15. Hydrocarbons – Multiple Choice Questions

1. Alkane

1. Which of the following has highest octane number

(a) *n*-hexane (b) *n*-heptane

(c) *n*-pentane (d) 2, 2, 4-trimethyl pentane

2. The chemical added to leaded petrol to prevent the deposition of lead in the combustion chamber is

(a) Iso-octane (b) Ethylene dibromide

(c) Tetraethyl lead (d) Mercaptan

(e) *n*-heptane

3. Petroleum consists mainly of

(a) Aliphatic hydrocarbons (b) Aromatic hydrocarbons

(c) Aliphatic alcohols (d) None of these

4. Tetraethyl lead is used as

(a) Fire extinguisher (b) Pain reliever

(c) Petroleum additive (d) Mosquito repellent

5. *LPG* is a mixture of

(a) $C_6H_{12} + C_6H_6$ (b) $C_4H_{10} + C_3H_8$

(c) $C_2H_4 + C_2H_2$ (d) $C_2H_4 + CH_4$

6. In the process of cracking

(a) Organic compounds decompose into their constituent elements

(b) Hydrocarbons decompose into carbon and hydrogen

(c) High molecular weight organic compounds decompose to give low molecular weight organic compounds

(d) Hydrocarbons yield alkyl radicals and hydrogen

7. Octane number has 0 value for

(a) Iso-octane (b) *n*-hexane

(c) *n*-heptane (d) Iso-heptane

8. Natural gas is a mixture of

(a) $CO + CO_2$ (b) $CO + N_2$

(c) $CO + H_2 + CH_4$ (d) $CH_4 + C_2H_6 + C_3H_8$

9. Gasoline has composition

(a) $C_8 - C_{12}$ (b) $C_2 - C_5$

(c) $C_6 - C_8$ (d) None of these

10. Which of the following is obtained at lowest temperature by fractional distillation of petroleum

(a) Kerosene (b) Diesel oil

(c) Gasoline (d) Heavy oil

11. The poisonous gas that comes out with petrol burning in a car is

(a) CH_4 (b) C_2H_6

(c) CO_2 (d) CO

12. The marsh gas detector used by miners works on the principle of

(a) Difference in the rates of diffusion of gases

(b) Avogadro's hypothesis

(c) Gay-Lussac's law of gaseous volumes

(d) Berzelius hypothesis

13. The purest form of coal is

(a) Peat (b) Anthracite

(c) Bituminous (d) Lignite

14. The most volatile compound is

(a) 2, 2-dimethyl propane (b) 2-methyl butane

(c) Isobutane (d) *n*-pentane

15. In Wurtz reaction, the reagent used is

(a) *Na* (b) *Na*/liquid NH_3

(c) *Na*/dry ether (d) *Na*/dry alcohol

16. In catalytic reduction of hydrocarbons which catalyst is mostly used

(a) Pt / Ni (b) Pd

(c) SiO_2 (d) Misch metal

17. Which of the following does not give alkane

(a) Reaction of CH_3I with *Na* in ether

(b) Reaction of sodium acetate with sodalime

(c) Electrolysis of concentrated sodium acetate solution

(d) Reaction of ethyl chloride with alco. *KOH*

18. The reagent used in Wolff-Kishner reduction is

(a) $NH_2 - NH_2$ and KOH in ethylene glycol

(b) $Zn - Hg$ / conc. HCl

(c) $NaBH_4$

(d) $Na - Hg / H_2O$

19. To prepare a pure sample of n-hexane using sodium metal as one reactant, the other reactant will be

(a) *n*-propyl bromide

(b) Ethyl bromide and *n*-butyl bromide

(c) Ethyl chloride and *n*-butyl chloride

(d) Methyl bromide and *n* -pentyl chloride

20. Which of the following reactions will not give propane

(a) $CH_3CH_2CH_2Cl \xrightarrow[H_2O]{Mg/ether}$

(b) $CH_3COCl \xrightarrow[H_2O]{CH_3MgX}$

(c) $CH_3CH=CH_2 \xrightarrow[CH_3COOH]{B_2H_6}$

(d) $CH_3\underset{\underset{OH}{|}}{CH}-CH_3 \xrightarrow{P/HI}$

21. A reaction between methyl magnesium bromide and ethyl alcohol gives

(a) Methane (b) Ethane

(c) Propane (d) Butane

22. Methane and ethane both can be obtained in a single step from

(a) CH_3I (b) C_2H_5I

(c) CH_3OH (d) C_2H_5OH

23. Propionic acid is subjected to reduction with hydroiodic acid in the presence of a little *P*, the product formed is

(a) Ethane (b) Propane

(c) Butane (d) None of these

24. In which case butane is formed

(a) $2C_2H_5-Cl+Na$

(b) $C_2H_5COOH+Na_2CO_3$

(c) $CH_2=CH-CH_3+H_2SO_4$

(d) None of these

25. Grignard reagent is not prepared in aqueous medium but prepared in ether medium because the reagent

(a) Reacts with water

(b) Is insoluble in water

(c) Is highly reactive in ether

(d) Becomes inactive in water

26. Propane cannot be prepared from which reaction

(a) $CH_3-CH=CH_2 \xrightarrow[OH^-]{B_2H_6}$

(b) $CH_3CH_2CH_2I \xrightarrow[P]{HI}$

(c) $CH_3CH_2CH_2Cl \xrightarrow{Na}$

(d) None of these

27. The best method for the preparation of 2,2-dimethylbutane is via the reaction of

(a) Me_3CBr and $MeCH_2Br$ in *Na*/ether

(b) $(Me_3C)_2CuLi$ and $MeCH_2Br$

(c) $(MeCH_2)_2CuLi$ and Me_3CBr

(d) Me_3CMgI and $MeCH_2I$

28. The decreasing order of boiling points is

(a) *n*-pentane > iso-pentane > neo-pentane

(b) Iso-pentane > *n*-pentane > neo-pentane

(c) Neo-pentane > iso-pentane > *n*-pentane

(d) *n*-pentane > *neo*-pentane > iso-pentane

29. Halogenation of alkanes is an example of

(a) Electrophilic substitution

(b) Nucleophilic substitution

(c) Free-radical substitution

(d) Oxidation

30. Carbon black, which is used in making printer's ink, is obtained by decomposition of

(a) Acetylene (b) Benzene

(c) Carbon tetrachloride (d) Methane

31. In the dichlorination reaction of propane, mixture of products are obtained. How many isomers, the mixture contains

(a) 2 (b) 3

(c) 4 (d) 5

32. Which hydrocarbon will be most stable

(a) Methane (b) Ethane

(c) Propane (d) Butane

33. *n*-pentane and isopentane can be distinguished by

(a) Br_2 (b) O_3

(c) Conc. H_2SO_4 (d) $KMnO_4$

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

A. n-butane

B. 2-methylbutane

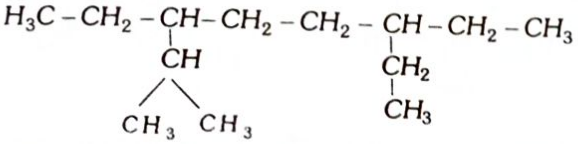
C. n-pentane

D. 2, 2-dimethylpropane

(a) $A > B > C > D$ (b) $B > C > D > A$

(c) $D > C > B > A$ (d) $C > B > D > A$

35. The correct IUPAC name of the following alkane is



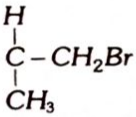
(a) 3, 6-diethyl-2-methyloctane

(b) 5-isopropyl -3-ethyloctane

(c) 3-ethyl-5-isopropyloctane

(d) 3-isopropyl-6-ethyloctane

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

A.  B. $CH_3 - CH_2 - Br$

C. $CH_3 - CH_2 - CH_2 - Br$

(a) $A > B > C$ (b) $C > B > A$

(c) $B > C > A$ (d) $A > C > B$

37. Which of the following reactions of methane is incomplete combustion

(a) $2CH_4 + O_2 \xrightarrow{Cu/523K/100atm} 2CH_3OH$

(b) $CH_4 + O_2 \xrightarrow{Mo_2O_3} HCHO + H_2O$

(c) $CH_4 + O_2 \longrightarrow C(s) + 2H_2O(l)$

(d) $CH_2 + 2O_2 \longrightarrow CO_2(g) + 2H_2O(l)$

38. Water gas is

(a) $CO + CO_2$ (b) $CO + N_2$

(c) $CO + H_2$ (d) $CO + N_2 + H_2$

39. Producer gas is a mixture of

(a) CO and N_2 (b) CO_2 and H_2

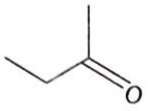
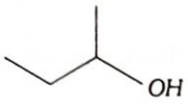
(c) N_2 and O_2 (d) CH_4 and N_2

