CHEMISTRY

BOOKS - MTG CHEMISTRY (ENGLISH)

HYDROCARBONS

Mcqs

1. Themajor constituent of natural gas is

A. methane

B. propane

C. butane

D. hexane.

Answer: A

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2. The number of chain isomers possible for hydrocarbon C_5H_{12} is

A. 3

B. 5

C. 4

D. 6

Answer: A

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3. Which one of the following gives onlyh one monochloro derivative?

A. neo-Pentane

B. n-Hexane

C. 2-ethylpentane

D. 3-Methylpentane

Answer: A

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4. Wurtz reaction is used to unit

A. two alkyl halides

B. two aryl halides

C. alkyl and aryl halides

D. two benzene units.

Answer: A

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5. Which of the following compounds will react with Na to form 4,5-diethyloctane?

A. $CH_3CH_2CH_2CH_2Br$

B. $CH_3CH_2CH_2 - \underset{\underset{CH_3}{|}}{C}H - CH_2CH_2Br$

C. $CH_3CH_2CH_2CH_2 - \underset{\underset{Br}{|}}{C}H - CH_3$

D. $CH_3CH_2CH_2 - \underset{\underset{Br}{|}}{C}H - CH_2CH_3$

Answer: D

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6. In the reaction, $Cl_2 + CH_4 \xrightarrow{hv} CH_3Cl + HCl$ presence of a small amount of oxygen

A. increases the rate of reaction for a brief period of time

B. decreases the rate of reaction for a brief period of time

C. does not affect the rate of reaction

D. completely stops the reaction

Answer: B

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7. A mixture of 1-iodoethane and 1-iodopropane is treated with sodium metal and dry ether to carry out Wurtz reaction. Which of the following hydrocarbons will be formed?

A. Propane+Hexane

B. Ethane+Propane

C. Butane+Propane

D. Butane+Pentane+Hexane

Answer: D

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8. Which alkane is produced when sodium salt of butanoic acid is heated with soda lime?

A. CH_3CH_3

B. $CH_3CH_2CH_2CH_3$

C. CH_4

D. $CH_3CH_2CH_3$

Answer: D

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9. Which of the following statements is true?

A. soda lime a mixture of sodium hydroxide and potassium hydroxide.

B. Methane can be prepared by wurtz reaction

C. In alkanes all carbon atoms are sp^3 hybridised.

D. neo-pentane yields three different monochloro derivatives.

Answer: C

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10. Match the column I with column II and mark the appropriate choice.

	Column I		Column II
(A)	n-Butane $\longrightarrow$ 2-Methylpropane	(i)	Free radical substitution
(B)	$CH_4 + Cl_2 \xrightarrow{h\upsilon} CH_3Cl$	(ii)	Wurtz reaction
(C)	$RCOONa$ + soda lime $\longrightarrow RH$	(iii)	Isomerisation
(D)	$RX + Na \xrightarrow{ether} R-R$	(iv)	Decarboxylation

A. $A \rightarrow iii, B \rightarrow i, C \rightarrow iv, D \rightarrow ii$

B. $A \rightarrow ii, B \rightarrow iv, C \rightarrow i, D \rightarrow iii$

C. $A \rightarrow i, B \rightarrow ii, C \rightarrow iv, D \rightarrow iii$

D. $A \rightarrow iv, B \rightarrow i, C \rightarrow iii, D \rightarrow ii$

Answer: A

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11. Hydrocarbon which is liquid at room temperature is

A. pentane

B. butane

C. propane

D. ethane

Answer: A

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12. Kerosene is a mixture of

A. aromatic hydrocarbons

B. aliphatic hydrocarbons

C. unsaturated hydrocarbons

D. saturated hydrocarbons.

Answer: B

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13. Which of the following has the lowest boiling points?

A. 2-Methylbutane

B. 2-Methylpropane

C. 2,2-Dimethylpropane

D. n-Pentane

Answer: B

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14. Chlorination of alkanes is a photochemical process. It is initiated by the process of

A. heterolysis

B. homolysis

C. pyrolysis

D. hydrolysis

Answer: B

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15. Chlorination of methane does not occur in dark because

A. methane can form free radicals in presence of sunlight ohnly

B. to get chlorine free radicals from Cl_2 molecules energy is required. It cannot happen in dark

C. substitution reaction can take place only in sunlight and not in dark

D. termination step cannot take place in dark, it requires sunlight.

Answer: B

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16. Ethane is foremd during the formation of chloromethane by chlorinationn of methane because

A. higher members of the hydrocarbons are generally formed during reactions

B. two methyl free radicals may combine during chlorination to give ethane

C. two chloromethane molecule react to form ethane

D. chlorine free radical reacts with methane to give ethane.

Answer: B

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17. Which of the following isomeric heptanes can yield seven differentt monochlorinated products upon free radical chlorination?

A. 2,2-Dimethylpentane

B. 2-methylhexane

C. 3-Methylhexane

D. 2,4-dimethylpentane

Answer: C

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18. An alkane C_6H_{14} gives two monochloro derivatives on chlorination. Its possible structure is

A. $CH_3CH_2CH_2CH_2CH_2CH_3$

B. $CH_3 - \underset{\underset{CH_3}{|}}{C}\ H - CH_2CH_2CH_3$

C. $CH_3 - \underset{\underset{CH_2CH_3}{|}}{C} H - CH_2CH_3$

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

Answer: D

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19. During halogenation of alkanes the halogens and alkane show a specific treand. Which of the following statements is not correct?

A. The reactivity of halogens is in the order $F_2 > Cl_2 > Br_2 > I_2$

B. For a given halogen the reactivity of hydrocarbon is in the order of $3^\circ > 2^\circ > 1^\circ$

C. Bromine is less reactive than chlorine towards a particular alkane.

D. On chlorination monosubstituted product is formed while on bromination disubstituted products are formed.

Answer: D

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20. An inhibitor is described as,

A. a substance that slows down or stops a reaction

B. a substnace which inhibits the properties of a catalyst

C. a substance formed during the reaction and does not participate in the reaction

D. a substance which prevents formationn of products in a reaction being most reactive.

Answer: A

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21. Which step is chain propagation step in the following mechanism?

(i) $Cl_2 \xrightarrow{hv} Cl^* + Cl^*$

(ii) $Cl^* + CH_4 \rightarrow .^* CH_3 + HCl$

(iii) $Cl^* + Cl^* \rightarrow Cl_2$

(iv) $.^* CH_3 +^* Cl \rightarrow CH_3Cl$

A. (i)

B. (ii)

C. (iii)

D. (iv)

Answer: B

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22. What happens when methane reacts with conc. HNO_3 at high temperature?

A. Nitromethane is formed

B. Methanol is formed.

C. CO_2 and H_2O are formed.

D. CO and H_2O are formed.

Answer: A

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23. Match the column I with column II to identify the products of oxidation of alkanes and mark the appropriate choice.

Column I		Column II	
(A)	$(CH_3)_3CH + 2O_2 \xrightarrow[{[O]}]{KMnO_4}$	(i)	$HCOOH + H_2O$
(B)	$2CH_4 + O_2 \xrightarrow[100\ atm]{Cu/523\ K}$	(ii)	$(CH_3)_3COH$
(C)	$CH_4 + O_2 \xrightarrow[\Delta]{Mo_2O_3}$	(iii)	$2CH_3OH$
(D)	$CH_4 + \frac{3}{2}O_2 \xrightarrow{(CH_3COO)_2Mn}$	(iv)	$HCHO + H_2O$

A. $A \rightarrow i, B \rightarrow ii, C \rightarrow iii, D \rightarrow iv$

B. $A \rightarrow ii, B \rightarrow iii, C \rightarrow iv, D \rightarrow i$

C. $A \rightarrow iv, B \rightarrow ii, C \rightarrow iii, D \rightarrow i$

D. $A \rightarrow iii, B \rightarrow i, C \rightarrow ii, D \rightarrow iv$

Answer: B

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24. Few reactions of alkanes are given below. Identify the name of the reaction which is not correctly matched with the reaction.

A. $CH_3CH_2CH_2CH_3 \xrightarrow{AlCl_3 + HCl} CH_3 - \underset{\text{Isomerisation}}{\overset{CH_3}{\overset{|}{C}}H} - CH_3$

B. $C_6H_{14} \xrightarrow{773K} C_4H_8 + C_2H_6 -$ Pyrolysis

C. $CH_4 + 2O_2 \xrightarrow{\Delta} CO_2 + 2H_2O$-Controlled oxidation

D. $CH_4 + HNO_3 \xrightarrow{400^\circ C} CH_3NO_2$-Nitration

Answer: C

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25. Which of the following products is formed when n-heptane is passed over $(Al_2O_3 + Cr_2O_3)$ catalyst at 773K?

A. Benzene

B. Toluene

C. Polyheptane

D. Cycloheptane

Answer: B

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26. Complete the following reactions:

(i) $C_2H_5I + H_2 \xrightarrow[C_2H_5OH]{Zn-Cu} K$

(ii) $CH_{30COONa + H_2O} \xrightarrow{\text{Electrolysis}} Y$

(iii) $CH_3CH_2CH_2CH_2CH_2CH_3 \xrightarrow[773K]{Cr_2O_3 / Al_2O_3} Z$

A. $X = C_2H_6, Y = C_2H_6, Z = C_6H_6$

B. $X = CH_4, Y = CH_{30COOH}, Z = CH_3CH_3$

C. $X = C_2H_6, Y = CH_4, Z = C_4H_{10}$

D. $X = C_2H_6, Y = CH_4, Z = C_5H_{10}$

Answer: A

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27. In the given reactions:

(i). $CH_3Br \xrightarrow{Na, ether} X \xrightarrow[hv]{Br_2} Y \quad Z^{Na, ether}$

(ii) $CH_3COOH \xrightarrow{NaOH} X \xrightarrow[CaO]{NaOH} Y \xrightarrow[hv]{Br_2} Z$

Identify, X,Y and Z

A. X-(i) CH_4 (ii) CH_3COONa

Y-CH_3Br, CH_3CH_3

Z-CH_3CH_3, CH_3CH_2Br

B. X-(i) CH_3CH_3 (ii) CH_3COONa

Y-CH_4, CH_4, Z-$CH_3Br, CH_3CH_2CH_3$

C. X-(i) CH_3CH_3 (ii)- CH_3COONa, Y-$CH_4, CH_3CH_3, Z - CH_3CH_3CH_3, CH_3Br$

D. X-(i) CH_3CH_3 (ii) CH_3COONa, Y-CH_3CH_2Br, CH_4 Z-$CH_3CH_2CH_2CH_3, CH_3Br$

Answer: D

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28. 1,3,5,7-Octatetraene contains (X)_____ σ-bonds and (Y)_____π-bonds. 'X' and 'Y' are

A. 23.4

B. 17,4

C. 18,5

D. 33,2

Answer: B

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29. Geometrical isomerism is caused

A. by restricted rotation around C=C bond

B. by the presence of one asymmetric carbon atom

C. due to the differennt groups attached to the same functional group

D. by swing of hydrogenn atom between two divalent atoms.

Answer: A

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30. How many geometrical isomers are possible for the given compound?

$$CH_3 - CH = CH - CH = CH - C_2H_5$$

A. Four

B. Three

C. Two

D. Five

Answer: A

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31. The alkene that exhibits geometrical isomerism is

A. propene

B. 2-methylpropene

C. 2-butene

D. 2-methyl-2-butene

Answer: C

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32. Which of the following compounds will show cis-trans isomerism?

A. $(CH_3)_2C = CHC_2H_5$

B. $H_2C = CCl_2$

C. $CH_3HC = CClCH_3$

D. $HClC = CH_2$

Answer: C

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33. 2-Bromopentane is treated with alcoholic KOH solution. Whatt will be the major product formed in this reaction and what is the type of elimination called?

