

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94. $HC \equiv CH \xrightarrow{\text{Tollen's regent}} A$ 'A' is white precipitate. It's molar mass is

A. 133

B. 240

C. 120

D. 373

Answer: B

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95. When alkyl substituted acetylene undergoes addition with hydrogen in presence of Lindlar's catalyst, the alkene formed is

A. A mixture of cis and trans isomers

B. Trans isomer

C. Cis isomer

D. No addition does not take place

Answer: C

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96. The reagent used for getting trans alkene from alkyl substituted acetylene with hydrogen is

A. Na in liq. NH_3

B. Li in liq. NH_3

C. Both (1) and (2)

D. H_2 / Ni (or) Pt (or) Pd

Answer: C

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97. The acidic nature of hydrogens in acetylene can be explained by the reaction with

A. Sodium metal

B. Ammonical cuprous chloride solution

C. Ammonical silver nitrate solution

D. All the above

Answer: D

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98. In the following reaction, what is X?

$$C_2H_2 \xrightarrow[HgSO_4, H_2SO_4]{H_2O, 60^\circ C} X \Leftrightarrow CH_3CHO$$

A. CH_3CH_2OH

B. $CH_3 - O - CH_3$

C. CH_3CH_2CHO

D. $H_2C = CHOH$

Answer: D

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99. The reagent used for converting acetylene to oxalic acid is

A. $HgSO_4$/aqueous H_2SO_4

B. $HgSO_4 / CH_3COOH$

C. $KMnO_4 / KOH, 25^\circ C$

D. CrO_3 / H_2SO_4

Answer: C

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100. When $R - C \equiv CH$ is treated with cuprous in ammonical medium, product formed is

A. $R - C \equiv C - Cu$

B. $Cu - C \equiv CH$

C. $CuC \equiv CCu$

D. $R - C \equiv C - R$

Answer: A

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101.

Compound	Ozonolysis products
A) Acetylene	1) Formaldehyde and Acetaldehyde
B) Ethylene	2) Acetaldehyde
C) Benzene	3) One mole of glyoxal
D) 2-Butene	4) 3 moles of glyoxal
	5) Formaldehyde

The correct match is

A. $\begin{matrix} A & B & C & D \\ 3 & 2 & 5 & 4 \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ 4 & 2 & 1 & 3 \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ 3 & 5 & 4 & 2 \end{matrix}$

D. $\begin{matrix} A & B & C & D \\ 5 & 3 & 1 & 4 \end{matrix}$

Answer: C

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102. $HC \equiv CH \xrightarrow{\text{Excess Na}} A \xrightarrow{\text{Excess } CH_3Cl} B.$

The final product B of the above conversion is

A. 2-Butyne

B. 1-Butyne

C. Propyne

D. Monosodium acetylide

Answer: A

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103. Which of the following cannot give precipitate with cuprous ammonium chloride?

A. $CH_3 - C \equiv C - CH_3$

B. $CH_3 - C \equiv CH$

C. $HC \equiv CH$

D. $CH_3 - CH_2 - C \equiv CH$

Answer: A

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104. (A) : Acetylene is used in oxyacetylene flame

(R) : The heat of combustion of acetylene is more than that of ethane or ethylene

A. A and R are true, R explains A

B. A and R are true, R does not explain A

C. A is true, but R is false

D. A is false, but R is true'

Answer: C

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105. $X + 2KOH \xrightarrow{\text{Alcohol}} H - C \equiv C - H$

Here the reactant "X' is

A. 1,1-Dibromoethane

B. 1,2-Dibromoethane

C. Both (1) and (2)

D. 1,1,2,2-Tetrabromoethane

Answer: C

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106. $CH_2Br - CH_2Br \xrightarrow[\text{KOH}]{\text{Alcoholic}} X$

$X \xrightarrow{NaNH_2,\ \Delta}$ Acetylene. Here X is

A. Vinyl bromide

B. 1,1-Dibromoethane

C. Ethyl bromide

D. Ethylene dibromide

Answer: A

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107. Acetylene is produced by the action of water on