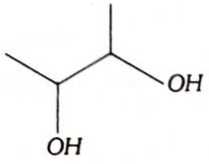
40. Dry distillation of sodium propanoate with sodalime gives

(a) Propane (b) Propene

(c) Ethane (d) Ethene

41. The major product of the reaction of 2 – butene with alkaline $KMnO_4$ solution is

(a)  (b) 

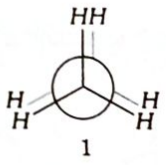
(c)  (d) 

42. Which of the following hydride is capable of showing conformations

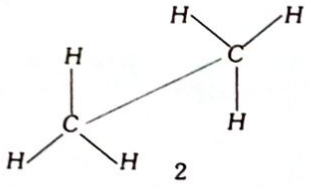
(a) $NH_2 - NH_2$ (b) B_2H_6

(c) CH_4 (d) None of these

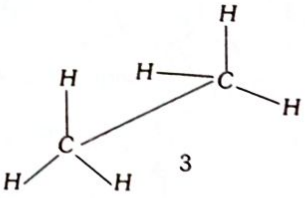
43. Which are the staggered forms of ethane



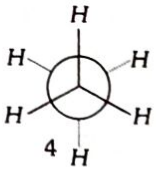
1



2



3



4

(a) 1 and 4 (b) 3 and 4

(c) 2 and 4 (d) 1 and 3

44. Which statement is true for cyclohexane

(a) It has two possible isomers

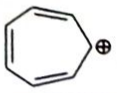
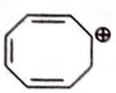
(b) It has three conformations

(c) Boat conformation is most stable

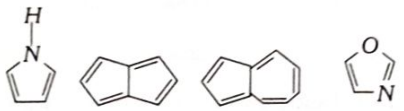
(d) Chair and boat conformations differ in energy by 30 kJ/mol

45. The aromatic carbocation among the following is

(a)  (b) 

(c)  (d) 

46. Among



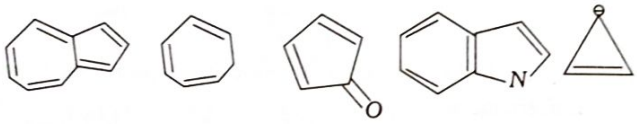
(i) (ii) (iii) (iv)

The compound which is not aromatic is

(a) (i) (b) (ii)

(c) (iii) (d) (iv)

47. Among the following



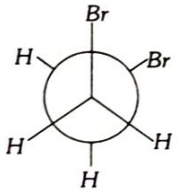
(I) (II) (III) (IV) (V)

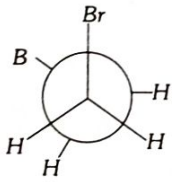
The antiaromatic compounds are

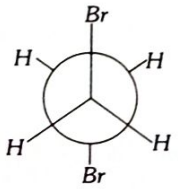
(a) (I) and (IV) (b) (III) and (V)

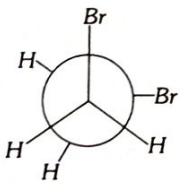
(c) (II) and (V) (d) (I) and (III)

48. The most stable conformation of 2, 3 – dibromobutane is

(a) 

(b) 

(c) 

(d) 

49. Which one of the following conformation of cyclohexane is chiral

(a) Twist boat (b) Rigid

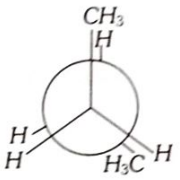
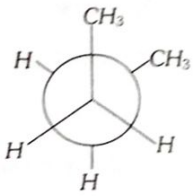
(c) Chair (d) Boat

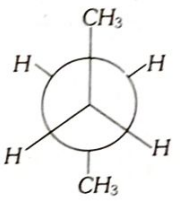
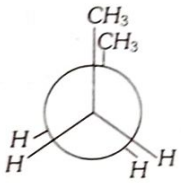
50. Increasing order of stability among the three main conformation (i.e. Eclipse, Anti, Gauche) of 2-fluoroethanol is

(a) Eclipse, Gauche, Anti (b) Gauche, Eclipse, Anti

(c) Eclipse, Anti, Gauche (d) Anti, Gauche, Eclipse

51. In the following, the most stable conformation of n – butane is

(a)  (b) 

(c)  (d) 

52. The correct statement regarding the comparison of staggered and eclipsed conformation of ethane, is

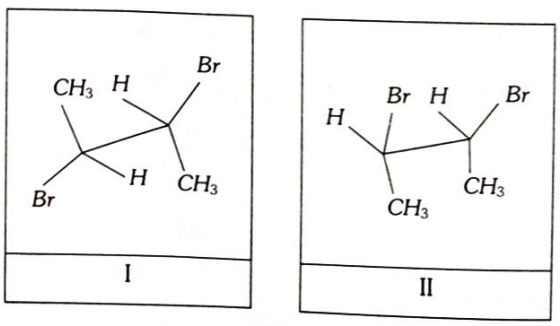
(a) The staggered conformation of ethane is less stable than eclipsed conformation, because staggered conformation has torsional strain

(b) The eclipsed conformation of ethane is more stable than staggered conformation, because eclipsed conformation has no torsional strain

(c) The eclipsed conformation of ethane is more stable than staggered conformation even through the eclipsed conformation has torsional strain

(d) The staggered conformation of ethane is more stable than eclipsed conformation, because staggered conformation has not torsional strain

53. Given



I II

I and II are

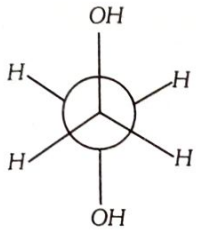
(a) Identical

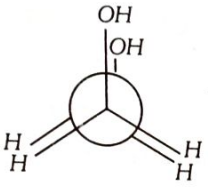
(b) A pair of conformers

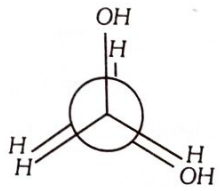
(c) A pair of geometrical isomers

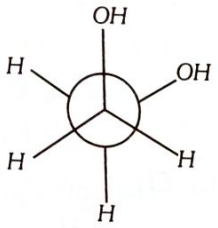
(d) A pair of optical isomers

54. Which of the following conformers for ethylene glycol is most stable

(a) 

(b) 

(c) 

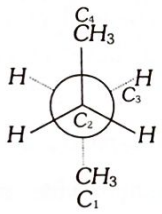
(d) 

55. The isomers which can be converted into another forms by rotation of the molecules around single bond are

(a) Geometrical isomers (b) Conformers

(c) Enantiomers (d) Diastereomers

56. In the given conformation C_2 is rotated about $C_2 - C_3$ bond anticlockwise by an angle of 120° then the conformation obtained is



(a) Fully eclipsed conformation

(b) Partially eclipsed conformation

(c) Gauche conformation

(d) Staggered conformation

2. Alkene

1. The final product formed when ethyl bromide is treated with excess of alcoholic *KOH* is

(a) Ethylene (b) Ethane

(c) Ethyne (d) Vinyl bromide

2. When alcoholic solution of ethylene dibromide is heated with granulated zinc, the compound formed is

(a) Ethylene (b) Ethyne

(c) Cyclobutane (d) Butane

3. A reagent used to test for unsaturation of alkene is

(a) Conc. H_2SO_4 (b) Ammoniacal Cu_2Cl_2

(c) Ammoniacal $AgNO_3$ (d) Solution of Br_2 in CCl_4

4. Which of the following yield both alkane and alkene

(a) Kolbe's reaction (b) Williamson's synthesis

(c) Wurtz reaction (d) Sandmeyer reaction

5. Cyclopentene on treatment with alkaline $KMnO_4$ gives

(a) Cyclopentanol

(b) *Trans* 1, 2-cyclopentanediol

(c) *Cis* 1, 2-cyclopentanediol

(d) 1 : 1 mixture of *cis* and *trans* 1, 2-cyclopentanediol

6. 2-chlorobutane is heated with alcoholic *NaOH*, the product formed in larger amount is

(a) 1-butene (b) 1-butyne

(c) 2-butene (d) All of these

7. What is obtained, when propene is treated with *N*-bromo succinimide

(a) $CH_3 - \underset{\underset{Br}{|}}{C} = CH_2$ (b) $BrCH_2 - CH = CH_2$

(c) $BrCH_2 - CH = CHBr$ (d) $BrCH_2 - \underset{\underset{Br}{|}}{CH} - CH_2Br$

8. $H_3C \diagdown \quad \diagup CH_3$ $\quad C = C \quad \xrightarrow[KOH(heat)]{X}$ $\quad CH_3 \diagdown \quad \diagup CH_3$ $\quad C = O + O = C$