A. Pent-1-ene, β-Elimination

B. Pent-2-ene, β-elimination

C. Pent-1-ene, Nucleophilic substitution

D. Pent-2-ene, Nucleophilic substitution.

Answer: B

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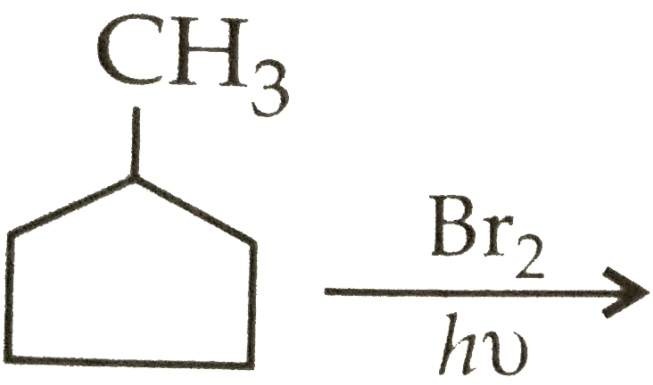
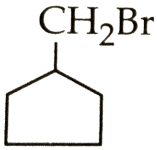
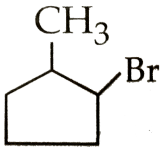
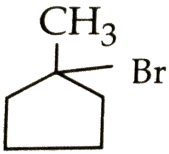
34. In the following reaction,

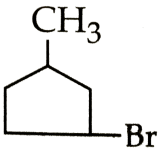


the major product obtained is

A. (a) 

B. (b) 

C. (c) 

D. (d) 

Answer: C

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35. What is the order of reactivity of hydrogen atoms attached to carbon atom in an alkene?

A. $3^\circ > 1^\circ > 2^\circ$

B. $2^\circ > 1^\circ > 3^\circ$

C. $3^\circ > 2^\circ > 1^\circ$

D. $1^\circ > 2^\circ > 3^\circ$

Answer: C

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36. Dehydrohalogenation involves removal of the halogenn atom together with a hydrogen atom from carbon adjacent to the one with halogen atom. Alcoholic KOH is used for dehydrohalogenation. According to saytzeff's rule, when two alkenes may be formed, the alkene which is most substituted is the major product.

Q. Arrange the following alkyl halides in decreasing order of the rate of β-elimination reaction with alcoholik KOH.

$$\underset{(i)}{CH_3CH_2CH_2BrCH_3} - \underset{\substack{| \\ CH_3 \\ (ii)}}{CH} - CH_2BrCH_3 - \underset{(iii)}{CH_2 - \underset{\substack{| \\ Br}}{CH} - CH_3}$$

A. iigtiiigti

B. iiigtiigti

C. igtiigtiii

D. iigtigtiii

Answer: B

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37. Dehydrohalogenation involves removal of the halogenn atom together with a hydrogen atom from carbon adjacent to the one with halogen atom. Alcoholic KOH is used for dehydrohalogenation. According to saytzeff's rule, when two alkenes may be formed, the alkene which is most substituted is the major product.

Q. The ease of dehydrohalogenation for different halogens is in the order

A. iodidegtbromidegtchloride

B. bromidegtiodidegtchloride

C. chloridegtbromidegtiodide

D. iodidegtchloridegtbromide

Answer: A

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38. Dehydrohalogenation involves removal of the halogenn atom together with a hydrogen atom from carbon adjacent to the one with halogen atom. Alcoholic KOH is used for dehydrohalogenation. According to saytzeff's rule, when two alkenes may be formed, the alkene which is most substituted is the major product.

Q. What are the products of dehydrohalogenation of 2-iodopentane?

A. 2-Pentene(major),1-Pentene (minor)

B. 1-Pentene (major), 2-Pentene (minor)

C. 2-Pentene (50%), 1-Pentene (50%)

D. None of these

Answer: A

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39. The compouhnd formed when alcoholic solution of ethylene dibromide is heated with granualted zinc is

A. ethene

B. ethyne

C. ethane

D. bromoethane

Answer: A

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40. $CH_3CH_2CH_2OH \xrightarrow[170^\circ C]{conc.\ H_2SO_4} A \xrightarrow[500^\circ C]{Cl_2} B.$

A and B. are

A. $A = CH_3CH_2CH_3, B = CH_3CH_2CH_2Cl$

B. $A = CH_3CH = CH_2, B = CH_2ClCH = CH_2$

C. $A = CH_2 = CH_2, B = CH_3CH_2Cl$

D. $A = CH_3CH_2CH_3, B = CH_3CH = CH_2$

Answer: B

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41. Pentene-1 with HCl gives

A. 3-chloropentane

B. 2-chloropentane

C. 1,2-dichloropentane

D. 1-chloropentane.

Answer: B

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42. Which of the following reactions does not show the correct products of the reaction?

A. $CH_3 - CH = CH_2 \xrightarrow[\text{peroxide}]{HBr} CH_3 - CH_2 - CH_2Br$

B. $CH_3 - CH = CH_2 \xrightarrow[\text{peroxide}]{HCl} CH_3 - CH_2 - CH_2Cl$

C. $CH_3 - CH = CH_2 \xrightarrow{HBr} CH_3 - \overset{\overset{Br}{|}}{CH} - CH_3$

D. $CH_3 - CH = CH_2 \xrightarrow{HCl} CH_3 - \underset{\underset{Cl}{|}}{CH} - CH_3$

Answer: B

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43. Presence of unsaturation in organic compounds can be tested with

A. Fehling's reagent

B. Tollen's reagent

C. Baeyer's reagent

D. Fitting's reaction

Answer: C

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44. An alekene X is obtained by dehydration of ann alcohol Y. X on ozonolysis gives two molecules of ethanal for every molecule of alkene. X and Y are

A. X=3-hexene,Y=3-hexanol

B. X=2-butene, Y=2-butanol

C. X=1-butene, Y=1-butanol

D. X=1-hexane, Y=1-hexanol

Answer: B

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45. Propanal-1 and pentan-3-one are the ozonolysis products of an alkene.

What is th structural formula of alkene?

A. $CH_3CH_2 - \underset{\underset{CH_2CH_3}{|}}{C} = CH - CH_2CH_3$

B. $CH_3CH_2 - CH = CH - \overset{\overset{CH_2CH_3}{|}}{C} H - CH_3$

C. $CH_3 - \underset{\underset{CH_2CH_3}{|}}{C} = \overset{\overset{CH_2CH_3}{|}}{C} - CH_3$

D. $CH_3CH_2CH_2CH_2 - CH = CH - CH_2CH_3$

Answer: A

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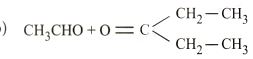
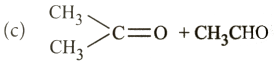
46. An alkene 3-ethylpent-2-ene will give which of the following products on ozonolysis?

A. $HCHO + CH_3CH_2CH_2CHO$

B. 

C. 

D. $CH_3CH_2CHO + CH_3CH_2CH_2CH_2CHO$

Answer: B

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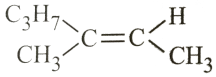
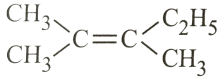
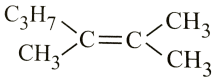
47. An unsaturated hydrocarbon was treated with ozone and resulting ozonide on hydrolysis gives 2-pentanone and acetaldehyde. What is the structure of alkene?

A. $C_3H_7 - CH = CH - CH_3$

B. 

C. 

D. 

Answer: B

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48. An organic compound $C_6H_{12}(X)$ on reduction gives $C_6H_{14}(Y)$. X on ozonolysis gives two aldehydes $C_2H_4O(I)$ and $C_4H_8O(II)$. Identify the compounds X, Y and aldehydes (I) and (II).

A.

$$X = CH_3CH = CHCH_2CH_2CH_3, Y = CH_3(CH_2)_4CH_3, (I) = C$$

B.

$$X = CH_3CH_2CH = CHCH_2CH_3, Y = CH_3(CH_2)_4CH_3, (I) = C$$

C.

$$X = CH_3CH_2CH_2CH = CH_2, Y = CH_3(CH_2)_4CH_3, (I) = HCH$$

D. $X = CH_3(CH_2)_3CH_3, (I) = CH_3CHO, (II) = CH_3CH_2CHO$

Answer: A

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49. Hydrolysis of ozonide of but-1-ene gives

A. ethylene only

B. acetaldehyde and formaldehyde

C. propionaldehyde and formaldehyde

D. acetaldehyde only

Answer: C

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50. Ozonolysis of 2,3-dimethylbut-1-ene followed by reduction with zinc and water gives

A. methanal and hexanoic acid

B. methanoic acid and butanone

C. methanal and 3-methylbutan-2-one

D. butanoic acid and 2,3-diimethylbutanoic acid.

Answer: C

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51. The products for the following reactions are

(i) $CH_3 - \overset{\overset{Br}{|}}{\underset{\underset{H}{|}}{C}} - CH_2 - CH_3 + \text{alc. KOH} \rightarrow X$

(ii) $CH_3 - \underset{\underset{CH_3}{|}}{C}\ H - CH = CH_2 \xrightarrow{O_3} Y + Z$

A.

$$X = (CH_3)_2C = CH_2, Y = CH_3CH_2CHO, Z = CH_3CH_2CHO$$

B. $X = CH_2 = CH_2, Y = CH_3CHO, Z = CH_3COOH$

C. $X = CH_3 - CH = CH - CH_3$

$$Y = CH_3 - \overset{\overset{CH_3}{|}}{C}\ H - CHO, Z = HCHO$$

D. $X = CH_3 - CH = C(CH_3)_2, Y = HCHO, Z = CH_3CHO$

Answer: C

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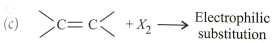
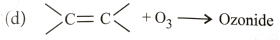
52. The reaction in terms of intermediates and type of reaction is given below. Mark the incorrect option.

A. $CH_3 - \overset{\overset{CH_3}{|}}{C} = CH_2 + HBr \rightarrow$ Carbocation intermediate

B. $CH_3 - \overset{\overset{CH_3}{|}}{C} = CH_2 + HBr \xrightarrow{\text{peroxide}}$ Free radical intermediate

C. 

D. 

Answer: C

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53. A compound X declourises Br_2 water and reacts slowly with conc H_2SO_4 to give an addition product. X reacts with HBr to form Y. Y reacts with NaOH to form Z. on oxidation Z gives hexan-3-one. X, Y and Z in the

reactions are

$$\underset{\substack{\downarrow \text{conc. } H_2SO_4 \\ \text{Addition product}}}{X} \xrightarrow{Br_2 \text{ water}} \text{Decolourisation}$$

$$X \xrightarrow{HBr} Y \xrightarrow{NaOH} Z \xrightarrow{[O]} CH_3CH_2CH_2 - \underset{\substack{|| \\ O \\ \text{Hexan-3-one}}}{C} - CH_2CH_3$$

A.

$$X = CH_3CH_2CH = CHCH_3, Y = CH_3CH_2CH(Br)CH(Br)CH_2$$

B.

$$X = CH_3CH = CHCH_3, Y = CH_3CH(Br)CH(Br)CH_3, Z = CH$$

C.

$$X = CH_3CH_2CH = CHCH_2CH_3, Y = CH_3CH_2 - \underset{\substack{| \\ Br}}{CH} - CH_2CH$$

D.

$$X = CH_3CH_2CH_2CH = CHCH_3, Y = CH_3CH_2CH_2CH_2CH_2CH$$

Answer: C

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54. Match the column I with column II to give the correct IUPAC names and mark the appropriate choice.

	Column I		Column II
(A)	$CH_3(CH_2)_4-\underset{\underset{CH_2-CH(CH_3)_2}{\vert}}{CH}-(CH_2)_3CH_3$	(i)	Pent-1-en-3-yne
(B)	$CH_2=CH-C\equiv C-CH_3$	(ii)	4-Ethyl-1,5-heptadiene
(C)	 $-CH_2-CH_2-CH=CH_2$	(iii)	5-(2-Methylpropyl)decane
(D)	$CH_3-CH=CH-\underset{\underset{C_2H_5}{\vert}}{CH}-CH_2-CH=CH_2$	(iv)	4-Phenylbut-1-ene

A. $A \rightarrow i, B \rightarrow iv, C \rightarrow ii, D \rightarrow iii$

B. $A \rightarrow iv, B \rightarrow ii, C \rightarrow iii, D \rightarrow i$

C. $A \rightarrow iii, B \rightarrow i, C \rightarrow iv, D \rightarrow ii$

D. $A \rightarrow ii, B \rightarrow iii, C \rightarrow i, D \rightarrow iv$

Answer: C

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55. How many structures are possible for C_5H_8 with one triple bond?