A. Be_2C

B. Al_4C_3

C. CaC_2

D. Mg_2C_3

Answer: C

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108. The homologue of ethyne is

A. C_2H_4

B. C_2H_6

C. C_3H_2

D. C_3H_4

Answer: D

Watch Video Solution

109. In the reaction,

$$CH_3 - \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}} - C \equiv CH \xrightarrow[+Liq.NH_3]{NaNH_2} (A) \xrightarrow{CH_3l} (B)$$

How many electron donating groups are attached with the carbon atom of unsaturated part of the product?

A. Two

B. Three

C. Four

D. None of these

Answer: A

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Objective Exercise 2

1. When ethyl bromide is heated with sodium in dry ether solvent, the alkane obtained is

A. Butane

B. Propane

C. Ethane

D. A mixture of the above three

Answer: A

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2. What is X in the following sequence of reactions?

$$X \xrightarrow[-\frac{1}{2}H_2]{Na} Y \xrightarrow[CaO]{NaOH} CH_4$$

A. Methanoic acid

B. Ethanoic acid

C. Propane

D. Methane

Answer: B

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3. Arrange the following compounds in the descending order of their boiling points

a) n-pentane b) iso pentane

c) neopentane

A. $c > b > a$

B. $a > b > c$

C. $b > c > a$

D. $c > a > b$

Answer: B

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4. Alkanes with how many carbons are solids at rooms temperature

A. above C_{17}

B. above C_{10}

C. above C_8

D. above C_4

Answer: A

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5. $CH_3 - \overset{\overset{CH_3}{|}}{C}H - CH_2 - CH_3 + Br_2 \xrightarrow{h\upsilon}$

Major organic product of the reaction is

A. $CH_3 - \underset{\underset{CH_3}{|}}{C}H - CH_2 - CH_2 - Br$

B. $CH_3 - \underset{\underset{CH_3}{|}}{C}H - CHBr - CH_3$

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

D. $CH_2Br - \underset{\underset{CH_3}{|}}{CH} - CH_2 - CH_3$

Answer: C

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6. $C_2H_6 \xrightarrow[\text{air}]{x\ ,\ \Delta}$ Ethanoicacid, here 'X' is

A. $(CH_3COO)_2Mg$

B. acedified $KMnO_4$

C. $(CH_3COO)_2Mn$

D. CH_3COONa

Answer: C

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7. The correct order of melting points is

A. ethane $<$ propane $<$ butane

B. butane $<$ propane $<$ ethane

C. propane $<$ ethane $<$ butane

D. ethane $<$ butane $<$ propane

Answer: C

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8. Which of the following hydrocarbons is not formed when Wurtz reaction takes place between ethyl iodide and propyl iodide?

A. Butane

B. Propane

C. Pentane

D. Hexane

Answer: B

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9. The dihedral angle between the hydrogen atoms of two methyl groups in staggered conformation of ethane is

A. 120°

B. 100°

C. 60°

D. 180°

Answer: D

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10. Alkanes having odd carbons cannot be prepared in

A) Wurtz reaction

B) Frankland reaction

C) Kolbe's electrolysis

D) Sabatier-sendersen reaction

A. B, C and D

B. A, C and D

C. A, B and D

D. A, B and C

Answer: B

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11. Characteristic reaction of alkenes is

A. Electrophilic addition

B. Nucleophiclic addition

C. Electrophilic substitution

D. Nucleophilic substitution

Answer: A

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12. $CH_3 - CH_2 - CH = CH - CH_3 + O_3 \xrightarrow[\text{Zn}]{H_2O}$

A. $CH_3CH_2CHO \& CH_3CHO$, each one mole

B. Two moles of CH_3CH_2CHO

C. Two moles of CH_3CHO

D. $CH_3 - CH_2 - CH - CH = CH_3$

Answer: A

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13. In dehydrohalogenation, hydrogen and halogen are removed from