$H_3C \diagup \quad \diagdown CH_3$ $\qquad\qquad\qquad\qquad\qquad\qquad\quad CH_3 \diagup \quad \diagdown CH_3$

X in the above reaction is

(a) HNO_3 (b) O_2

(c) O_3 (d) $KMnO_4$

9. How many *gram* of bromine will react with 21g C_3H_6

(a) 80 (b) 160

(c) 240 (d) 320

10. The molecular formula of Wilkinson catalyst, used in hydrogenation of alkenes is

(a) $Co(CO)_8$ (b) $(Ph_3P)_3RhCl$

(c) $[Pt(NH_3)_2Cl_2]$ (d) $K[Ag(CN)_2]$

11. Arrange the following hydrogen halides in order of their decreasing reactivity with propene

(a) $HCl > HBr > HI$ (b) $HBr > HI > HCl$

(c) $HI > HBr > HCl$ (d) $HCl > HI > HBr$

12. A hydrocarbon X adds on one mole of hydrogen to give another hydrocarbon and decolourises bromine water. X reacts with $KMnO_4$ in presence of acid to give two moles of the same carboxylic acid. The structure of X is

(a) $CH_2 = CH - CH_2CH_2CH_3$

(b) $CH_3CH_2CH_2 - CH = CHCH_3$

(c) $CH_3CH_2CH = CHCH_2CH_3$

(d) $CH_3CH = CHCH_2CH_2CH_3$

13. Which of the following are formed on addition reaction of DCl with 3-methyl-1-butene

(a) $CH_2DCHClCH(CH_3)_2$ (b) $CH_2DCH_2CCl(CH_3)_2$

(c) $CH_3CDClCH(CH_3)_2$ (d) $ClCH_2CHDCH(CH_3)_2$

14. The olefin which on ozonolysis gives CH_3CH_2CHO and CH_3CHO is

(a) 1-butene (b) 2-butene

(c) 1-pentene (d) 2-pentene

15. Addition of HCl does not obey anti-Markownikov's rule because

(a) It is a strong acid (b) It is a gas

(c) Its bond energy is high (d) Its bond energy is less

16. In the following reaction, $RCH_2CH = CH_2 + ICl \rightarrow [A]$

Markownikoff's product [A] is

(a) $RCH_2\underset{\underset{Cl}{|}}{CH} - CH_2I$

(b) $RCH_2 - \underset{\underset{I}{|}}{CH} - CH_2Cl$

(c) $RCH - \underset{\underset{I}{|}}{CH} = CH_2$

(d) $RCH = CH - CH_2I$

17. Presence of peroxides affects the addition of

(a) HBr (b) HCl

(c) HI (d) All of these

18. The product of following reaction is

$$CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - CH = CH_2 \xrightarrow[(ii)\ NaBH_4]{(i)\ Hg(OAc)_2;H_2O}$$

(a) $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - \underset{\underset{OH}{|}}{CH} - CH_3$

(b) $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - CH_2 - CH_2OH$

(c) $CH_3 - \underset{\underset{CH_3}{|}}{\overset{\overset{OH\ CH_3}{|\quad|}}{C}} - \underset{}{CH} - CH_3$

(d) $HOCH_2 - \underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}} - CH_2 - CH_2$

19. Position of double bond in an organic compound is determined by

(a) Ozonolysis (b) Oxidation

(c) Reduction (d) Hydrogenation

20. The major products obtained during ozonolysis of 2, 3–dimethyl–1–butene and subsequent reductions with Zn and H_2O are

(a) Methanoic acid and 2-methyl-2-butanone

(b) Methanal and 3-methyl-2-butanone

(c) Methanol and 2, 2-dimethyl-3-butanone

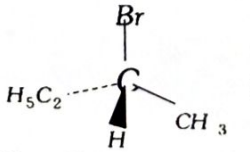
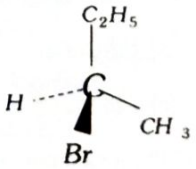
(d) Methanoic acid and 2-methyl-3-butanone

21. The addition of HBr is easiest with

(a) $Cl_2C = CHCl$ (b) $ClCH = CHCl$

(c) $CH_3 - CH = CH_2$ (d) $(CH_3)_2C = CH_2$

22. The addition of HBr to 1-butene gives a mixture of products A, B and C

(A)  (B) 

(C) $CH_3 - CH_2 - CH_2 - CH_2 - Br$

The mixture consists of

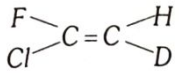
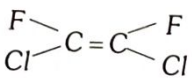
(a) A and B as major and C as minor products

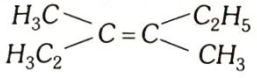
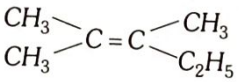
(b) B as major, A and C as minor products

(c) B as minor, A and C as major products

(d) A and B as minor and C as major products

23. Which of the following will not show geometrical isomerism

(a)  (b) 

(c)  (d) 

24. One mole of each of the following alkenes is catalytically hydrogenated. The quantity of heat evolved will be the lowest in the case of

(a) 1-butene (b) trans-2-butene

(c) cis-2-butene (d) 1, 3-butadiene

25. The order of reactivity of alkenes,

$(CH_3)_2C = CH_2, CH_3CH = CH_2, CH_2 = CH_2$

(I) (II) (III)

when subjected to acid catalyzed hydration is

(a) I > II > III (b) I > III > II

(c) III > II > I (d) II > I > III

26. Which of the following compounds represents acrylonitrile

(a) Vinyl cyanide (b) Cyanoethene

(c) Prop-2-ene nitrile (d) All of them

27. The following is a conjugated diene

(a) $CH_3 - CH = C = CH - CH_3$

(b) $CH_2 = CH - CH_2 - CH = CH_2$

(c) $CH_2 = CH - CH_2 - CH_2 - CH = CH_2$

(d) $CH_2 = \underset{\displaystyle CH_3}{\overset{\displaystyle |}{C}} - CH = CH_2$

28. Addition of bromine to 1, 3-butadiene gives

(a) 1, 2 addition product only

(b) 1, 4 addition product only

(c) Both 1, 2 and 1, 4 addition products

(d) No reaction

29. Which of the following order of reagent is chosen to prepare 1, 3-butadiene from C_2H_2

(a) Cu_2Cl_2 / NH_4Cl and $H_2 / Pd(BaSO_4)$

(b) $NH_4Cl / CuCl$ and $H_2 / Pd(BaSO_4)$

(c) $H_2 / Pd(BaSO_4)$ and $CuCl / NH_4Cl$

(d) $H_2 / Pd(BaSO_4)$ and $NH_4Cl / CuCl$

30. An alkyne combines with a conjugated diene to give an unconjugated cycloalkadiene. The most likely title of this reaction is

(a) Schotten–Baumann reaction

(b) Hofmann–Bromasmide reaction

(c) Pinacol– Pinacolone rearrangement

(d) Diels–Alder reaction

31. An alkene given two moles of $HCHO$, one mole of CO_2 and one mole of CH_3COCHO on ozonolysis. What is its structure

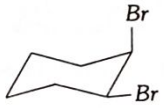
(a) $CH_2 = C = CH - CH_2 - CH_3$

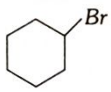
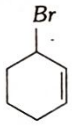
(b) $CH_2 = CH - \underset{\displaystyle CH_3}{\overset{\displaystyle |}{CH}} - CH = CH_2$

(c) $CH_2 = C = \underset{\displaystyle CH_3}{\overset{\displaystyle |}{C}} - CH_3$

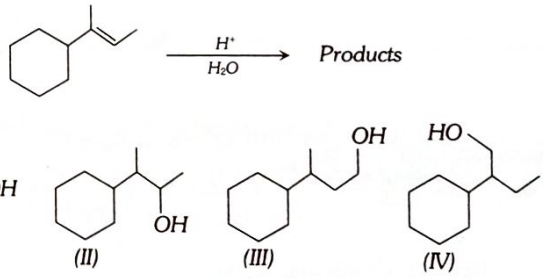
(d) $CH_2 = C = \underset{\displaystyle CH_3}{\overset{\displaystyle |}{C}} - CH = CH_2$

32. Cyclohexene is reacted with bromine in CCl_4 in the dark. The product of the reaction is

(a)  (b) 

(c)  (d) 

33. The major product of the reaction



(a) (I) (b) (II)