A. 4

B. 3

C. 2

D. 1

Answer: B

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56. Identify X and Y in the following

$$\underset{\underset{Br}{|}}{H_2C} - \underset{\underset{Br}{|}}{CH_2} + KOH \xrightarrow{\text{alcohol}} X \xrightarrow{NaNH_2} Y$$

A. $X - CH_3CHBr, Y - CH_2 = CH_2$

B. $X - CH_2OH - CH_2OH, Y - CH_2 = CH_2$

C. $X - CH_2CHBr, Y - CH \equiv CH$

D. $X - CH \equiv CBr, Y - CH \equiv CH$

Answer: C

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57. What happens when calcium carbide is treated with water?

A. Ethane is formed

B. Methane and ethane are formed

C. Ethyne is formed

D. Ethene and ethyne are formed.

Answer: C

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58. One mole of 1,2-dibromopropane on treatment with X moles off $NaNH_2$ followed by treatment with ethyl bromide gave a 2-pentyne. The value of X is

A. one

B. two

C. three

D. four

Answer: C

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59. Which of the following will give 2,2-dibromopropane on reaction with HBr?

A. $CH_2 - CH = CH_2$

B. $CH_3C \equiv CH$

C. $CH_3CH = CHBr$

D. $CH \equiv CH$

Answer: B

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60. The most acidic hydrogen atoms are present in

A. Ethane

B. ethene

C. ethyne

D. benzene

Answer: C

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61. Which of the following alkynes is most acidic?

A. $CH_3C \equiv CH$

B. $CH_3C \equiv CCH_3$

C. $CH_3CH_2C \equiv CH$

D. $CH \equiv CH$

Answer: D

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62. The correct trend of acidic nature of the following alkynes is

A. $CH \equiv CH > CH_3 - C \equiv CH > CH_3C \equiv CCH_3$

B. $CH_3 - C \equiv CH > CH \equiv CH > CH_3C \equiv CCH_3$

C. $CH_3C \equiv CCH_3 > CH_{3-C\equiv CH > CH\equiv CH}$

D. $CH \equiv CH > CH_3C \equiv CCH_3 > CH_3C \equiv CH$

Answer: A

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63. Identify the reagent which can easily distinguish between 1-butyne and 2-butyne.

A. Bromine water

B. Baeyer's reagent

C. Dilute $H_2SO_4 + HgSO_4$

D. Ammoniacal Cu_2Cl_2

Answer: D

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64. Which of the following alkynes can be identified and distinguished from the rest of the alkynes on reaction with ammoniacal silver nitrate to gave a white presipitate?

A. $CH_3C \equiv C - CH_3$

B. $CH_3CH_2C \equiv CH$

C. $CH_3CH_2C \equiv CCH_3$

D. $CH_3C \equiv CCH_2CH_2CH_3$

Answer: B

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65. Which of the following reactions does not show the acidic nature of ethyne?

A. Acetylene reacts with sodamide to form sodium acetylides.

B. When passed through ammoniacal cuprous chloride solution, a red precipitate is formed

C. Acetylene reacts with chloine in the dark to form di or tetrachlorides.

D. Acetylene when passed throguh ammoniacal silver nitrate gives a white precipitate

Answer: C

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66. Identify the product for the following reaction:

$$CH \equiv CH + HOCl \rightarrow$$

A. Cl_2CHCHO

B. $CH(OH) = CHCl$

C. $ClCH_2CH_2OH$

D. CH_3COCl

Answer: A

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67. Complete the following reaction by identifying X and Y.

$$CH_3CH_2C \equiv CH \xrightarrow{NaNH_2} X \xrightarrow{C_2H_5Br} Y$$

A. $X = CH_3CH_2COONa, Y = CH_3CH_2CH = CH_2$

B. $X = CH_3CH_2C \equiv CNa, Y = CH_3CH_2C \equiv CC_2H_5$

C. $X = CH_3CH_2CH_2CH_2Na, Y = CH_3CH_2CH_2CH_3$

D. $X = CH_3CH_2CH \equiv CNa, Y = CH_3CH_2 - \underset{\underset{C_2H_5}{|}}{C}\ H - CH_3$

Answer: B

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68. When 1-butyne undergoes oxymercuraction with the help of $HgSO_4 + H_2SO_4$, the product(s) formed is/are

A. $CH_3CH_2COOH + HCOOH$

B. $CH_3CH_2COCH_3$

C. $CH_3CH_2CH_2COOH$

D. $CH_3CH_2CH_2CHO$

Answer: B

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69. Ozonolysis products of 2-pentyne after decomposition of ozonide with water and subsequent oxidation are

A. ethanoic acid and propanoic acid

B. ethanoic acid and propanone

C. ethanoic acid

D. formic acid and glyoxal

Answer: A

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70. the ozonolysis product(s) of the following reaction is(are) $CH_3CH_2 - C \equiv CH \xrightarrow[(\text{ii})\ H_2O]{(i)\ O_3}$ product(s)

A. CH_3COCH_3

B. $CH_3COCH_3 + HCHO$

C. $CH_3COOH + HCOOH$

D. $CH_3CH_2COOH + HCOOH$

Answer: D

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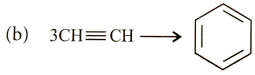
71. Which of the following does not represent polymerisation of alkenes and alkynes?

A. $nCH \equiv Ch \rightarrow (- - CH = CH - CH = CH - -)_n$

B. 

C. $nCH_3 - CH = CH_2 \rightarrow (- - \underset{\underset{CH_3}{|}}{CH} - CH_2 - -)_n$

D. $nCH_2 = CH_2 \rightarrow (- - CH_2 - CH = CH - CH_2 - -)_n$

Answer: D

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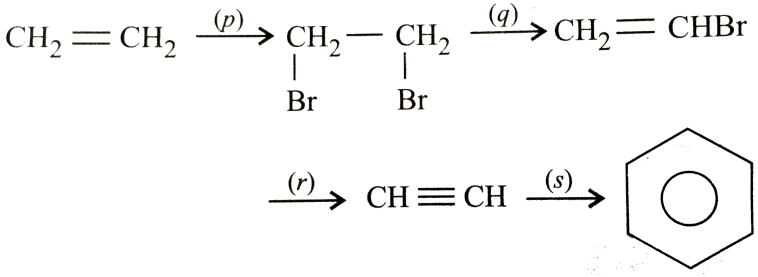
72. Choose the correct reagent used in the conversion.



A. $p - Br_2, q -$ alc. $KOH, r - NaOH, s - Al_2O_3$

B. $p - HBr$, alc. $KOH, r - CaC_2, s - KMnO_4$

C. $p - HBr, q -$ alc. $KOH, r - NaNH_2, s -$ red hot iron tube

D. $p - Br_2, q -$ alc. $KOH, r - NaNH_2, s -$ red hot iron tube

Answer: D

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73. Coal tar is the main source of

A. aromatic compounds

B. alicyclic compounds

C. aliphatic compounds

D. nitro compounds.

Answer: A

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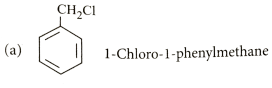
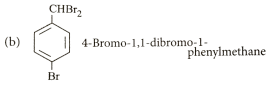
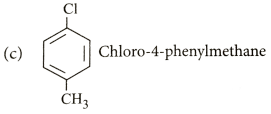
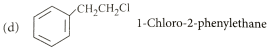
74. Which of the following names is not correctly written in front of the compound?

A. 

B. 

C. 

D. 

Answer: C

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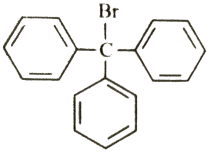
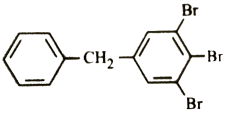
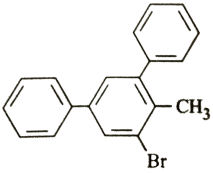
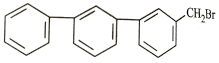
75. The correct structure for triphenylbromomethane is

A. (a) 

B. (b) 

C. (c) 

D. (d) 

Answer: A

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76. Although benzene is highly unsaturated it does not undergo addition reactions. The explanation of this can be suggested as

A. π-electrons of benzene ring are delocalised

B. since π-electrons are present inside the ring, addition cannot take place

C. cyclic structures do not show addition reactions

D. benzene is not a reactive compound.

Answer: A

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77. Fill in the blanks with appropriate words. Benzene has a planar structure. All carbon atoms in benzene are (I)___ hybridised. The ring structure of benzene was proposed by (II)_____. It shows (III)_____substitution reactions. It reacts with (IV)_____in presence of aluminium chloride to form acetophenone.

A. $I - sp^2$,II-Kekule, III-electrolphilic, IV-acetyl chloride

B. $I - sp$, II-Dewar, III-Nucleophilic, IV-chloroethane

C. $I - sp^2$, II-Ladenberg, III-electrophilic, IV-chloroethane

D. $I - sp^2$, II-Baeyer, III-nucleophilic, IV-methyl bromide

Answer: A

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78. Mark the incorrect statement from the following

A. Benzene has a planar structure

B. Benzene is an unsaturated hydrocarbon and shows addition reactions like alkenes.

C. In benzene carbon uses two p-orbitals for hybridisation

D. aromatic hydrocarbons contain high percentage of carbon hence burn with sooty flame.

Answer: B

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79. What is the carbon-carbon bond length in benzene?

A. 1.20 Å and 1.31 Å

B. 1.39 Å

C. 1.39 Å and 1.20 Å

D. 1.20 Å

Answer: B

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80. Benzene easily shows

A. ring fission reactions since it is unstable

B. addition reactions since it is unsaturated

C. electrophilic substitution reactions due to stable ring and high π electron density

D. nucleophilic substitution reactions due to stable ring and minimum electron density.

Answer: C

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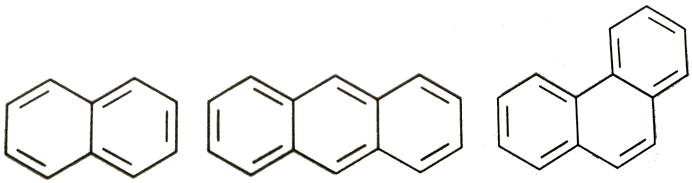
81. Identify the polynuclear aromatic compound which is aromatic.



(i) (ii) (iii)

A. (i) and (ii)

B. (ii) and (iii)

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

D. (i) and (iii)

Answer: C

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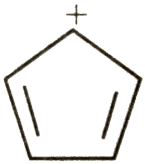
82. Which of the following species is aromatic?

(a)

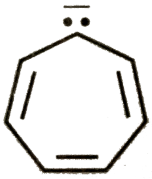


A.

(b)

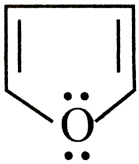
B.

(c)



C.

(d)



D.

Answer: D

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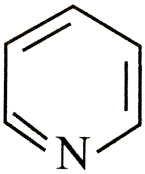
83. Which of the following species does not show aromaticity?

(a)

A.

(b)



B.

(c)

C.

(d) 

D.

Answer: D

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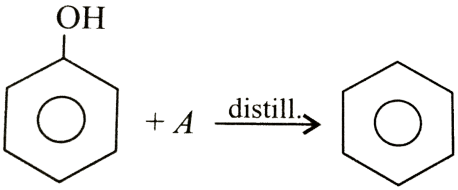
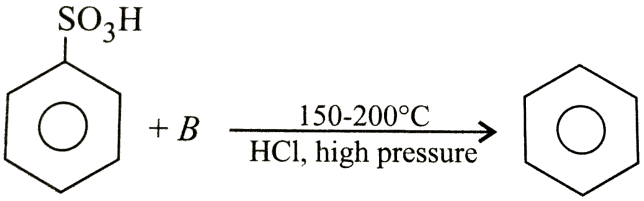
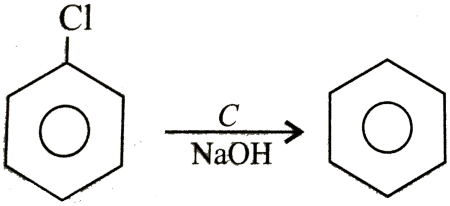
84. Complete the followingg reactions:

(i) 

(ii) 

(iii) 

and identify A, B, C respectively.