A. the same carbon atom

B. adjacent carbon atoms

C. isolate carbon atoms

D. any two carbon atoms

Answer: B

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14. $C_2H_5Cl \xrightarrow{\text{alc. KOH}} A \xrightarrow{dil.\,H_2SO_4} B.$

Here A and B are

A. C_2H_4, C_2H_5OH

B. C_2H_6, C_2H_5OH

C. C_3H_8, C_2H_5OH

D. C_2H_2, C_2H_5OH

Answer: A

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15. Ozonolysis of products obtained from alkene, 2-methyl-2-butene are

A. $HCHO + HCHO$

B. $CH_3CHO + HCHO$

C. $CH_3CHO + CH_3COCH_3$

D. $HCHO + CH_3COCH_3$

Answer: C

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16. Which is a planar molecule?

A. $CH_2 = CH_2$

B. $CH_3 - CH_3$

C. $CH \equiv C - CH_3$

D. Cyclohexane

Answer: A

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17.

List - 1	List - 2
A) Baeyer's reagent	1) $Pd/BaSO_4$ - Quinoline
B) Lindlar's catalyst	2) Ammonical silver nitrate
C) Tollen's reagent	3) Alkaline permanganate
D) Wurtz reaction	4) Na,dry ether
	5) Br_2 in CCl_4

The correct match is

A. $\begin{matrix} A & B & C & D \\ 3 & 1 & 5 & 2 \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ 2 & 1 & 5 & 4 \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ 5 & 2 & 1 & 3 \end{matrix}$

D. $\begin{matrix} A & B & C & D \\ 3 & 1 & 2 & 4 \end{matrix}$

Answer: D

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18. On mixing a certain alkane with chlorine and irradiating it with ultraviolet light, it forms only one monochloroalkane. This alkane

should be

A. Neopentane

B. Propane

C. Pentane

D. Isopentane

Answer: A

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19. $CH_2 = CH_2 + H_2 \xrightarrow{Pt, T_1 K} C_2H_6$

$CH_2 = CH_2 + H_2 \xrightarrow{Ni, T_2 K} C_2H_6$

The correct relation among the following is

A. $T_1 > T_2$

B. $T_2 > T_1$

C. $T = T_2$

D. $T_1 > 2T_2$

Answer: B

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20. Here X and Y are

A. $ClCH_2 - CH_2Cl, ClCH_2 - CH_2Cl$

B. $ClCH_2 - CH_2Cl, ClCH_2 - CH_2OH$

C. $Cl_2C = CCl_2, ClCH = CHCl$

D. $Cl_2C = CCl_2, ClCH_2 - CH_2OH$

Answer: B

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21. $CH_3 - \underset{CH_3}{\overset{|}{C}} = CH_2 + HBr \xrightarrow{(C_6H_5CO)_2O_2}$ Products Here the major product of the above reaction is

A. $(CH_3)_2CBrCH_3$

B. $(CH_3)_2CHCH_2Br$

C. $BrCH = \overset{CH_3}{\overset{|}{C}} - CH_3$

D. $CH_3 - \overset{CHBr}{\overset{|}{C}}H = CH_2$

Answer: B

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22. Arrange the following alkenes in the descending order of their reactivity with HBr.

a) Ethene b) Propene

c) 2-Butene d) 2-Methyl-2-butene

A. $a > b > c > d$

B. $d > c > b > a$

C. $d > c > a > b$

D. $a > b > d > c$

Answer: B

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23. The number of σ and π bonds present in ethene is

A. 6σ and $no\pi$

B. 3σ and $n o \pi$

C. 4σ and 2π

D. 5σ and 1π

Answer: D

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24. What are Y and Z in the following sequence?

$$CH_2 = CHBr \xrightarrow{NaNH_2} Y \xrightarrow[H_2O, 333K]{Hg^{2+} / H^+} Z$$

A.

X	Y
ethane	ethanol

B.

X	Y
ethyne	acetic acid

C.

X	Y
ethyne	ethanal

D.