(c) (III) (d) (IV)

34. The major product formed when 2–butene is reacted with O_3 followed by treatment with Zn / H_2O is

(a) CH_3COOH (b) CH_3CHO

(c) CH_3CH_2OH (d) $CH_2 = CH_2$

3. Alkyne

1. $CaC_2 + H_2O \longrightarrow X \xrightarrow{O_3 / H_2O / OH^+} HCOOH + HCOOH$, X is

(a) C_2H_4 (b) C_2H_2

(c) C_2H_6 (d) $Ca(OH)_2$

2. What is formed when calcium carbide react with heavy water

(a) C_2D_2 (b) CaD_2

(c) CaD_2O (d) CD_2

3. Which of the following gases is used for welding

(a) Methane (b) Ethane

(c) Acetylene (d) Ethene

4. Identify the alkyne in the following sequence of reactions

$$\text{Alkyne} \xrightarrow[\text{Lindlar's catalyst}]{H_2} A \xrightarrow{\text{Ozonolysis}} \underset{\text{only}}{B} \xleftarrow[\text{Process}]{\text{Wacker}} CH_2 = CH_2$$

(a) $H_3C - C \equiv C - CH_3$

(b) $H_3C - CH_2 - C \equiv CH$

(c) $H_2C = CH - C \equiv CH$

(d) $HC \equiv C - CH_2 - C \equiv CH$

5. $CH_3C \equiv CCH_3 \xrightarrow[(ii)H_2O/Zn]{(i)X} CH_3 - \underset{O}{\overset{||}{C}} - \underset{O}{\overset{||}{C}} - CH_3$

X in the above reaction is

(a) HNO_3 (b) O_2

(c) O_3 (d) $KMnO_4$

6. $[A] \xleftarrow[\text{catalyst}]{\text{lindlar's}} CH_3 - C \equiv C - CH_3 \xrightarrow[\text{liq.}NH_3]{Na \text{ in}} [B]$

[A] and [B] are respectively

(a) Cis, trans-2-butene (b) Both trans-2-butene

(c) Trans, cis-2-butene (d) Both cis-2-butene

7. When 2-butyne is treated with $Pd - BaSO_4$; the product formed will be

(a) $Cis-2-butene$ (b) $Trans-2-butene$

(c) $1-butene$ (d)

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

A. $H_3C - C \equiv C^-$ B. $H - C \equiv C^-$

C. $H_3C - \bar{C}H_2$

(a) $A > B > C$ (b) $B > A > C$

(c) $C > B > A$ (d) $C > A > B$

9. What is the major product of the following reaction

$$CH_3C \equiv C - CH_2 - CH_3 \xrightarrow{1 \text{ mole of } Cl_2}$$

(a) $\begin{matrix} Cl \\ CH_3 \end{matrix} > C = C < \begin{matrix} Cl \\ CH_2CH_3 \end{matrix}$

(b) $CH_3 - CH_2 - \underset{\displaystyle Cl}{\overset{\displaystyle Cl}{\overset{|}{\underset{|}{C}}}} - CH_2CH_3$

(c) $\begin{matrix} Cl \\ CH_3 \end{matrix} > C = C < \begin{matrix} CH_2CH_3 \\ Cl \end{matrix}$

(d) $CH_3 - \underset{\displaystyle Cl}{\overset{\displaystyle Cl}{\overset{|}{\underset{|}{C}}}} - \underset{\displaystyle Cl}{\overset{\displaystyle Cl}{\overset{|}{\underset{|}{C}}}} - CH_2CH_3$

10. A compound C_5H_8 which give white ppt. with ammonical $AgNO_3$. A give $(CH_3)_2CHCOOH$ with hot alcoholic $KMnO_4$ then compound is

(a) $CH_3CH_2 - CH_2 - CH = CH_2$

(b) $CH_3 - CH_2 - C \equiv CH$

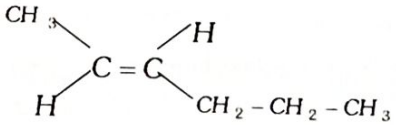
(c) $(CH_3)_2CH - C \equiv CH$

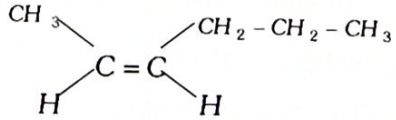
(d) $CH_2 = CH - CH_2 - CH = CH_2$

11. Identify X in the following sequence of reactions

$$CH_3 - \underset{\displaystyle Br}{\overset{|}{CH}} - \underset{\displaystyle Br}{\overset{|}{CH}} - CH_2 - CH_2 - CH_3 \xrightarrow[2.\text{Na in liquid}NH_3]{1.NaNH_2} X$$

(a) $CH_3 - \underset{\displaystyle Br}{\overset{|}{CH}} - \underset{\displaystyle NH_2}{\overset{|}{CH}} - CH_2CH_2CH_3$

(b) 

(c) 

(d) $CH_3 - \underset{\displaystyle NH_2}{\overset{|}{CH}} - \underset{\displaystyle NH_2}{\overset{|}{CH}} - CH_2CH_2CH_3$

12. A compound is treated with $NaNH_2$ to give sodium salt. Identify the compound

(a) C_2H_2 (b) C_6H_6

(c) C_2H_6 (d) C_2H_4

13. If acetylene is passed through an electric arc in the atmosphere of nitrogen, the compound formed is

(a) HCN (b) Pyrrole

(c) Pyrazole (d) Pyridine

14. Acetylene adds on to HCN gives

(a) Acetylene cyanide (b) Cyano acetylene

(c) Vinyl ethene (d) Acrylonitrile

15. Catalyst used in dimerisation of acetylene to prepare chloroprene is

(a) $HgSO_4 + H_2SO_4$ (b) Cu_2Cl_2

(c) $Cu_2Cl_2 + NH_4Cl$ (d) $Cu_2Cl_2 + NH_4OH$

16. $CH \equiv CH \xrightarrow[H_2SO_4]{H_2O/Hg^{2+}} X \xrightarrow{LiAlH_4} Y \xrightarrow{P_4/Br_2} Z$ Here Z is

(a) Ethylene bromide (b) Ethanol

(c) Ethyl bromide (d) Ethylidene bromide

17. $CH \equiv CH \xrightarrow[\text{Pressure}]{Ni(CN)_2} X$. Here X in the reaction

(a) Benzene (b) Ethane

(c) Cyclooctatetraene (d) Cyclohexane

18. $\begin{matrix} CH \\ \| \\ CH \end{matrix}$ reacts with acetic acid in presence of Hg^{2+} to give

(a) $\begin{matrix} CH_3 \\ | \\ CH(CH_3COO)_2 \end{matrix}$ (b) $\begin{matrix} CH(CH_3COO)_2 \\ | \\ CH(CH_3COO)_2 \end{matrix}$

(c) $\begin{matrix} CH_3 \\ | \\ CH_2(CH_3COO) \end{matrix}$ (d) None of these

19. In the following reaction $HC \equiv CH \xrightarrow[Hg^{2+}]{H_2SO_4} 'P'$

Product 'P' will not give

(a) Tollen's reagent test (b) Brady's reagent test

(c) Victor Meyer test (d) Iodoform test

20. The structure of the product(Z) in the reactions given below

$HC \equiv CH \xrightarrow[H^+]{NaNH_2, CH_3COCH_3} X \xrightarrow[H_2O]{Hg^{2+}, H_3O^+} Z$ is

(a) $CH_3 - CH_2 - CH_2 - \overset{\overset{O}{\|}}{C} - CH_2OH$

(b) $CH_3 - \underset{\underset{O}{\|}}{C} - \overset{\overset{CH_3}{|}}{CH} - CH_2OH$

(c) $CH_3 - \underset{\underset{O}{\|}}{C} - \overset{\overset{CH_3}{|}}{\underset{\underset{OH}{|}}{C}} - CH_3$

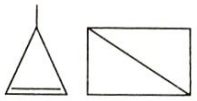
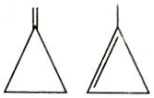
(d) $CH_3 - CHOH - \overset{\overset{CH_3}{|}}{CH} - CHO$

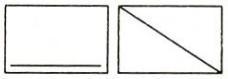
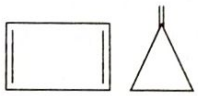
21. $CH \equiv CH \xrightarrow[H_2SO_4]{HgSO_4} \xrightarrow[H_2O]{CH_3MgBr} \xrightarrow{P/Br_2}$