A. $A = NI, B = H_2O(\text{liquid}), C = H_2O$

B. $A = Zn, B = H_2O(\text{steam}), C = H(\text{Ni-Al alloy})$

C. $A = Mg, B = H_2O(\text{liquid}), C = HCl$

D. $A = Zn, B = H_2O(\text{boiling}), C = SnCl_2$

Answer: B

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85. Nitration and chlorination of benzene are

A. nucleophilic and electrophilic substitution respectively

B. electrophilic and nucleophilic substitution respectively

C. electrophilic substitution in both the reaction

D. nucleophilic substitution in both the reaction.

Answer: C

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86. Nitration of benzene is carried out with conc. HNO_3 in presence of conc. H_2SO_4. The role of conc. H_2SO_4 is to provide

A. nucleophile during the reaction

B. free radical during the reaction

C. electrophile during the reaction

D. catalyst during the reaction

Answer: C

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87. In halogenation of aromatic hydrocarbon, a halogen carrier is used which is generally a Lewis acid. The main function of this reagent is to generate the species

A. X

B. X^-

C. X^+

D. X^*

Answer: C

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88. The following reaction is known as

$$C_6H_6 + CH_3Cl \xrightarrow[(\text{anhy.})]{AlCl_3} C_6H_5CH_3 + HCl$$

A. Wurtz-Fittig reaction

B. Friedel-Crafts reaction

C. Rosenmund reaction

D. Sandmeyer reaction

Answer: B

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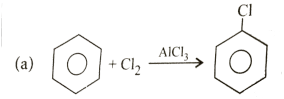
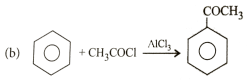
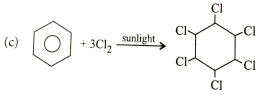
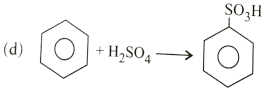
89. Which of the following reactions is not an example of electrophilic substitution in benzene ring?

A. 

B. 

C. 

D. 

Answer: C

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90. Name othe products of the following reactions.

(I). C_6H_6 reacts with methyl chloride in presence of $AlCl_3$.

(II) C_6H_6 reacts with acetyl chloride in presence of $AlCl_3$.

(III) C_6H_6 reacts with fuming nitric acid in presence of conc. H_2SO_4.

(IV). C_6H_6 is catalytically hyddrogenated.

A. I-Chloromethane, II-Toluene, III-Nitrobenzene, IV-n-Hexane

B. I-Methylbenzene, II-Chlorobenzene, III-Phenylnitrite, IV-Trimethylbenzene

C. I-Benzylchloride, II-Trimethylbenzene,III-Trinitroboluene, IV-Toluene

D. I-Toluene, II-Acetophenone, III-Trinitrobenzene, IVCyclohexane

Answer: D

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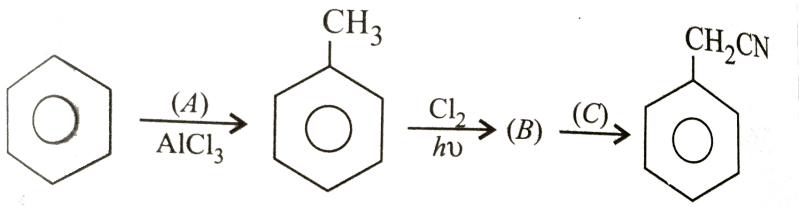
91. Identify the unknown compound.



A. $A \rightarrow CH_3COCl, B \rightarrow C_6H_5Cl, C \rightarrow NaCN$

B. $A \rightarrow CH_3Cl, B \rightarrow C_6H_5CH_2Cl, C \rightarrow KCN$

C. $A \rightarrow CH_4, B \rightarrow C_6H_5CH_2Cl, C \rightarrow AgCN$

D. $A \rightarrow CH_3Cl, B \rightarrow C_6H_5COCl, C \rightarrow KCN$

Answer: B

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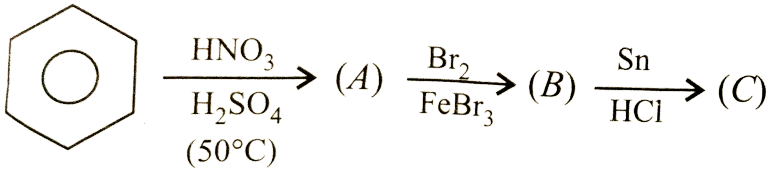
92. Identify the unknown compouds.



A. $A \rightarrow$ Nitrobenzene, $B \rightarrow$ Dinitrobenzene, $C \rightarrow$ p-Bromoaniline

B. $A \rightarrow C_6H_5SO_3H, B \rightarrow m$-Benzenesulphonic acid, $C \rightarrow m-$ Benzenesulphonate

C. $A \rightarrow C_6H_5NO_2, B \rightarrow m$,Bromonitrobenzene, $C \rightarrow m$- Bromoaniline

D. $A \top$ -Nitrobenzene, $B \rightarrow m$-Trinitrobenzene, $C \rightarrow$ m-Bromoaniline

Answer: C

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93. Match the column I with column II and mark the appropriate choice.

	Column I		Column II
(A)	Alkyl halide + Sodium in presence of dry ether	(i)	Sulphonation
(B)	Arene + Acid halide in presence of $AlCl_3$	(ii)	Wurtz reaction
(C)	Arene + Fuming sulphuric acid	(iii)	Catalytic hydrogenation
(D)	Arene + Hydrogen in presence of Ni	(iv)	Friedel–Crafts reaction

A. $A \rightarrow i, B \rightarrow iii, C \rightarrow ii, D \rightarrow iv$

B. $A \rightarrow iv, B \rightarrow ii, C \rightarrow iii, D \rightarrow i$

C. $A \rightarrow iv, B \rightarrow ii, C \rightarrow iii, D \rightarrow i$

D. $A \rightarrow iii, B \rightarrow i, C \rightarrow iv, D \rightarrow ii$

Answer: D

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94. Which of the following steps is not correct in the mechanism of electrophilic substitution of benzene?

A. Generation of electrophile like X^+, R^+, RC^+O, NO_2^+, etc.

B. Attack of electrophile resulting in the formation of arenium ion in which one of the carbon is sp^3 hybridised.

C. Addition of proton on benzene ring to give carbocation.

D. Removal of proton from sp^3 carbon atom to restore aromatic character.

Answer: C

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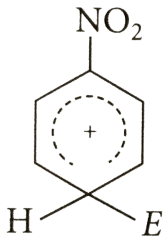
95. The electrophile, E^+ attacks the benzene ring to generate the intermediate σ-complex. Which σ-complex is of lowest energy?

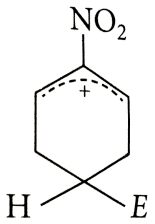
A.

(a)



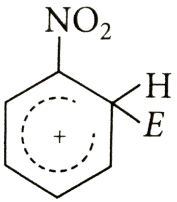
B.

(b)



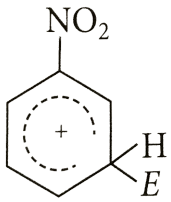
C.

(c)



D.

(d)



Answer: D

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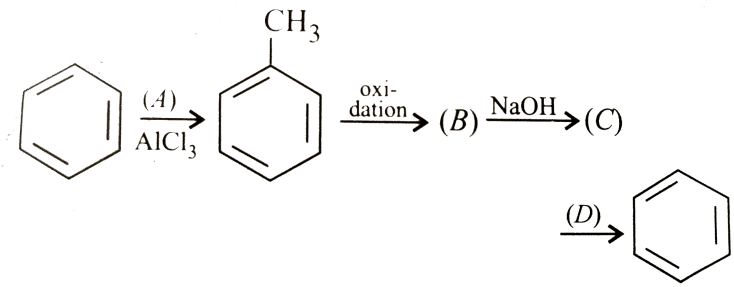
96. Complete the reaction with suitable reagents and compounds.



A.

$$(A) - CH_4, (B) - C_6H_5CHO, (C) - C_6H_5COONa, (D) - CH_4$$

B.

$$(A) - CH_3Cl, (B) - C_6H_5COOH, (C) - C_6H_5COONa, (D) - alc$$

C.

$$(A) - CH_3Cl, (B) - C_6H_5COOH, (C) - C_6H_5COONa, (D) - Na$$

D.

$$(A) = CH_3COCl, (B) - C_6H_5CHO, (C) - C_6H_5COONa, (D) - A$$

Answer: C

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97. Which of the following groups is o-p directing but deactivates benzene ring for electrophilic substitution?

A. $-CH_3$

B. $-NH_2$

C. $-Cl$

D. $-NO_2$

Answer: C

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98. The correct order of reactivity towards electrophilic substitution is

A. benzene > phenol > benzoic acid > chlorobenzene

B. phenol > benzene > chlorobenzene > benzoic acid

C. chlorobenzene > benzoic acid > phenol > benzene

D. benzoic acid > chlorobenzene > benzenegtphenol.

Answer: B

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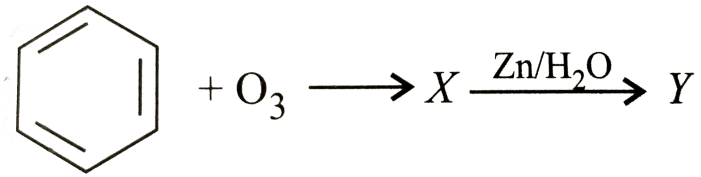
99. similar to alkenes and alkynes benzene also undergoes ozonolysis. In the sequence of the given reaction identify X and Y.



A. X=Triozonide, Y=Glyoxal

B. X-Diozonide, Y=Succinic acid

C. X=Monoozonide, Y=Benzoic acid

D. X=Triozonide, Y=Benzaldehyde.

Answer: A

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100. 1,2-Benzpyrene is

A. a polynuclear hydrocarbon

B. carcinogenic in nature

C. an aromatic hydrocarbon

D. both (a) and (b)

Answer: D

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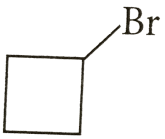
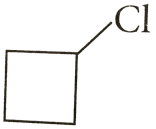
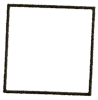
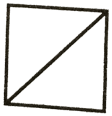
Higher Order Thinkin Skills

1. 1-Bromo-3-chlorocyclobutane is treated with two equivalents of Na, in the presence of ether. Which of the following compounds will be formed.

A. (a) 

B. (b) 

C. (c) 

D. (d) 

Answer: D

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2. $CH_3CH_2CH_2CH_3 \xrightarrow[hv]{Cl_2} \underset{(\text{monochlorination products})}{A+B}$

The approximate ratio of percentage yields of A and B formed in the above reaction is

A. $50:50$

B. $72:28$

C. $45:55$

D. $60:40$

Answer: B

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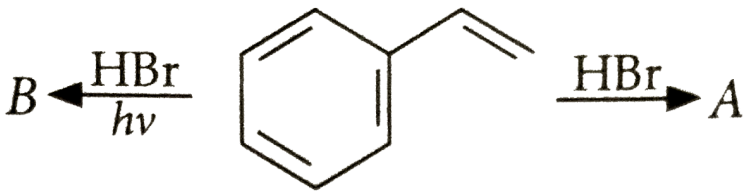
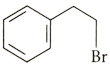
3. Observe the following reactions and predict the products A and B



A. (a) A and B both are 

B. (b) A and B both are 

C. (c) A is  and B is 

D. (d) A is  and B is 

Answer: C

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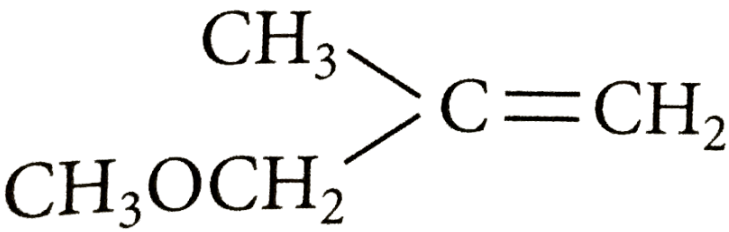
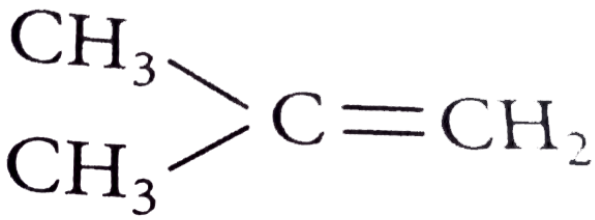
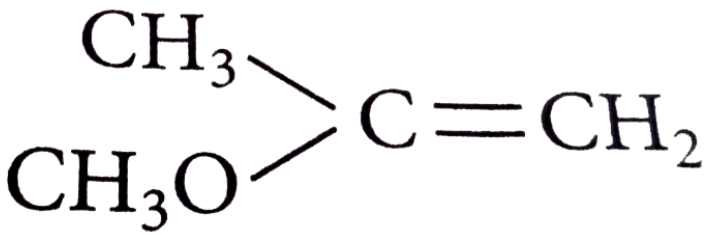
4. Arrange the following alkenes







in decreasing order of their reactivity towards HBr.