X	Y
ethylamine	ethanal

Answer: C

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25. $1-\text{Butene}+HBr \xrightarrow[h\upsilon]{H_2O_2}$ 1-Bromobutane. This reaction is based as

A. Markownikoff's rule

B. Saytzeff's rule

C. Anti Markownikoff's rule

D. Hoffmann's rule

Answer: C

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26. Identify X and Y in the following reaction sequence

$$X \xrightarrow{Zn} Y \xrightarrow[Zn-H_2O]{O_3} (CH_3)_2CO + CH_2O$$

A.

X	Y
$(CH_3)_2CHCH_3$ with Br on the central C	$CH_3CH=CHCH_3$

B.

X	Y
$(CH_3)_2CHCH_2Br$	$CH_3CH=CHCH_3$

C.

X	Y
$(CH_3)_2CBrCH_2Br$	$(CH_3)_2C=CH_2$

D.

X	Y
$(CH_3)_2CHCHBr_2$	$(CH_3)_2C=CH_2$

Answer: C

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27. In the following chemical reaction

$$H-C\equiv CH \xrightarrow[(2)\,CH_3CH_2Br]{NaNH_2\,/\,liq.NH_3}$$

$$X = \xrightarrow[(2)\,CH_3CH_2Br]{(1)\,NaNH_2\,/\,liq.NH_3} Y$$

X and Y are :

A. X = 1-Butyne , Y = 3-Hexyne

B. X = 2-Butyne , Y= 3-Hexyne

C. X = 2-Butyne , Y = 2-Hexyne

D. X = 1-Butyne , Y = 2-Hexyne

Answer: A

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28. When acetylene is passed through dil. H_2SO_4 in the presence of the HgO_4, the compound formed is

A. Ether

B. ketone

C. Acetic aci

D. Acetaldehyde

Answer: D

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29. What are X and Y respectively in the following reaction?

Z - product $\xleftarrow{Y}$ 2-Butyne $\xrightarrow{x}$ E-product

A. $Na/NH_{3(liq)}$ and $Pd/BaSO_4 + H_2$

B. $Ni/140^\circ C$ and $Pd/BaSO_4 + H_2$

C. $Ni/140^\circ C$ and $Na/NH_{3(liq)}$

D. $Pd/BaSO_4 + H_2$ and $Na/NH_{3(aq)}$

Answer: A

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30. $CH_3 - CH_2 - CH_2Cl \xrightarrow{alc.KOH} X$

$CH \equiv CH + H_2 \xrightarrow{Pd+BaSO_4} Y$

Here, in the above sequences, the final products 'X' and 'Y'

A. are a pair of homologues

B. have the same percentage composition

C. have the same empirical formula

D. All the above

Answer: D

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31. Which of these will not react with acetylene?

A. NaOH

B. Na

C. Ammonical $AgNO_3$

D. HCl

Answer: A

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32. Addition of ozone to acetylene gives a product which is

A. monocyclic

B. bicyclic

C. tricyclic

D. tetracyclic

Answer: B

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33. Number of linear atoms in acetylene molecues is a maximum of

A. 1

B. 2

C. 3

D. 4

Answer: D

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34. Propyne and propene can be distinguished by

A. Conc. H_2SO_4

B. Br_2 in CCl_4

C. Dil $KMnO_4$

D. $AgNO_3$ solution in ammonia

Answer: D

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35. x' on ozonolysis gives a dial while 'y' reacts with Baeyer's reagent to give a diol then 'x' and 'y' respectively are

A. $C_2H_2 \& C_6H_6$

B. $C_2H_4 \& C_2H_2$

C. $C_2H_2 \& C_2H_4$

D. $C_2H_4 \& C_6H_6$

Answer: C

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36. The conversion of ethylene to ethyne involves

A. Br_2 treatment followed by aqueous KOH reaction

B. Alcoholic KOH treatment followed by Br_2 reaction

C. Br_2 treatment followed by alcoholic KOH reaction

D. Oxidation followed by reduction

Answer: C

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37. $HC \equiv CH + H_2 \xrightarrow[\text{Quinoline}]{Pd - BaSO_4} A$