(a) $CH_3CH(Br)CH_3$ (b) $CH_3CH_2CH_2Br$

(c) $CH_2 = CH - Br$ (d) $BrCH = CH - CH_3$

22. Which pair does not represent the cyclic compound of the molecular formula C_4H_6

(a)  (b) 

(c)  (d) 

23. Hydrocarbon C_6H_6 decolourise Br_2 water and gives ppt. with ammoniacal $AgNO_3$. Hydrocarbon can be

(a) 1, 3, 5-cyclohexatriene (b) 1, 5-hexadiyne

(c) 2, 4-hexadiyne (d) None

24. A dibromo derivative of an alkane reacts with sodium metal to form an alicyclic hydrocarbon. The derivative is

(a) 1,1-dibromopropane (b) 2,2-dibromobutane

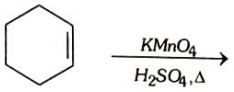
(c) 1,2-dibromoethane (d) 1,4-dibromobutane

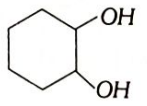
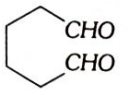
25. The alkene C_6H_{10} producing $OHC - (CH_2)_4 - CHO$ on ozonolysis is

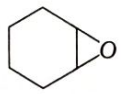
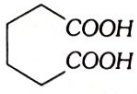
(a) Hexene-1 (b) Hexene-3

(c) Cyclohexene (d) 1-methylcyclohexene-1

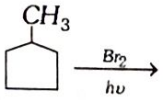
26. The final product in the given reaction is



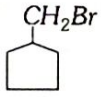
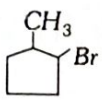
(a)  (b) 

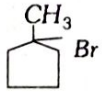
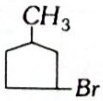
(c)  (d) 

27. In the following reaction,



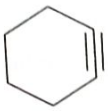
the major product obtained is

(a)  (b) 

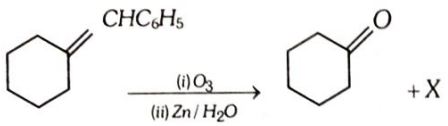
(c)  (d) 

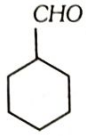
28. Which of the following compounds is the most-stable

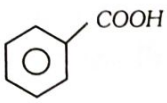
(a)  (b) 

(c)  (d) 

29. Identify the compound X in the following reaction



(a)  (b) 

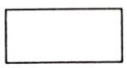
(c)  (d) 

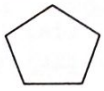
30. The angle strain in cyclobutane is

(a) $19°22'$ (b) $9°44'$

(c) $24°44'$ (d) $29°16'$

31. Which cycloalkane has the lowest heat of combustion per CH_2 group

(a)  (b) 

(c)  (d) 

32. Cyclohexene on reaction with OsO_4 followed by reaction with $NaHSO_3$ gives

(a) *Cis*-diol (b) *Trans*-diol

(c) Epoxy (d) Alcohol

33. Ozonolysis of an alkene produces only one dicarbonyl compound. The structure of the alkene is

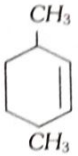
(a) $H_3C-CH=CH-CH_3$

(b) 

(c) 

(d) $CH_3-CH=CH-CH=CH_2$

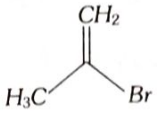
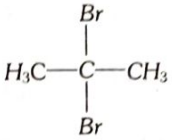
34. Which one of the following on ozonolysis followed by oxidation will give adipic acid

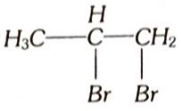
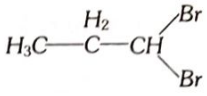
(a)  (b) 

(c)  (d) 

35. The major product in the following reaction is

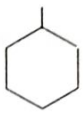
$H_3C-C\equiv C-H+HBr$ (excess)

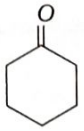
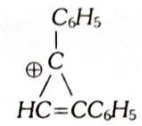
(a)  (b) 

(c)  (d) 

4. Aromatic Hydrocarbon

1. Which compound is aromatic

(a)  (b) 

(c)  (d) 

2. Most common reactions of benzene (aromatic hydrocarbon) and its derivatives are

(a) Electrophilic addition reactions

(b) Electrophilic substitution reactions

(c) Nucleophilic addition reactions

(d) Nucleophilic substitution reactions

3. Aromatic compounds burn with sooty flame because

(a) They have a ring structure of carbon atoms

(b) They have a relatively high percentage of hydrogen

(c) They have a relatively high percentage of carbon

(d) They resist reaction with oxygen of air

4. Three fused benzene rings are found in

(a) Naphthalene (b) Anthracene

(c) Phenanthroline (d) Triphenyl methane

5. Which of the following is aromatic

(a)  (b) 

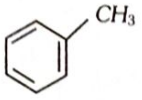
(c)  (d) 

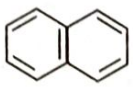
6. Which of the following species is aromatic

(a)  (b) 

(c)  (d) 

7. Which is a non-aromatic compound

(a)  (b) 

(c)  (d) 

8. In the following reaction, the product '*R*' is

$$CaC_2 \xrightarrow{H_2O} P \xrightarrow[\text{tube}]{\text{hot iron}} Q \xrightarrow[AlCl_3]{CH_3Cl} R$$

(a) Benzene (b) Ethylbenzene

(c) Toluene (d) *n*-propylbenzene

9. Nitration of benzene by nitric acid and sulphuric acid is

(a) Electrophilic substitution (b) Electrophilic addition

(c) Nucleophilic substitution (d) Free radical substitution

10. Benzene can be obtained by heating either benzoic acid with X or phenol with Y. X and Y are respectively

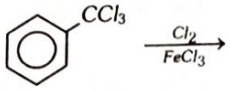
(a) Zinc dust and soda lime

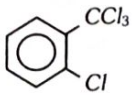
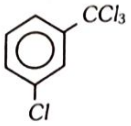
(b) Soda lime and zinc dust

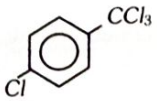
(c) Zinc dust and sodium hydroxide

(d) Soda lime and copper

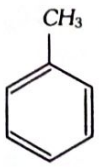
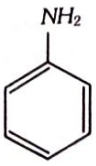
11. Find the major product in the following reaction

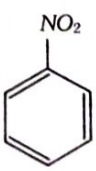
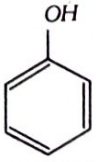


(a)  (b) 

(c)  (d) 

12. Which of the following compounds reacts slower than benzene in electrophilic substitution

(a)  (b) 

(c)  (d) 

13. Acylation of benzene to produce aliphatic aromatic ketones is known as

(a) Benzoin condensation (b) Hydroformylation

(c) Clemmensen reduction (d) Friedel-Craft's reaction

14. Which of the following group activates the benzene ring most towards electrophilic substitution

(a) $-CHO$ (b) $-NR_2$

(c) $-NHCOCH_3$ (d) $-NO_2$

15. The compound 'A' when treated with HNO_3 (in presence of H_2SO_4) gives compound 'B' which is then reduced with *Sn* and *HCl* to aniline. The compound 'A' is

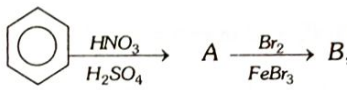
(a) Toluene (b) Benzene

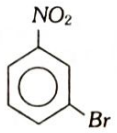
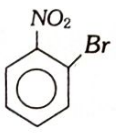
(c) Ethane (d) Acetamide

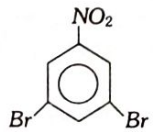
16. Chlorobenzene is *o,p*-directing in electrophilic substitution reaction. The directing influence is explained by

(a) $+M$ of *Ph* (b) $+I$ of *Cl*

(c) $+M$ of *Cl* (d) $+I$ of *Ph*

17.  The compound *B* is

(a)  (b) 

(c)  (d) 

18. Friedel – Craft reaction is not related with

(a) Sulphonation (b) Nitration

(c) Acylation (d) Reduction

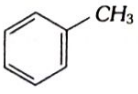
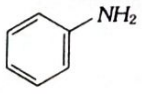
19. Which one of the following reactions is most suitable for the preparation of *n*-propyl benzene

(a) Friedel-Craft's reaction (b) Wurtz reaction

(c) Wurtz-Fittig reaction (d) Grignard reaction

20. Which of the following does not respond to Friedel Craft reaction

(a)  (b) 

(c)  (d) 