A. Igt IIgt III

B. IIgt IIIgt I

C. IIIgt IIgt I

D. IIIgt Igt II

Answer: C

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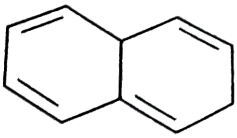
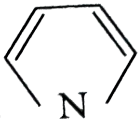
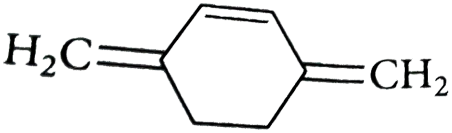
5. Which of the following will exhibit aromatic character?



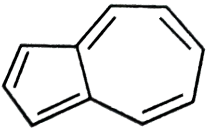
I



II



III



IV

A. I,III

B. III,IV

C. II,IV

D. II,III

Answer: C

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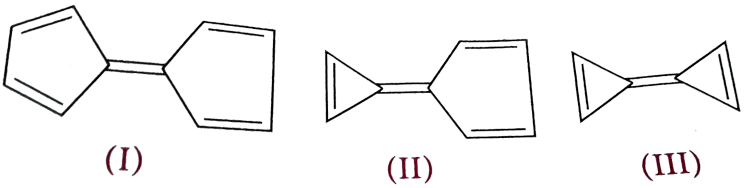
6. Consider the following compounds:



Which compound possesses highest dipole moment?

A. I

B. II

C. Both I and II

D. III

Answer: B

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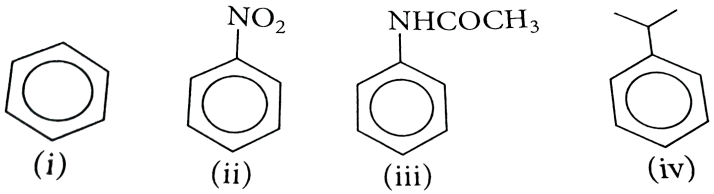
7. Consider the following compounds:



the correct order towards electrophilic substitution reaction is

A. iv>iii>ii>i

B. i>ii>iii>iv

C. iv>iii>i>ii

D. iii>iv>i>ii

Answer: D

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Exemplar Problems

1. Arrange the following in decreasing order of their boiling points:

(I) n-Butane

(II) 2-Methylbutane,

(III) n-Pentane

(IV) 2,2-Dimethylpropane

A. IgtIIgtIIIgtIV

B. IIgtIIIgtIVgtI

C. IVgtIIIgtIIgtI

D. IIIgtIIgtIVgtI

Answer: D

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

A. $R - CL < R - I < R - Br$

B. $R - Cl < R - Br < R - I$

C. $R - I < R - Br < R - Cl$

D. $R - Br < R - I < R - Cl$

Answer: B

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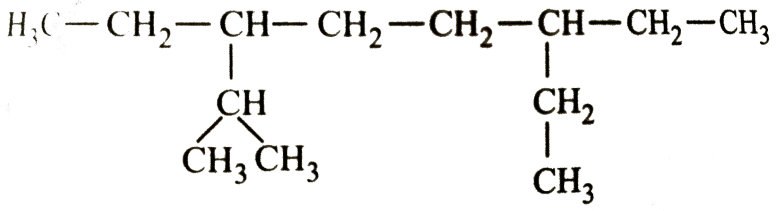
4. The correct IUPAC name of the following alkane is



A. 3,6-diethyl-2-methyloctane

B. 5-isopropyl-3-ethyloctane

C. 3-ethyl-5-isopropyloctane

D. 3-isopropyl-6-ethyloctane

Answer: A

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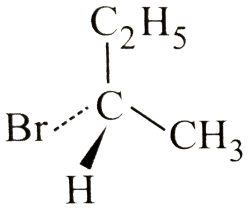
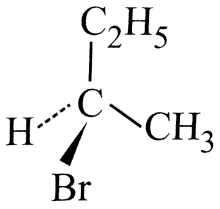
5. The addition off HBr to 1-butene gives a mixture of products (I), (II) and (III):



(I)



(II)

The mixture consists of

A. (I) and (II) as major and (III) as minor products

B. (II) as major, (I) and (III) as minor products

C. (II) as minor, (I) and (III) as major products

D. (I) and (II) as minor and (III) as major products.

Answer: A

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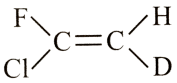
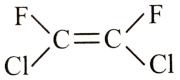
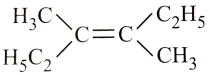
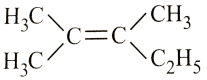
6. Which of the following will not show geometrical isomerism?

A. (a)



B. (b) 

C. (c) 

D. (d) 

Answer: D

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7. Arrange the followingg hydrogen halides in order of their decreasin reactivity with propene.

A. HCl>HBr>HI

B. HBr>HI>HCl

C. HI>HBr>HCl

D. HCl>HI>HBr

Answer: C

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8. Arrange the following carbanions in order of their decreasing stability.

(I) $H_3C - C \equiv C^-$

(II) $H - C \equiv C^-$

(III) $H_3C - CH_2^-$

A. I>II>III

B. IIgtIgtIII

C. III>II>I

D. III>I>II

Answer: B

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9. Arrange the following alkyl halides in decreasing order of the rate of β-elimination reaction with alcoholic KOH.

(I) $CH_3 - \underset{CH_3}{\overset{H}{C}} - CH_3Br$

(II) $CH_3 - CH_2 - Br$

(III) $CH_3 - CH_2 - CH_2 - Br$

A. I>II>III

B. III>II>I

C. II>III>I

D. I>III>II

Answer: D

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10. Which of the followingg reactions of methane is incomplete combustion?

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Assertion Reason

1. Assertion: 2,2-Dimethylbutane does not have any tertiary carbon atom.

Reason: Tertiary carbon atom is attached to three carbon atoms.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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2. Assertion: The reaction, $C_2H_5Br + 2Na + C_2H_5Br \rightarrow C_4H_{10} + 2NaBr$ is known as Wurtz

reaction.

Reason: The reaction is carried out in presence of dry ether.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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3. Assertion: Wurtz reaction is not preferred for the preparation of alkanes containing odd number of carbon atoms.

Reason: It is not possible to prepare alkanes with odd number of carbon atoms through wurtz reaction.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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4. Assertion: Sodium salt of butanoic acid on heating with soda lime gives butane.

Reason: Decarboxylation reaction yields alkanes having same number of carbon atoms as the parent acid.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: D

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5. Assertion: Boiling point of pentane is higher than 2,2-dimethylpropane.

Reason: There is steady increase in boiling point with increase in molecular mass.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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6. Assertion: Iodination of alkanes is carried out in the presence of oxidising agents like HIO_3 or HNO_3.

Reason: Iodination of alkanes is an irreversible reaction.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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7. Assertion: Staggered conformation of ethane is most stable while eclipsed conformation is least stable. ltbr. Reason: Staggered form has the least torsional strain and the eclipsed form has the maximum torsional strain.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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8. Assertion: cis-form of alkene is found to be more polar than the trans-form.

Reason: Since the groups are in opposite directions in the trans-form, the dipole moments of bonds cancel each other making trans-form almost non-polar.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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9. Assertion: Alkenes are easily attacked by electrophilic reagents.

Reason: Alkenes are unstable molecules in comparison to alkenes.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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10. Assertion: Addition of HBr to propene yields 2-bromopropane but in presence of a peroxide it yields 1-bromopropane.

Reason: When reaction is carried out in the presence of a peroxide it

follows free radical mechanism, 2° free radical is more stable than 1° free radical.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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11. Assertion: Decolourisation of $KMnO_4$ solution is used as a test for unsaturation.

Reason: Alkenes on reaction with cold, dilute aqueous solution of potasssium permanganate produce vicinal glycols.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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12. Assertion: Ethyne reacts with sodium metal and sodamide to form sodium acetylide with the liberation of dihydrogen gas.

Reason: Alkynes are highly unsaturated.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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13. Assertion: Cyclopentadienyl anion is aromatic in nature.

Reason: Cyclopentaddienyl anion has six π electrons.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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14. Assertion: The second substituent may enter the mono-substituted benzene ring at either ortho, para or at meta position.

Reason: The position of the incoming group is determined by the natrue fo the group present in monosubstituted benzene ring.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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15. Assertion: In case of aryl halides, halogens are moderately deactivating.

Reason: Halogens are ortho, para directing groups.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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Alkanes

1. Themajor constituent of natural gas is

A. methane

B. propane

C. butane

D. hexane.

Answer: A

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2. The number of chain isomers possible for hydrocarbon C_5H_{12} is

A. 3

B. 5

C. 4

D. 6

Answer: A

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3. Which one of the following gives onlyh one monochloro derivative?

A. neo-Pentane

B. n-Hexane

C. 2-ethylpentane

D. 3-Methylpentane

Answer: A

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4. Wurtz reaction is used to unit

A. two alkyl halides

B. two aryl halides

C. alkyl and aryl halides

D. two benzene units.

Answer: A

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5. Which of the following compounds will react with Na to form 4,5-diethyloctane?

A. $CH_3CH_2CH_2CH_2Br$

B. $CH_3CH_2CH_2 - \underset{\underset{CH_3}{|}}{C}H - CH_2CH_2Br$

C. $CH_3CH_2CH_2CH_2 - \underset{\underset{Br}{|}}{C}H - CH_3$

D. $CH_3CH_2CH_2 - \underset{\underset{Br}{|}}{C}H - CH_2CH_3$

Answer: D

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6. In the reaction, $Cl_2 + CH_4 \xrightarrow{hv} CH_3Cl + HCl$ presence of a small amount of oxygen

A. increases the rate of reaction for a brief period of time

B. decreases the rate of reaction for a brief period of time

C. does not affect the rate of reaction

D. completely stops the reaction

Answer: B

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7. A mixture of 1-iodoethane and 1-iodopropane is treated with sodium metal and dry ether to carry out Wurtz reaction. Which of the following

hydrocarbons will be formed?

A. Propane+Hexane

B. Ethane+Propane

C. Butane+Propane

D. Butane+Pentane+Hexane

Answer: D

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8. Which alkane is produced when sodium salt of butanoic acid is heated with soda lime?

A. CH_3CH_3

B. $CH_3CH_2CH_2CH_3$

C. CH_4

D. $CH_3CH_2CH_3$

Answer: D

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9. Which of the following statements is true?

A. soda lime a mixture of sodium hydroxide and potassium hydroxide.

B. Methane can be prepared by wurtz reaction

C. In alkanes all carbon atoms are sp^3 hybridised.

D. neo-pentane yields three different monochloro derivatives.

Answer: C

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10. Hydrocarbon which is liquid at room temperature is

A. pentane

B. butane

C. propane

D. ethane

Answer: A

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11. Kerosene is a mixture of

A. aromatic hydrocarbons

B. aliphatic hydrocarbons

C. unsaturated hydrocarbons

D. saturated hydrocarbons.

Answer: B

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12. Which of the following has the lowest boiling points?