$A \xrightarrow[AlCl_3]{HCl} B \xrightarrow[\text{Dry ether}]{Na} C$. Here 'C' is

A. C_2H_6

B. C_4H_{10}

C. C_2H_5Cl

D. C_3H_7Cl

Answer: B

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38. The decreasing order of bond angles in ethane, ethylene, acetylene and benzene is

A. $C_2H_6 > C_2H_4 > C_2H_2 > C_6H_6$

B. $C_2H_6 > C_2H_4 = C_2H_2 > C_6H_6$

C. $C_2H_2 > C_2H_4 = C_6H_6 > C_2H_6$

D. $C_6H_6 > C_2H_2 > C_2H_4 > C_2H_6$

Answer: C

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39. In the following reaction, what is X?

$$C_2H_2 \xrightarrow[HgSO_4\,,H_2SO_4]{H_2O\,,60^\circ C} X \Leftrightarrow CH_3CHO$$

A. CH_3CH_2OH

B. $CH_3 - O - CH_3$

C. CH_3CH_2CHO

D. $H_2C = CHOH$

Answer: D

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40. Alkaline $KMnO_4$ solution converts acetylene into

A. Acetaldehyde

B. Oxalic acid

C. Acetic aci

D. Glycol

Answer: C

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41. $HC \equiv CH \xrightarrow{HBr} A \xrightarrow{HBr} B \xrightarrow[\Delta]{alc.KOH} C$

Then C in the reaction is

A. Ethanol

B. Ethane

C. Ethene

D. Ethyne

Answer: D

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42. An alkyne differs with an alkene when tested with

A) Bromine water

B) Tollen's reagent

C) Baeyer's reagent

A. A and C

B. B and C

C. A only

D. B only

Answer: D

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43. Which of the following hydrocarbons is the most reactive towards addition of H_2SO_4?

A. Ethene

B. Propylene

C. 3-methyl but- 1 - ene

D. 1 - butene

Answer: C

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44. The product Z of the following reaction is:

$$H_3CC \equiv CH \xrightarrow{2HBr} Z$$

A. $H_3CCH_2CHBr_2$

B. $H_3CCBr_2CH_3$

C. $H_3CCHBrCH_2Br$

D. $BrCH_2CH_2CH_2Br$

Answer: B

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Practice Exercise

1. When a mixture of methyl iodide, ethyl iodide are heated with sodium in dry ether solvent, the alkane(s) obtained

A. Ethane

B. Propane

C. Butane

D. A mixture of the above three

Answer: D

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2. The nature of the aqueous solution after Kolbe's electrolysis is

A. Acidic

B. Alkaline

C. Neutral

D. May be acidic, alkaline or neutral

Answer: B

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3. Pyrolysis of methane and ethane respectively are

A. Exothermic and Endothermic

B. Endothermic and Exothermic

C. Both are endothermic

D. both are exothermic

Answer: C

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4. Among the following, boiling point is maximum for

A. isobutane

B. n-butane

C. propane

D. ethane

Answer: B

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5. Petroleum refining invovles

a) distillation b) cracking c) reforming

A. only a

B. only b and c

C. only a and b

D. a, b and c

Answer: D

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6. In the chlorination of ethane in the presence of sunlight which one of the following is also formed in minute quantity?

A. CH_4

B. C_4H_{10}

C. C_2H_6

D. C_8H_{18}

Answer: B

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7. Halogenation of alkanes in the presence of sunlight is

A. Free radical addition

B. Electrophilic substitution

C. Nucleophilic substitution

D. Free radical substitution

Answer: D

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8. Polythene is

A. $(-H_2C=CH_2-)_n$

B. $(-HC=CH-)_n$

C. $(-H_3C=CH_3-)_n$

D. $(-H_2C-CH_2-)_n$

Answer: D

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9. Which of the following is not obtained when propyl chloride and methyl chloride react with sodium in dry ether?