21. Propyne on polymerisation gives

(a) Mesitylene (b) Benzene

(c) Ethyl benzene (d) Propyl benzene

22. Xylenes on oxidation with acidic $KMnO_4$ gives

(a) Terphthalic acid (b) Phthalic acid

(c) Isophthalic acid (d) All of these

23. The product formed when toluene is heated in light with Cl_2 and in absence of halogen carrier is

(a) Benzotrichloride (b) Gammexane

(c) Chlorobenzene (d) None of these

24. What is the end product which is obtained on the nitration of toluene

(a) o-nitrotoluene (b) p-nitrotoluene

(c) 2, 4-dinitrotoluene (d) 2, 4, 6-trinitrotoluene

25. An equimolar mixture of toluene and chlorobenzene is treated with a mixture of conc. H_2SO_4 and conc. HNO_3. Indicate the correct statement from the following

(a) p – nitrotoluene is formed in excess

(b) Equimolar amounts of p – nitrotoluene and p – nitrochlorobenzene are formed

(c) p – nitrochlorobenzene is formed in excess

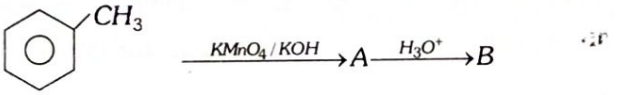
(d) m – nitrochlorobenzene is formed in excess

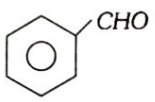
26. Catalytic dehydrogenation of n-heptane in presence of Cr_2O_3 / Al_2O_3 at 750 K gives

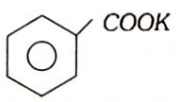
(a) Iso-heptane (b) 1-heptene

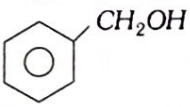
(c) Toluene (d) 2, 3-dimethylpentene-1

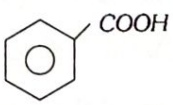
27. The final product formed in this reaction is



(a) 

(b) 

(c) 

(d) 

28. Acylation process is preferred than direct alkylation because (by the Friedel-Craft's reaction)

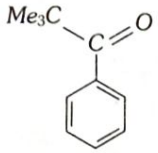
(a) In alkylation, a poisonous gas is evolved

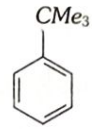
(b) In alkylation, large amount of heat is evolved

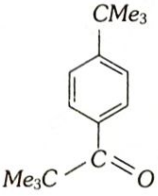
(c) In alkylation, polyalkylated product is formed

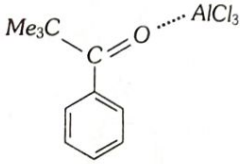
(d) Alkylation is very costly

29. Reaction of benzene with $Me_3C\overset{O}{\overset{\|}{C}}-Cl$ in the presence of anhydrous $AlCl_3$ gives

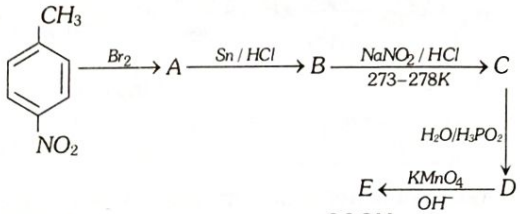
(a) 

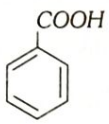
(b) 

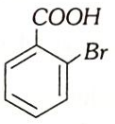
(c) 

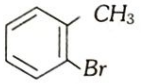
(d) 

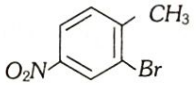
30. Identify the product (E) in the following sequence of reactions



(a) 

(b) 

(c) 

(d) 

31. Friedel– Crafts acylation is

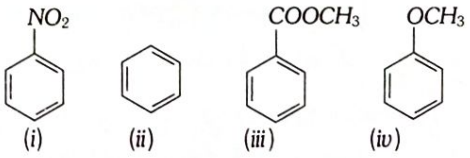
(a) α – acylation of α carbonyl compound

(b) Acylation of phenols to generate esters

(c) Acylation of aliphatic olefins

(d) Acylation of aromatic nucleus

32. In the following set of aromatic compounds

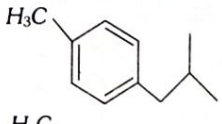


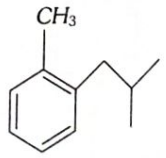
The correct order of reactivity toward Friedel–Crafts alkylation is

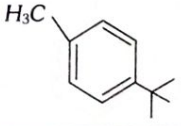
(a) $i > ii > iii > iv$ (b) $ii > iv > iii > i$

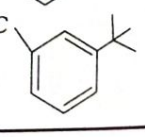
(c) $iv > ii > iii > i$ (d) $iii > i > iv > ii$

33. The major product obtained in the reaction of toluene with 1–bromo–2–methyl propane in the presence of anhydrous $AlCl_3$ is

(a) 

(b) 

(c) 

(d) 

5. IIT-JEE/ AIEEE

1. A mixture of ethyl iodide and *n*-propyl iodide is subjected to Wurtz reaction. The hydrocarbon that will not be formed is **[1990]**

(a) *n*-butane (b) *n*-propane

(c) *n*-pentane (d) *n*-hexane

2. 1-Butene may be converted to butane by reaction with **[2003]**

(a) *Zn-HCl* (b) *Sn-HCl*

(c) *Zn-Hg* (d) Pd/H_2

3. When isobutyl magnesium bromide in dry ether is treated with absolute ethyl alcohol, the products formed are **[1995]**

(a) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2OH$ and CH_3CH_2MgBr

(b) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2-CH_2-CH_3$ and $Mg(OH)Br$

(c) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_3$ and CH_3-CH_2OMgBr

(d) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_3, CH_2=CH_2$ and $Mg(OH)Br$

4. The highest boiling point is expected for **[1986]**

(a) n-butane

(b) Iso-octane

(c) n-octane

(d) 2,2,3,3-tetramethyl butane

5. Which of the following compounds is insoluble even in hot concentrated H_2SO_4 **[1983]**

(a) Ethylene (b) Benzene

(c) Hexane (d) Aniline

6. The number of possible enantiomeric pairs that can be produced during monochlorination of 2-methylbutane is **[1997]**

(a) 2 (b) 3

(c) 4 (d) 1

7. What is the chief product obtained when *n*-butane is treated with bromine in the presence of light at $130^\circ C$ **[1995]**

(a) $CH_3-CH_2-\underset{\displaystyle CH_3}{\underset{|}{CH}}-Br$

(b) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2-Br$

(c) $CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-Br$

(d) $CH_3-CH_2-CH_2-CH_2-Br$

8. Of the five isomeric hexanes, the isomer which can give two monochlorinated compounds is **[2005]**

(a) *n*-hexane (b) 2, 3-dimethylbutane

(c) 2, 2-dimethylbutane (d) 2-methylpentane

9. Which one of the following has the minimum boiling point **[2004]**

(a) 1-butene (b) 1-butyne

(c) *n*-butane (d) Isobutane

10. Main constituent of marsh gas is **[1980]**

(a) C_2H_2 (b) CH_4

(c) H_2S (d) CO

11. Which one of the following compounds gives methane on treatment with water **[1990]**

(a) Al_4C_3 (b) CaC_2

(c) VC (d) SiC

(e) B_4C

12. The major organic compound formed by the reaction of 1, 1, 1 - trichloroethane with silver powder is **[2014]**

(a) Acetylene (b) Ethene

(c) 2-Butyne (d) 2-Butene

13. *n*-propyl bromide on treatment with ethanolic potassium hydroxide produces **[1987]**

(a) Propane (b) Propene

(c) Propyne (d) Propanol

14. Alcoholic solution of *KOH* is used for **[1990]**

(a) Dehydration (b) Dehydrogenation

(c) Dehydrohalogenation (d) Dehalogenation

15. During debromination of meso-dibromobutane, the major compound formed is **[1997]**

(a) *n*-butane (b) 1-butane

(c) *cis*-2-butene (d) *trans*-2-butene

16. The dehydrohalogenation of neopentyl bromide with alcoholic *KOH* mainly gives **[1990]**

(a) 2-methyl-1-butene (b) 2-methyl-2-butene

(c) 2, 2-dimethyl-1-butene (d) 2-butene

17. In the following sequence of reactions, the alkene affords the compound 'B'

$$CH_3CH=CHCH_3 \xrightarrow{O_3} A \xrightarrow[Zn]{H_2O} B$$

The compound B is **[2008]**

(a) CH_3COCH_3 (b) $CH_3CH_2COCH_3$

(c) CH_3CHO (d) CH_3CH_2CHO

18. The halogen which is most reactive in the halogenation of alkenes under sunlight is **[1981]**

(a) Chlorine (b) Bromine

(c) Iodine (d) All equal

19. The product of acid catalyzed hydration of 2-phenyl propene is **[2004]**

(a) 3-phenyl-2-propanol (b) 1-phenyl-2-propanol

(c) 2-phenyl-2-propanol (d) 2-phenyl-1-propanol

20. In which of the following, addition of *HBr* does not take place against Markownikoff's rule **[1985]**

(a) Propene (b) But-1-ene

(c) But-2-ene (d) Pent-2-ene

21. $CH_3-CH=CH_2+NOCl \rightarrow P$. Identify the product **[2006]**

(a) $CH_3-\underset{Cl}{\underset{|}{CH}}-\underset{NO}{\underset{|}{CH_2}}$ (b) $CH_3-\underset{NO}{\underset{|}{CH}}-\underset{Cl}{\underset{|}{CH_2}}$