A. 2-Methylbutane

B. 2-Methylpropane

C. 2,2-Dimethylpropane

D. n-Pentane

Answer: B

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13. Chlorination of alkanes is a photochemical process. It is initiated by the process of

A. heterolysis

B. homolysis

C. pyrolysis

D. hydrolysis

Answer: B

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14. Chlorination of methane does not occur in dark because

A. methane can form free radicals in presence of sunlight ohnly

B. to get chlorine free radicals from Cl_2 molecules energy is required.

It cannot happen in dark

C. substitution reaction can take place only in sunlight and not in dark

D. termination step cannot take place in dark, it requires sunlight.

Answer: B

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15. Ethane is foremd during the formation of chloromethane by chlorinationn of methane because

A. higher members of the hydrocarbons are generally formed during reactions

B. two methyl free radicals may combine during chlorination to give ethane

C. two chloromethane molecule react to form ethane

D. chlorine free radical reacts with methane to give ethane.

Answer: B

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16. Which of the following isomeric heptanes can yield seven differentt monochlorinated products upon free radical chlorination?

A. 2,2-Dimethylpentane

B. 2-methylhexane

C. 3-Methylhexane

D. 2,4-dimethylpentane

Answer: C

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17. An alkane C_6H_{14} gives two monochloro derivatives on chlorination. Its possible structure is

A. $CH_3CH_2CH_2CH_2CH_2CH_3$

B. $CH_3 - \underset{\underset{CH_3}{|}}{C}\ H - CH_2CH_2CH_3$

C. $CH_3 - \underset{\underset{CH_2CH_3}{|}}{C}\ H - CH_2CH_3$

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

Answer: D

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18. During halogenation of alkanes the halogens and alkane show a specific treand. Which of the following statements is not correct?

A. The reactivity of halogens is in the order $F_2 > Cl_2 > Br_2 > I_2$

B. For a given halogen the reactivity of hydrocarbon is in the order of $3^\circ > 2^\circ > 1^\circ$

C. Bromine is less reactive than chlorine towards a particular alkane.

D. On chlorination monosubstituted product is formed while on bromination disubstituted products are formed.

Answer: D

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19. An inhibitor is described as,

A. a substance that slows down or stops a reaction

B. a substnace which inhibits the properties of a catalyst

C. a substance formed during the reaction and does not participate in the reaction

D. a substance which prevents formationn of products in a reaction being most reactive.

Answer: A

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20. Which step is chain propagation step in the following mechanism?

(i) $Cl_2 \xrightarrow{hv} Cl^* + Cl^*$

(ii) $Cl^* + CH_4 \rightarrow .^* CH_3 + HCl$

(iii) $Cl^* + Cl^* \rightarrow Cl_2$

(iv) $.^* CH_3 +^* Cl \rightarrow CH_3Cl$

A. (i)

B. (ii)

C. (iii)

D. (iv)

Answer: B

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21. What happens when methane reacts with conc. HNO_3 at high temperature?

A. Nitromethane is formed

B. Methanol is formed.

C. CO_2 and H_2O are formed.

D. CO and H_2O are formed.

Answer: A

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22. Few reactions of alkanes are given below. Identify the name of the reaction which is not correctly matched with the reaction.

A. $CH_3CH_2CH_2CH_3 \xrightarrow{AlCl_3+HCl} CH_3-\underset{\text{Isomerisation}}{\overset{\overset{CH_3}{|}}{C}H}-CH_3$

B. $C_6H_{14} \xrightarrow{773K} C_4H_8+C_2H_6$ – Pyrolysis

C. $CH_4+2O_2 \xrightarrow{\Delta} CO_2+2H_2O$-Controlled oxidation

D. $CH_4+HNO_3 \xrightarrow{400^\circ C} CH_3NO_2$-Nitration

Answer: C

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23. Which of the following products is formed when n-heptane is passed over $(Al_2O_3+Cr_2O_3)$ catalyst at 773K?

A. Benzene

B. Toluene

C. Polyheptane

D. Cycloheptane

Answer: B

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24. Complete the following reactions:

(i) $C_2H_5I + H_2 \xrightarrow[C_2H_5OH]{Zn-Cu} K$

(ii) $CH_{30COONa+H_2O} \xrightarrow{\text{Electrolysis}} Y$

(iii) $CH_3CH_2CH_2CH_2CH_2CH_3 \xrightarrow[773K]{Cr_2O_3\,/\,Al_2O_3} Z$

A. $X = C_2H_6, Y = C_2H_6, Z = C_6H_6$

B. $X = CH_4, Y = CH_{30COOH}, Z = CH_3CH_3$

C. $X = C_2H_6, Y = CH_4, Z = C_4H_{10}$

D. $X = C_2H_6, Y = CH_4, Z = C_5H_{10}$

Answer: A

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25. In the given reactions:

(i). $CH_3Br \xrightarrow{Na, ether} X \xrightarrow[hv]{Br_2} Y \overset{Na, ether}{} Z$

(ii) $CH_3COOH \xrightarrow{NaOH} X \xrightarrow[CaO]{NaOH} Y \xrightarrow[hv]{Br_2} Z$

Identify, X,Y and Z

A. X-(i) CH_4 (ii) CH_3COONa

Y-CH_3Br, CH_3CH_3

Z-CH_3CH_3, CH_3CH_2Br

B. X-(i) CH_3CH_3 (ii) CH_3COONa

Y-CH_4, CH_4, Z-$CH_3Br, CH_3CH_2CH_3$

C. X-(i) CH_3CH_3 (ii)- CH_3COONa, Y-$CH_4, CH_3CH_3, Z - CH_3CH_3CH_3, CH_3Br$

D. X-(i) CH_3CH_3 (ii) CH_3COONa, Y-CH_3CH_2Br, CH_4 Z-$CH_3CH_2CH_2CH_3, CH_3Br$

Answer: D

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Alkenes

1. 1,3,5,7-Octatetraene contains (X)_____ σ-bonds and (Y)_____π-bonds. 'X' and 'Y' are

A. 23.4

B. 17,4

C. 18,5

D. 33,2

Answer: B

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2. Geometrical isomerism is caused

A. by restricted rotation around C=C bond

B. by the presence of one asymmetric carbon atom

C. due to the differennt groups attached to the same functional group

D. by swing of hydrogenn atom between two divalent atoms.

Answer: A

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3. How many geometrical isomers are possible for the given compound?

$CH_3 - CH = CH - CH = CH - C_2H_5$

A. Four

B. Three

C. Two

D. Five

Answer: A

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4. The alkene that exhibits geometrical isomerism is

A. propene

B. 2-methylpropene

C. 2-butene

D. 2-methyl-2-butene

Answer: C

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5. Which of the following compounds will show cis-trans isomerism?

A. $(CH_3)_2C = CHC_2H_5$

B. $H_2C = CCl_2$

C. $CH_3HC = CClCH_3$

D. $HClC = CH_2$

Answer: C

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6. 2-Bromopentane is treated with alcoholic KOH solution. Whatt will be the major product formed in this reaction and what is the type of elimination called?

A. Pent-1-ene, β-Elimination

B. Pent-2-ene, β-elimination

C. Pent-1-ene, Nucleophilic substitution

D. Pent-2-ene, Nucleophilic substitution.

Answer: B

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7. What is the order of reactivity of hydrogen atoms attached to carbon atom in an alkene?

A. $3^\circ > 1^\circ > 2^\circ$

B. $2^\circ > 1^\circ > 3^\circ$

C. $3^\circ > 2^\circ > 1^\circ$

D. $1^\circ > 2^\circ > 3^\circ$

Answer: C

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8. Dehydrohalogenation involves removal of the halogenn atom together with a hydrogen atom from carbon adjacent to the one with halogen

atom. Alcoholic KOH is used for dehydrohalogenation. According to saytzeff's rule, when two alkenes may be formed, the alkene which is most substituted is the major product.

Q. Arrange the following alkyl halides in decreasing order of the rate of β-elimination reaction with alcoholik KOH.

$$\underset{(i)}{CH_3CH_2CH_2BrCH_3} - \underset{\substack{|\\ CH_3}}{\underset{(ii)}{C}}H - CH_2BrCH_3 - CH_2 - \underset{\substack{|\\ Br}}{\underset{(iii)}{C}}H - CH_3$$

A. iigtiiigti

B. iiigtiigti

C. igtiigtiii

D. iigtigtiii

Answer: B

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9. Dehydrohalogenation involves removal of the halogenn atom together with a hydrogen atom from carbon adjacent to the one with halogen

atom. Alcoholic KOH is used for dehydrohalogenation. According to saytzeff's rule, when two alkenes may be formed, the alkene which is most substituted is the major product.

Q. The ease of dehydrohalogenation for different halogens is in the order

A. iodidegtbromidegtchloride

B. bromidegtiodidegtchloride

C. chloridegtbromidegtiodide

D. iodidegtchloridegtbromide

Answer: A

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10. Dehydrohalogenation involves removal of the halogenn atom together with a hydrogen atom from carbon adjacent to the one with halogen atom. Alcoholic KOH is used for dehydrohalogenation. According to saytzeff's rule, when two alkenes may be formed, the alkene which is

most substituted is the major product.

Q. What are the products of dehydrohalogenation of 2-iodopentane?

A. 2-Pentene(major),1-Pentene (minor)

B. 1-Pentene (major), 2-Pentene (minor)

C. 2-Pentene (50%), 1-Pentene (50%)

D. None of these

Answer: A

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11. The compouhnd formed when alcoholic solution of ethylene dibromide is heated with granualted zinc is

A. ethene

B. ethyne

C. ethane

D. bromoethane

Answer: A

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12. $CH_3CH_2CH_2OH \xrightarrow[170^\circ C]{conc.\ H_2SO_4} A \xrightarrow[500^\circ C]{Cl_2} B.$

A and B. are

A. $A = CH_3CH_2CH_3, B = CH_3CH_2CH_2Cl$

B. $A = CH_3CH = CH_2, B = CH_2ClCH = CH_2$

C. $A = CH_2 = CH_2, B = CH_3CH_2Cl$

D. $A = CH_3CH_2CH_3, B = CH_3CH = CH_2$

Answer: B

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13. Pentene-1 with HCl gives

A. 3-chloropentane

B. 2-chloropentane

C. 1,2-dichloropentane

D. 1-chloropentane.

Answer: B

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14. Which of the following reactions does not show the correct products of the reaction?

A. $CH_3 - CH = CH_2 \xrightarrow[\text{peroxide}]{HBr} CH_3 - CH_2 - CH_2Br$

B. $CH_3 - CH = CH_2 \xrightarrow[\text{peroxide}]{HCl} CH_3 - CH_2 - CH_2Cl$

C. $CH_3 - CH = CH_2 \xrightarrow{HBr} CH_3 - \overset{\overset{Br}{|}}{CH} - CH_3$

D. $CH_3 - CH = CH_2 \xrightarrow{HCl} CH_3 - \underset{\underset{Cl}{|}}{CH} - CH_3$

Answer: B

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15. Presence of unsaturation in organic compounds can be tested with

A. Fehling's reagent

B. Tollen's reagent

C. Baeyer's reagent

D. Fitting's reaction

Answer: C

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16. An alekene X is obtained by dehydration of ann alcohol Y. X on ozonolysis gives two molecules of ethanal for every molecule of alkene. X and Y are

A. X=3-hexene,Y=3-hexanol

B. X=2-butene, Y=2-butanol

C. X=1-butene, Y=1-butanol

D. X=1-hexane, Y=1-hexanol

Answer: B

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17. Propanal-1 and pentan-3-one are the ozonolysis products of an alkene. What is th structural formula of alkene?

A. $CH_3CH_2 - \underset{\underset{CH_2CH_3}{|}}{C} = CH - CH_2CH_3$

B. $CH_3CH_2 - CH = CH - \overset{CH_2CH_3}{\overset{|}{C}} H - CH_3$

C. $CH_3 - \underset{CH_2CH_3}{\underset{|}{C}} = \overset{CH_2CH_3}{\overset{|}{C}} - CH_3$

D. $CH_3CH_2CH_2CH_2 - CH = CH - CH_2CH_3$

Answer: A

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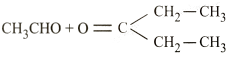
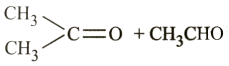
18. An alkene 3-ethylpent-2-ene will give which of the following products on ozonolysis?