A. C_2H_6

B. C_4H_{10}

C. C_3H_8

D. C_6H_{14}

Answer: C

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10. The dihedral angle between the two methyl groups in gauche conformation of n-butane is

A. 120°

B. 180°

C. 45°

D. 60°

Answer: D

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11. Dehydration means

A. Removal of hydrogen molecule from adjacent carbons

B. Removal of hydrogen molecule from the same carbon

C. Removal of water moelcule from the same carbon as H and OH

D. Removal of H and OH from the adjacent carbons as water molecule

Answer: D

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12. The IUPAC name of the product formed when ethylene reacts with hypochlorous acid is

A. Ethylene chlorohydrin

B. 2-Chloroethanol

C. 1-Chloroethanol

D. Hydroxyethyl chloride

Answer: B

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13. The oxidation product of ethylene by air at $200 - 400^{\circ} C$ in presence of silver catalyst is

A. Ethylene glycol

B. Ethylene oxide

C. 1,2-Ethanediol

D. Ethylene chlorohydrin

Answer: B

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14. $B \xleftarrow{alc.KOH} C_2H_5Cl \xrightarrow[C_2H_5OH]{Zn-Cu} A$ Here compounds A and B are

A. CH_4, C_2H_4

B. C_2H_4, C_2H_6

C. C_2H_6, C_2H_4

D. C_2H_6, CH_4

Answer: C

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15. The most important method of preparation of hydrocarbons of lower carbon number is

A. Pyrolysis of higher carbon number hydrocarbons

B. Electrolysis of salts of fatty acids

C. 'Sabatier and Senderen's reaction

D. Direct synthesis

Answer: A

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16. $CH_3 - CH_2Cl \xrightarrow{\text{alcoholic KOH}} A$ Compound $A \xrightarrow{Br_2} B$. Compound $B \xrightarrow[\Delta]{Zn} C$. Compound C is

A. Acetylene

B. Ethane

C. Ethene

D. Methane

Answer: C

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17. $C_2H_5Cl \xrightarrow{AlcKOH}$ Product.

This reaction is known as

A. hydrohalogenation

B. dehydrohalogenation

C. halogenation

D. dehalogenation

Answer: B

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18. Which of the following compounds does not form an ozonide?

A. Ethane

B. Propyne

C. Propene

D. Ethene

Answer: A

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19. One mole of a symmetrical alkene on ozonolysis gives two moles of an aldehyde having a molecular mass of 44 u. The alkene is

A. 2-butene

B. Ethene

C. 1-butene

D. propene

Answer: A

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20. IUAPC name of allyl chloride is

A. 1-chloro propene

B. 2-chloro propene

C. 3-chloro propene

D. 3-chloropropane

Answer: C

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21. Correct statement about ethene is

A. $\angle(HCC)$ is greater than $109.5^{\circ s}$

B. $\angle(HCC)$ is less than $\angle(HCH)$

C. $C-C$ bond length is less than $C-H$ bond length

D. Carbon underoges sp^3 hybridisation

Answer: A

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22. Incorret statement about addition of halogen to alkenes

A. It is electrophilic addition

B. Syn addition of halogen to C = C takes place

C. Three membered cyclic halonium ion is intermediate

D. Vicinal dihalides are formed.

Answer: B

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23. $CH_3 - CH = CH - CH_3 \xrightarrow{KMnO_4 / H^+}$ product in this reaction

A. $CH_3 - \underset{\underset{OH}{|}}{CH} - \underset{\underset{OH}{|}}{CH} - CH_3$

B. $2CH_3CHO$

C. $2CH_3COOH$

D. $CH_3CHO + CH_3COOH$

Answer: C

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24. $(CH_3)_2C = CH - CH_3 \xrightarrow{H^+ / KMnO_4}$ Products in this reaction