(c) $CH_3-CH_2-\overset{NO}{\overset{|}{\underset{Cl}{\underset{|}{CH}}}}$ (d) $\underset{NO}{\underset{|}{CH_2}}-CH_2-\underset{Cl}{\underset{|}{CH_2}}$

22. The predominant product formed, when 3-methyl-2-pentene reacts with *HOCl*, is **[1995]**

(a) $CH_3-CH_2-\overset{Cl}{\overset{|}{\underset{CH_3}{\underset{|}{C}}}}-\overset{OH}{\overset{|}{CH}}-CH_3$

(b) $CH_3-CH_2-\overset{Cl}{\overset{|}{\underset{CH_3}{\underset{|}{C}}}}-\overset{Cl}{\overset{|}{CH}}-CH_3$

(c) $CH_3-CH_2-\overset{OH}{\overset{|}{\underset{CH_3}{\underset{|}{C}}}}-\overset{Cl}{\overset{|}{CH}}-CH_3$

(d) $CH_3-\overset{CH_3}{\overset{|}{\underset{CH_3}{\underset{|}{C}}}}-\overset{OH}{\overset{|}{CH}}-CH_3$

23. One mole of a symmetrical alkene on ozonolysis gives two moles of an aldehyde having a molecular mass of 44u. The alkene is **[2010]**

(a) Ethene (b) Propene

(c) 1-butene (d) 2-butene

24. The reaction of propene with *HOCl* proceeds via the addition of **[2001]**

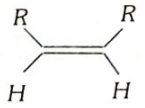
(a) H^+ in the first step

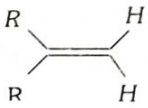
(b) Cl^+ in the first step

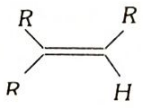
(c) OH^- in the first step

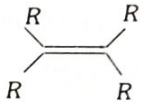
(d) Cl^+ and OH^- in a single step

25. Which one of the following alkenes will react fastest with H_2 under catalytic hydrogenation condition **[2000]**

(a) 

(b) 

(c) 

(d) 

26. The intermediate during the addition of *HCl* to propene in the presence of peroxide is **[1997]**

(a) $CH_3\dot{C}HCH_2Cl$ (b) $CH_3\overset{+}{C}HCH_3$

(c) $CH_3CH_2\dot{C}H_2$ (d) $CH_3CH_2\overset{+}{C}H_2$

27. In the presence of peroxide, hydrogen chloride and hydrogen iodide do not give anti-Markownikov's addition to alkenes because **[2001]**

(a) Both are highly ionic

(b) One is oxidising and the other is reducing

(c) One of the steps is endothermic in both the cases

(d) All the steps are exothermic in both the cases

28. The compound having both *sp* and sp^2 hybridised carbon atom is **[1981]**

(a) Propene (b) Propyne

(c) Propadiene (d) None of these

29. Reaction of one molecule of HBr with one molecule of 1,3-butadiene at $40^{\circ}C$ gives predominantly **[2005]**

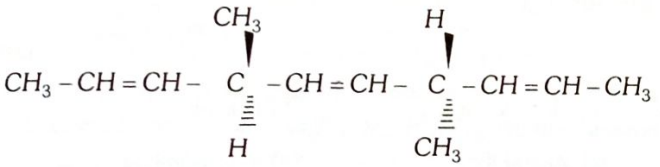
(a) 3-bromobutene under kinetically controlled conditions

(b) 1-bromo-2-butene under thermodynamically controlled conditions

(c) 3-bromobutene under thermodynamically controlled conditions

(d) 1-bromo-2-butene under kinetically controlled conditions

30. The number of optically active products obtained from the **complete** ozonolysis of the given compound is



[2012]

(a) 0 (b) 1

(c) 2 (d) 4

31. 3-Methyl-pent-2-ene on reaction with HBr in presence of peroxide forms an addition product. The number of possible stereoisomers for the product is **[2017]**

(a) Zero (b) Two

(c) Four (d) Six

32. The synthesis of 3-octyne is achieved by adding a bromoalkane into a mixture of sodium amide and an alkyne. The bromoalkane and alkyne respectively are **[2010]**

(a) $BrCH_2CH_2CH_2CH_2CH_3$ and $CH_3CH_2C \equiv CH$

(b) $BrCH_2CH_2CH_3$ and $CH_3CH_2CH_2C \equiv CH$

(c) $BrCH_2CH_2CH_2CH_2CH_3$ and $CH_3C \equiv CH$

(d) $BrCH_2CH_2CH_2CH_3$ and $CH_3CH_2C \equiv CH$

33. A gas formed by the action of alcoholic KOH on ethyl iodide, decolourises alkaline $KMnO_4$ solution. The gas is **[1982]**

(a) CH_4 (b) C_2H_6

(c) C_2H_4 (d) C_2H_2

34. The hydrocarbon which can react with sodium in liquid ammonia is **[2008]**

(a) $CH_3CH_2C \equiv CH$

(b) $CH_3CH = CHCH_3$

(c) $CH_3CH_2C \equiv CCH_2CH_3$

(d) $CH_3CH_2CH_2C \equiv CCH_2CH_2CH_3$

35. In the reaction,

$$CH_3COOH \xrightarrow{LiAlH_4} A \xrightarrow{PCl_5} B \xrightarrow{Alc.KOH} C,$$

the product C is **[2014]**

(a) Acetaldehyde (b) Acetylene

(c) Ethylene (d) Acetyl chloride

36. The treatment of CH_3MgX with $CH_3C \equiv C-H$ produces **[2008]**

(a) $CH_3C \equiv C-CH_3$ (b) $CH_3-\overset{H}{\underset{|}{C}}=\overset{H}{\underset{|}{C}}-CH_3$

(c) CH_4 (d) $CH_3-CH=CH_2$

37. The product(s) obtained via oxymercuration ($HgSO_4 + H_2SO_4$) of 1-butyne would be **[1999]**

(a) $CH_3-CH_2-\overset{O}{\overset{\|}{C}}-CH_3$

(b) $CH_3-CH_2-CH_2-CHO$

(c) $CH_3-CH_2-CHO+HCHO$

(d) $CH_3CH_2COOH+HCOOH$

38. When propyne reacts with aqueous H_2SO_4 in the presence of $HgSO_4$, the major product is **[1983]**

(a) Propanal (b) Propyl hydrogen sulphate

(c) Acetone (d) Propanol

39. Which of the following reactions will yield 2, 2-dibromopropane **[2007]**

(a) $HC \equiv CH + 2HBr \rightarrow$

(b) $CH_3C \equiv CH + 2HBr \rightarrow$

(c) $CH_3CH = CH_2 + HBr \rightarrow$

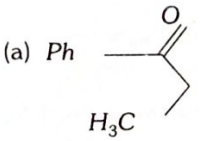
(d) $CH_3CH = CHBr + HBr \rightarrow$

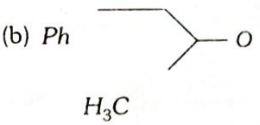
40. 2 – Hexyne gives trans – 2 – Hexene on treatment with **[2012]**

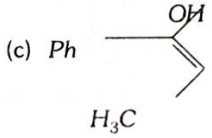
(a) Pt/H_2 (b) Li/NH_3

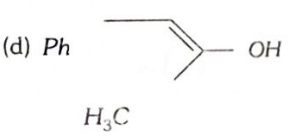
(c) $Pd/BaSO_4$ (d) $LiAlH_4$

41. $Ph-C \equiv C-CH_3 \xrightarrow{Hg^{2+}/H^+} A$. A is **[2002]**

(a) 

(b) 

(c) 

(d) 

42. Which of these will not react with acetylene **[2002]**

(a) $NaOH$ (b) Ammonical $AgNO_3$

(c) Na (d) HCl

43. What is the product when acetylene reacts with hypochlorous acid **[2002]**

(a) CH_3COCl (b) $ClCH_2CHO$

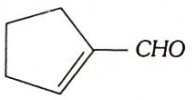
(c) Cl_2CHCHO (d) $ClCHCOOH$

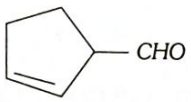
44. The most strained cycloalkane is **[1981]**