A. $HCHO + CH_3CH_2CH_2CHO$

B. 

C. 

D. $CH_3CH_2CHO + CH_3CH_2CH_2CH_2CHO$

Answer: B

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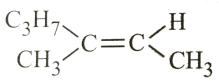
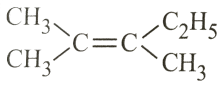
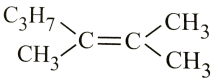
19. An unsaturated hydrocarbon was treated with ozone and resulting ozonide on hydrolysis gives 2-pentanone and acetaldehyde. What is the structure of alkene?

A. $C_3H_7 - CH = CH - CH_3$

B. 

C. 

D. 

Answer: B

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20. An organic compound $C_6H_{12}(X)$ on reduction gives $C_6H_{14}(Y)$. X on ozonolysis gives two aldehydes $C_2H_4O(I)$ and $C_4H_8O(II)$. Identify the

compounds X, Y and aldehydes (I) and (II).

A.

$$X = CH_3CH = CHCH_2CH_2CH_3, Y = CH_3(CH_2)_4CH_3, (I) = CI$$

B.

$$X = CH_3CH_2CH = CHCH_2CH_3, Y = CH_3(CH_2)_4CH_3, (I) = CI$$

C.

$$X = CH_3CH_2CH_2CH = CH_2, Y = CH_3(CH_2)_4CH_3, (I) = HCH$$

D. $X = CH_3(CH_2)_3CH_3, (I) = CH_3CHO, (II) = CH_3CH_2CHO$

Answer: A

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21. Hydrolysis of ozonide of but-1-ene gives

A. ethylene only

B. acetaldehyde and formaldehyde

C. propionaldehyde and formaldehyde

D. acetaldehyde only

Answer: C

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22. Ozonolysis of 2,3-dimethylbut-1-ene followed by reduction with zinc and water gives

A. methanal and hexanoic acid

B. methanoic acid and butanone

C. methanal and 3-methylbutan-2-one

D. butanoic acid and 2,3-diimethylbutanoic acid.

Answer: C

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23. The products for the following reactions are

(i) $CH_3 - \underset{\underset{H}{|}}{\overset{\overset{Br}{|}}{C}} - CH_2 - CH_3 + \text{alc. KOH} \rightarrow X$

(ii) $CH_3 - \underset{\underset{CH_3}{|}}{C}H - CH = CH_2 \xrightarrow{O_3} Y + Z$

A.

$$X = (CH_3)_2C = CH_2, Y = CH_3CH_2CHO, Z = CH_3CH_2CHO$$

B. $X = CH_2 = CH_2, Y = CH_3CHO, Z = CH_3COOH$

C. $X = CH_3 - CH = CH - CH_3$

$$Y = CH_3 - \overset{\overset{CH_3}{|}}{C}H - CHO, Z = HCHO$$

D. $X = CH_3 - CH = C(CH_3)_2, Y = HCHO, Z = CH_3CHO$

Answer: C

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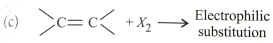
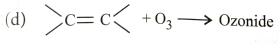
24. The reaction in terms of intermediates and type of reaction is given below. Mark the incorrect option.

A. $CH_3 - \overset{\overset{CH_3}{|}}{C} = CH_2 + HBr \rightarrow$ Carbocation intermediate

B. $CH_3 - \overset{\overset{CH_3}{|}}{C} = CH_2 + HBr \xrightarrow{\text{peroxide}}$ Free radical intermediate

C. 

D. 

Answer: C

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25. A compound X declourises Br_2 water and reacts slowly with conc H_2SO_4 to give an addition product. X reacts with HBr to form Y. Y reacts with NaOH to form Z. on oxidation Z gives hexan-3-one. X, Y and Z in the reactions are

$$\underset{\substack{\downarrow \text{conc. } H_2SO_4 \\ \text{Addition product}}}{X} \xrightarrow{Br_2 \text{ water}} \text{Decolourisation}$$

$$X \xrightarrow{HBr} Y \xrightarrow{NaOH} Z \xrightarrow{[O]} CH_3CH_2CH_2 - \underset{\substack{|| \\ O \\ \text{Hexan-3-one}}}{C} - CH_2CH_3$$

A.

$$X = CH_3CH_2CH = CHCH_3, Y = CH_3CH_2CH(Br)CH(Br)CH_2$$

B.

$$X = CH_3CH = CHCH_3, Y = CH_3CH(Br)CH(Br)CH_3, Z = CH$$

C.

$$X = CH_3CH_2CH = CHCH_2CH_3, Y = CH_3CH_2 - \underset{\substack{| \\ Br}}{CH} - CH_2CH$$

D.

$$X = CH_3CH_2CH_2CH = CHCH_3, Y = CH_3CH_2CH_2CH_2CH_2CH$$

Answer: C

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Alkynes

1. How many structures are possible for C_5H_8 with one triple bond?

A. 4

B. 3

C. 2

D. 1

Answer: B

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2. Identify X and Y in the following

$$\underset{\underset{Br}{|}}{H_2C} - \underset{\underset{Br}{|}}{CH_2} + KOH \xrightarrow{\text{alcohol}} X \xrightarrow{NaNH_2} Y$$

A. $X - CH_3CHBr, Y - CH_2 = CH_2$

B. $X - CH_2OH - CH_2OH, Y - CH_2 = CH_2$

C. $X - CH_2CHBr, Y - CH \equiv CH$

D. $X - CH \equiv CBr, Y - CH \equiv CH$

Answer: C

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3. What happens when calcium carbide is treated with water?

A. Ethane is formed

B. Methane and ethane are formed

C. Ethyne is formed

D. Ethene and ethyne are formed.

Answer: C

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4. One mole of 1,2-dibromopropane on treatment with X moles off $NaNH_2$ followed by treatment with ethyl bromide gave a 2-pentyne. The value of X is

A. one

B. two

C. three

D. four

Answer: C

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5. Which of the following will give 2,2-dibromopropane on reaction with HBr?

A. $CH_2 - CH = CH_2$

B. $CH_3C \equiv CH$

C. $CH_3CH = CHBr$

D. $CH \equiv CH$

Answer: B

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6. The most acidic hydrogen atoms are present in

A. Ethane

B. ethene

C. ethyne

D. benzene

Answer: C

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7. Which of the following alkynes is most acidic?

A. $CH_3C \equiv CH$

B. $CH_3C \equiv CCH_3$

C. $CH_3CH_2C \equiv CH$

D. $CH \equiv CH$

Answer: D

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8. The correct trend of acidic nature of the following alkynes is

A. $CH \equiv CH > CH_3 - C \equiv CH > CH_3C \equiv CCH_3$

B. $CH_3 - C \equiv CH > CH \equiv CH > CH_3C \equiv CCH_3$

C. $CH_3C \equiv CCH_3 > CH_{3-C\equiv CH > CH\equiv CH}$

D. $CH \equiv CH > CH_3C \equiv CCH_3 > CH_3C \equiv CH$

Answer: A

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9. Identify the reagent which can easily distinguish between 1-butyne and 2-butyne.

A. Bromine water

B. Baeyer's reagent

C. Dilute $H_2SO_4 + HgSO_4$

D. Ammoniacal Cu_2Cl_2

Answer: D

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10. Which of the following alkynes can be identified and distinguished from the rest of the alkynes on reaction with ammoniacal silver nitrate to

gave a white presipitate?

A. $CH_3C \equiv C - CH_3$

B. $CH_3CH_2C \equiv CH$

C. $CH_3CH_2C \equiv CCH_3$

D. $CH_3C \equiv CCH_2CH_2CH_3$

Answer: B

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11. Which of the following reactions does not show the acidic nature of ethyne?

A. Acetylene reacts with sodamide to form sodium acetylides.

B. When passed through ammoniacal cuprous chloride solution, a red precipitate is formed

C. Acetylene reacts with chloine in the dark to form di or tetrachlorides.

D. Acetylene when passed throguh ammoniacal silver nitrate gives a white precipitate

Answer: C

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12. Identify the product for the following reaction:

$CH \equiv CH + HOCl \rightarrow$

A. Cl_2CHCHO

B. $CH(OH) = CHCl$

C. $ClCH_2CH_2OH$

D. CH_3COCl

Answer: A

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13. Complete the following reaction by identifying X and Y.

$$CH_3CH_2C \equiv CH \xrightarrow{NaNH_2} X \xrightarrow{C_2H_5Br} Y$$

A. $X = CH_3CH_2COONa, Y = CH_3CH_2CH = CH_2$

B. $X = CH_3CH_2C \equiv CNa, Y = CH_3CH_2C \equiv CC_2H_5$

C. $X = CH_3CH_2CH_2CH_2Na, Y = CH_3CH_2CH_2CH_3$

D. $X = CH_3CH_2CH \equiv CNa, Y = CH_3CH_2 - \underset{\underset{C_2H_5}{|}}{C}H - CH_3$

Answer: B

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14. When 1-butyne undergoes oxymercuraction with the help of $HgSO_4 + H_2SO_4$, the product(s) formed is/are

A. $CH_3CH_2COOH + HCOOH$

B. $CH_3CH_2COCH_3$

C. $CH_3CH_2CH_2COOH$

D. $CH_3CH_2CH_2CHO$

Answer: B

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15. Ozonolysis products of 2-pentyne after decomposition of ozonide with water and subsequent oxidation are

A. ethanoic acid and propanoic acid

B. ethanoic acid and propanone

C. ethanoic acid

D. formic acid and glyoxal

Answer: A

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16. the ozonolysis product(s) of the following reaction is(are)

$CH_3CH_2 - C \equiv CH \xrightarrow[(ii)\ H_2O]{(i)\ O_3}$ product(s)

A. CH_3COCH_3

B. $CH_3COCH_3 + HCHO$

C. $CH_3COOH + HCOOH$

D. $CH_3CH_2COOH + HCOOH$

Answer: D

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17. Which of the following does not represent polymerisation of alkenes and alkynes?

A. $nCH \equiv Ch \rightarrow (- \ - CH = CH - CH = CH - \ -)_n$

B. (b) $3CH \equiv CH \longrightarrow$ 

C. $nCH_3 - CH = CH_2 \rightarrow (- - \underset{\underset{CH_3}{|}}{CH} - CH_2 - -)_n$

D. $nCH_2 = CH_2 \rightarrow (- - CH_2 - CH = CH - CH_2 - -)_n$

Answer: D

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Aromatic Hydrocarbons

1. Coal tar is the main source of

A. aromatic compounds

B. alicyclic compounds

C. aliphatic compounds

D. nitro compounds.

Answer: A

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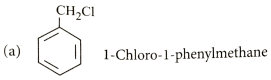
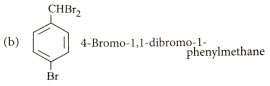
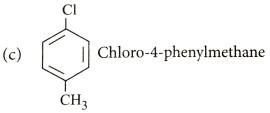
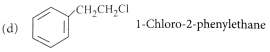
2. Which of the following names is not correctly written in front of the compound?

A. 

B. 

C. 

D. 

Answer: C

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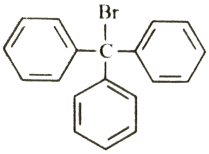
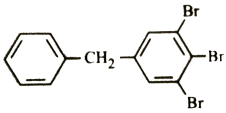
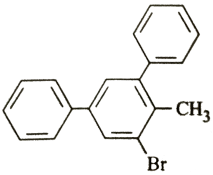
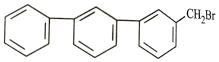
3. The correct structure for triphenylbromomethane is

A. (a) 

B. (b) 

C. (c) 

D. (d) 

Answer: A

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4. Although benzene is highly unsaturated it does not undergo addition reactions. The explanation of this can be suggested as

A. π-electrons of benzene ring are delocalised

B. since π-electrons are present inside the ring, addition cannot take place

C. cyclic structures do not show addition reactions

D. benzene is not a reactive compound.

Answer: A

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5. Fill in the blanks with appropriate words. Benzene has a planar structure. All carbon atoms in benzene are (I)___ hybridised. The ring structure of benzene was proposed by (II)_____. It shows (III)_____substitution reactions. It reacts with (IV)_____in presence of aluminium chloride to form acetophenone.