A. $(CH_3)_2C(OH)C(OH)CH_3$

B. $CH_3CHO + CH_3CHO$

C. $CH_3COCH_3 + CH_3COOH$

D. $2CH_3COOH$

Answer: C

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25. Photochemical chlorination of alkane is initiated by a process

A. Pyrolysis

B. Substitution

C. Homolysis

D. Peroxidation

Answer: C

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26. The method of converting high boiling hydrocarbons into low boiling hydrocarbons is known as

A. Polymerization

B. Isomerism

C. Cracking

D. Condensation

Answer: C

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

A. Methyl iodide

B. Ethyl iodide

C. Methyl alcohol

D. Ethyl alcohol

Answer: A

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28. The prepare a pure sample of normal hexane using sodium metal as one reactant, the other reactant or reactants will be

A. Isobutyl chloride and ethyl chloride

B. Methyl bromide and n-pentyl bromide

C. n-Propyl bromide

D. Ethyl bromide and n-Butyl bromide

Answer: C

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29. In a reaction

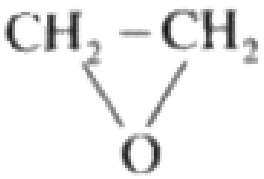
$$CH_2 = CH_2 \xrightarrow[\text{acid}]{\text{Hypochlorous}} M \xrightarrow{R} \underset{\underset{CH_2OH}{|}}{CH_2OH}$$

Here, M = Molecule, R = Reagent, M and R are respectively

A. CH_3CH_2Cl and $NaOH$

B. $CH_2Cl.CH_2OH$ and $aq.\ Na_2CO_3$

C. CH_3CH_2OH and HCl

D. 

Answer: B

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30. The compound which decolourises bromine water but does not give white precipitate with Tollen's reagent.

A. C_2H_2

B. C_2H_4

C. C_6H_6

D. CH_4

Answer: B

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31. Which of the following reacts with ammonical cuprous chloride?

A. CH_4

B. C_2H_2

C. C_2H_6

D. C_6H_6

Answer: B

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32. Which one of the following has the smallest heat of hydrogenation per mole

A. 1 - Butene

B. trans-2-Butene

C. cis-2-Butene

D. 1,3-Butadiene

Answer: B

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33. A saturated hydrocarbon has the formula C_nH_{12}. The value of 'n' in this compound is

A. 4

B. 5

C. 6

D. 2

Answer: B

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34. Which conformer of ethane has maximum energy

A. Skew

B. Eclipsed

C. Staggered

D. All have equal energy

Answer: B

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35. Which of the following is most stable

A. Methane

B. Ethane

C. propane $<$ ethane $<$ butane

D. Butane

Answer: A

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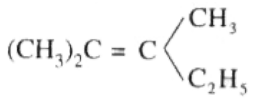
36. Which one of the following alkenes reductive ozonolysis will give a mixture of ketones

A. $CH_3 - CH = CH - CH_3$

B. $(CH_3)_2C = CHCH_3$

C. 

D. $(CH_3)_2C = C(CH_3)_2$

Answer: C

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37. $CH_3 - CH = CH_2 + HI \rightarrow 'X'$. Here product 'X' is

A. $CH_3CH_2CH_2I$

B. $CH_3 - CHI - CH_3$

C. $CH_3CH_2CH_3$

D. $CI_3 - CH_2 - CI_3$

Answer: B

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38. The chlorination of ethane is an example for which type of the following reactions?

A. Nucleophilic substitution

B. Electrophilic substitution

C. Free radical substitution

D. Rearrangement

Answer: C

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39. $C_2H_6 \xrightarrow{450^\circ C} C_2H_4 + H_2$. Above reaction is called is

A. Combustion

B. Rearrangement

C. Pyrolysis

D. Cleavage

Answer: C

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40. What is Z in the following reaction?

$$CH_3 - CH_2 - CO_2^{\ominus} Na^{\oplus} \xrightarrow[\Delta]{NaOH / CaO} Z$$

A. propane

B. n-butane

C. ethane

D. ethyne

Answer: C

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