A. $I - sp^2$,II-Kekule, III-electrolphilic, IV-acetyl chloride

B. $I - sp$, II-Dewar, III-Nucleophilic, IV-chloroethane

C. $I - sp^2$, II-Ladenberg, III-electrophilic, IV-chloroethane

D. $I - sp^2$, II-Baeyer, III-nucleophilic, IV-methyl bromide

Answer: A

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6. Mark the incorrect statement from the following

A. Benzene has a planar structure

B. Benzene is an unsaturated hydrocarbon and shows addition reactions like alkenes.

C. In benzene carbon uses two p-orbitals for hybridisation

D. aromatic hydrocarbons contain high percentage of carbon hence burn with sooty flame.

Answer: B

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7. What is the carbon-carbon bond length in benzene?

A. 1.20 Å and 1.31 Å

B. 1.39 Å

C. 1.39 Å and 1.20 Å

D. 1.20 Å

Answer: B

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8. Benzene easily shows

A. ring fission reactions since it is unstable

B. addition reactions since it is unsaturated

C. electrophilic substitution reactions due to stable ring and high π electron density

D. nucleophilic substitution reactions due to stable ring and minimum electron density.

Answer: C

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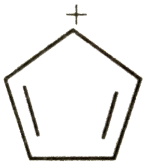
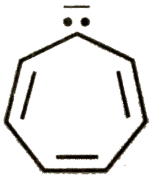
9. Which of the following species is aromatic?

A. (a)

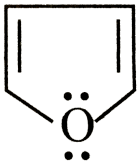


B. (b)

C. (c)



(d)



D.

Answer: D

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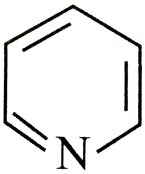
10. Which of the following species does not show aromaticity?

(a)

A.

(b)



B.

(c)

C.

D. (d) 

Answer: D

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11. Nitration and chlorination of benzene are

A. nucleophilic and electrophilic substitution respectively

B. electrophilic and nucleophilic substitution respectively

C. electrophilic substitution in both the reaction

D. nucleophilic substitution in both the reaction.

Answer: C

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12. Nitration of benzene is carried out with conc. HNO_3 in presence of conc. H_2SO_4. The role of conc. H_2SO_4 is to provide

A. nucleophile during the reaction

B. free radical during the reaction

C. electrophile during the reaction

D. catalyst during the reaction

Answer: C

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13. In halogenation of aromatic hydrocarbon, a halogen carrier is used which is generally a Lewis acid. The main function of this reagent is to generate the species

A. X

B. X^-

C. X^{+}

D. X^{*}

Answer: C

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14. The following reaction is known as

$$C_6H_6 + CH_3Cl \xrightarrow[\text{(anhy.)}]{AlCl_3} C_6H_5CH_3 + HCl$$

A. Wurtz-Fittig reaction

B. Friedel-Crafts reaction

C. Rosenmund reaction

D. Sandmeyer reaction

Answer: B

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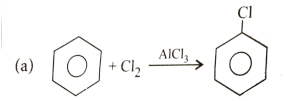
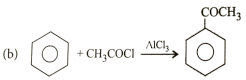
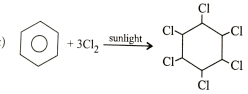
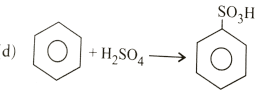
15. Which of the following reactions is not an example of electrophilic substitution in benzene ring?

A. 

B. 

C. 

D. 

Answer: C

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16. Name othe products of the following reactions.

(I). C_6H_6 reacts with methyl chloride in presence of $AlCl_3$.

(II) C_6H_6 reacts with acetyl chloride in presence of $AlCl_3$.

(III) C_6H_6 reacts with fuming nitric acid in presence of conc. H_2SO_4.

(IV). C_6H_6 is catalytically hyddrogenated.

A. I-Chloromethane, II-Toluene, III-Nitrobenzene, IV-n-Hexane

B. I-Methylbenzene, II-Chlorobenzene, III-Phenylnitrite, IV-Trimethylbenzene

C. I-Benzylchloride, II-Trimethylbenzene,III-Trinitroboluene, IV-Toluene

D. I-Toluene, II-Acetophenone, III-Trinitrobenzene, IVCyclohexane

Answer: D

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17. Which of the following steps is not correct in the mechanism of electrophilic substitution of benzene?

A. Generation of electrophile like X^+, R^+, RC^+O, NO_2^+, etc.

B. Attack of electrophile resulting in the formation of arenium ion in which one of the carbon is sp^3 hybridised.

C. Addition of proton on benzene ring to give carbocation.

D. Removal of proton from sp^3 carbon atom to restore aromatic character.

Answer: C

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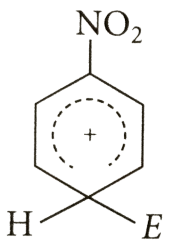
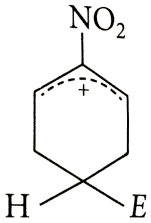
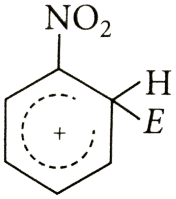
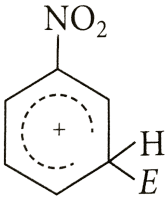
18. The electrophile, E^+ attacks the benzene ring to generate the intermediate σ-complex. Which σ-complex is of lowest energy?

A. (a)



B. (b) 

C. (c) 

D. (d) 

Answer: D

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19. Which of the following groups is o-p directing but deactivates benzene ring for electrophilic substitution?

A. $-CH_3$

B. $-NH_2$

C. $-Cl$

D. $-NO_2$

Answer: C

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20. The correct order of reactivity towards electrophilic substitution is

A. benzene > phenol > benzoic acid > chlorobenzene

B. phenol > benzene > chlorobenzene > benzoic acid

C. chlorobenzene > benzoic acid > phenol > benzene

D. benzoic acid > chlorobenzene > benzenegtphenol.

Answer: B

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21. 1,2-Benzpyrene is

A. a polynuclear hydrocarbon

B. carcinogenic in nature

C. an aromatic hydrocarbon

D. both (a) and (b)

Answer: D

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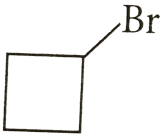
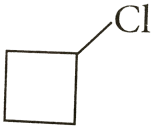
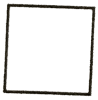
Higher Order Thinking Skills

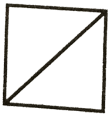
1. 1-Bromo-3-chlorocyclobutane is treated with two equivalents of Na, in the presence of ether. Which of the following compounds will be formed.

A. (a)



B. (b) 

C. (c) 

D. (d) 

Answer: D

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2. $CH_3CH_2CH_2CH_3 \xrightarrow[hv]{Cl_2} \underset{(\text{monochlorination products})}{A+B}$

The approximate ratio of percentage yields of A and B formed in the above reaction is

A. $50:50$

B. $72:28$

C. $45:55$

D. $60:40$

Answer: B

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Ncert Exemplar

1. Arrange the following in decreasing order of their boiling points:

(I) n-Butane

(II) 2-Methylbutane,

(III) n-Pentane

(IV) 2,2-Dimethylpropane

A. IgtIIgtIIIgtIV

B. IIgtIIIgtIVgtI

C. IVgtIIIgtIIgtI

D. IIIgtIIgtIVgtI

Answer: D

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

A. $R - CL < R - I < R - Br$

B. $R - Cl < R - Br < R - I$

C. $R - I < R - Br < R - Cl$

D. $R - Br < R - I < R - Cl$

Answer: B

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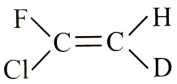
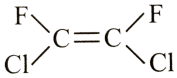
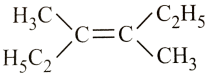
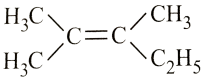
4. Which of the following will not show geometrical isomerism?

A. (a) 

B. (b) 

C. (c) 

D. (d) 

Answer: D

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5. Arrange the followingg hydrogen halides in order of their decreasin reactivity with propene.

A. HCl>HBr>HI

B. HBr>HI>HCl

C. HI>HBr>HCl

D. HCl>HI>HBr

Answer: C

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6. Arrange the following carbanions in order of their decreasing stability.

(I) $H_3C - C \equiv C^-$

(II) $H - C \equiv C^-$

(III) $H_3C - CH_2^-$

A. I>II>III

B. IIgtIgtIII

C. III>II>I

D. III>I>II

Answer: B

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7. Arrange the following alkyl halides in decreasing order of the rate of β-elimination reaction with alcoholic KOH.

(I) $CH_3 - \underset{CH_3}{\overset{H}{C}} - CH_3Br$

(II) $CH_3 - CH_2 - Br$

(III) $CH_3 - CH_2 - CH_2 - Br$

A. I>II>III

B. III>II>I

C. II>III>I

D. I>III>II

Answer: D

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8. Which of the followingg reactions of methane is incomplete combustion?

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Assertion And Reason

1. Assertion: 2,2-Dimethylbutane does not have any tertiary carbon atom.

Reason: Tertiary carbon atom is attached to three carbon atoms.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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2. Assertion: The reaction, $C_2H_5Br + 2Na + C_2H_5Br \rightarrow C_4H_{10} + 2NaBr$ is known as Wurtz reaction.

Reason: The reaction is carried out in presence of dry ether.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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3. Assertion: Wurtz reaction is not preferred for the preparation of alkanes containing odd number of carbon atoms.

Reason: It is not possible to prepare alkanes with odd number of carbon atoms through wurtz reaction.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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4. Assertion: Sodium salt of butanoic acid on heating with soda lime gives butane.

Reason: Decarboxylation reaction yields alkanes having same number of carbon atoms as the parent acid.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: D

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5. Assertion: Boiling point of pentane is higher than 2,2-dimethylpropane.

Reason: There is steady increase in boiling point with increase in molecular mass.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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6. Assertion: Iodination of alkanes is carried out in the presence of oxidising agents like HIO_3 or HNO_3.

Reason: Iodination of alkanes is an irreversible reaction.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: C

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7. Assertion: Staggered conformation of ethane is most stable while eclipsed conformation is least stable. ltbr. Reason: Staggered form has

the least torsional strain and the eclipsed form has the maximum torsional strain.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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8. Assertion: cis-form of alkene is found to be more polar than the trans-form.

Reason: Since the groups are in opposite directions in the trans-form, the

dipole moments of bonds cancel each other making trans-form almost non-polar.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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9. Assertion: Alkenes are easily attacked by electrophilic reagents.

Reason: Alkenes are unstable molecules in comparison to alkenes.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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10. Assertion: Addition of HBr to propene yields 2-bromopropane but in presence of a peroxide it yields 1-bromopropane.

Reason: When reaction is carried out in the presence of a peroxide it follows free radical mechanism, 2° free radical is more stable than 1° free radical.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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11. Assertion: Decolourisation of $KMnO_4$ solution is used as a test for unsaturation.

Reason: Alkenes on reaction with cold, dilute aqueous solution of potasssium permanganate produce vicinal glycols.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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12. Assertion: Ethyne reacts with sodium metal and sodamide to form sodium acetylide with the liberation of dihydrogen gas.

Reason: Alkynes are highly unsaturated.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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13. Assertion: Cyclopentadienyl anion is aromatic in nature.

Reason: Cyclopentaddienyl anion has six π electrons.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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14. Assertion: The second substituent may enter the mono-substituted benzene ring at either ortho, para or at meta position.

Reason: The position of the incoming group is determined by the natrue fo the group present in monosubstituted benzene ring.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: A

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15. Assertion: In case of aryl halides, halogens are moderately deactivating.

Reason: Halogens are ortho, para directing groups.

A. If both assertion and reson are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

Answer: B

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