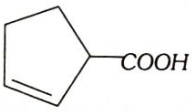
(a) Cyclopropane (b) Cyclobutane

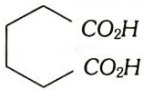
(c) Cyclopentane (d) Cyclohexane

45. Cyclohexene on ozonolysis followed by reaction with zinc dust and water gives compound E. Compound E on further treatment with aqueous KOH yields compound F. Compound F is **[2007]**

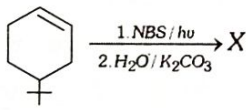
(a) 

(b) 

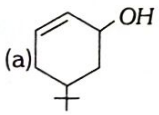
(c) 

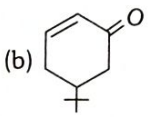
(d) 

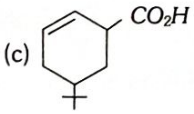
46. The product of the reaction given below is

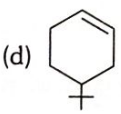


[2016]

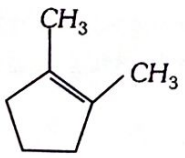
(a) 

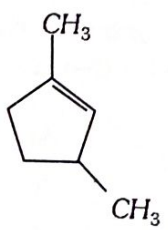
(b) 

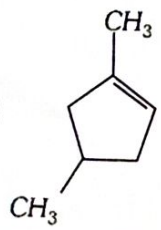
(c) 

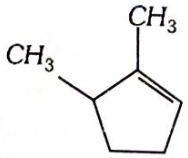
(d) 

47. Which compound would give 5 – keto – 2 – methyl hexanal upon ozonolysis **[2015]**

(a) 

(b) 

(c) 

(d) 

48. The trans–alkenes are formed by the reduction of alkynes with **[2018]**

(a) $Na/liq.NH_3$ (b) $Sn-HCl$

(c) $H_2-Pd/C, BaSO_4$ (d) $NaBH_4$

49. The bond order of individual carbon-carbon bonds in benzene is **[1981]**

(a) One (b) Two

(c) Between one and two (d) One and two, alternately

50. Amongst the following the most basic compound is **[2005]**

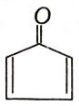
(a) Benzylamine (b) Aniline

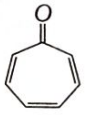
(c) Acetanilide (d) p-nitroaniline

51. Which of the following molecules, in pure form, is (are) unstable at room temperature **[2012]**

(a) 

(b) 

(c) 

(d) 

52. Presence of a nitro group in a benzene ring **[2007]**

(a) Activates the ring towards electrophilic substitution

(b) Renders the ring basic

(c) Deactivates the ring towards nucleophilic substitution

(d) Deactivates the ring towards electrophilic substitution

53. Amongst the following, the compound that can be most readily sulphonated is **[1982]**

(a) Benzene (b) Nitrobenzene

(c) Toluene (d) Chlorobenzene

54. Among the following statements on the nitration of aromatic compounds, the false one is **[1997]**

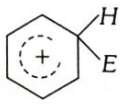
(a) The rate of nitration of benzene is almost the same as that of hexadeuterobenzene

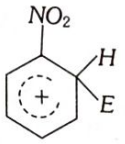
(b) The rate of nitration of toluene is greater than that of benzene

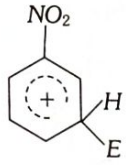
(c) The rate of nitration of benzene is greater than that of hexadeuterobenzene

(d) Nitration is an electrophilic substitution reaction

55. The electrophile, $E^{\oplus}$ attacks the benzene ring to generate the intermediate σ-complex. Of the following, which σ-complex is of lowest energy **[2008]**

(a) 

(b) 

(c) 

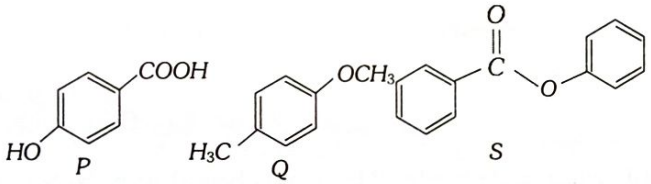
(d) 

56. Nitrobenzene can be prepared from benzene by using a mixture of conc. HNO_3 and conc. H_2SO_4. In the nitrating mixture, HNO_3 acts as a **[1997]**

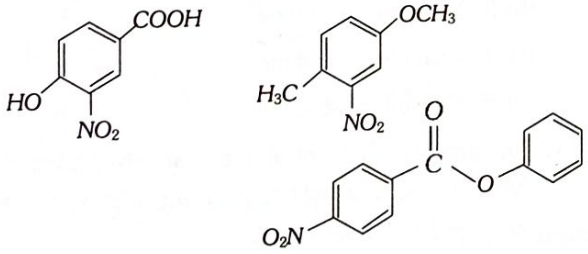
(a) Base (b) Acid

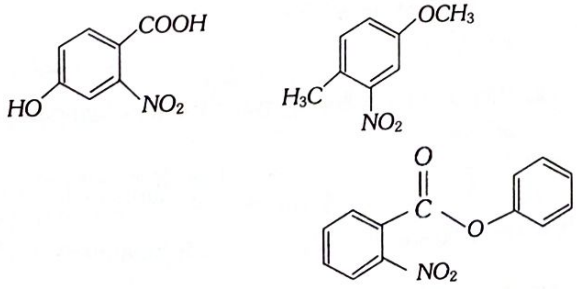
(c) Reducing agent (d) Catalyst

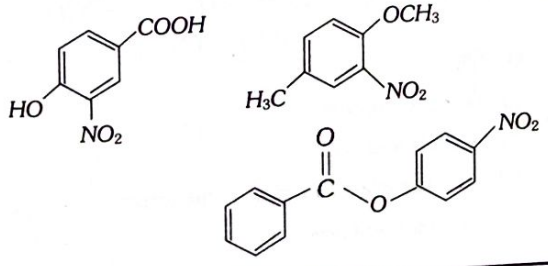
57. The compounds *P*, *Q* and *S*

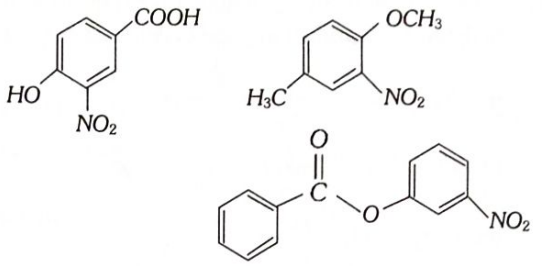


were separately subjected to nitration using HNO_3 / H_2SO_4 mixture. The major product formed in each case respectively, is **[2010]**

(a) 

(b) 

(c) 

(d) 

58. The reaction of toluene with Cl_2 in presence of $FeCl_3$ gives predominantly **[2007]**

(a) Benzoyl chloride (b) Benzyl chloride

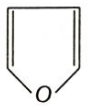
(c) *o*–and *p*–chlorotoluene (d) *m*–chlorotoluene

59. The compound formed as a result of oxidation of ethyl benzene by $KMnO_4$ is **[2007]**

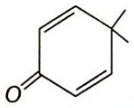
(a) Benzophenone (b) Acetophenone

(c) Benzoic acid (d) Benzyl alcohol

60. Which of the following molecules is least resonance stabilized **[2017]**

(a) 

(b) 

(c) 

(d) 

6. NEET/ AIPMT/ CBSE-PMT

1. In the commercial gasolines, the type of hydrocarbons which are more desirable is **[1997]**

(a) Branched hydrocarbon

(b) Straight-chain hydrocarbon

(c) Linear unsaturated hydrocarbon

(d) Toluene

2. Propane is obtained from propene, by which of the following methods **[2001]**

(a) Wurtz reaction (b) Dehydrogenation

(c) Frankland reaction (d) Catalytic hydrogenation

3. The most important method of preparation of hydrocarbons of lower carbon number is **[1989]**

(a) Pyrolysis of higher carbon number hydrocarbons

(b) Electrolysis of salts of fatty acids

(c) Sabatier and Senderen's reaction

(d) Direct synthesis

4. Which of the following reaction is expected to readily give a hydrocarbon product in good yields **[1997]**

(a) $RCOOK \xrightarrow{\text{Oxidation Electrolysis}}$

(b) $RCOOAg \xrightarrow{I_2}$

(c) $CH_3 - CH_3 \xrightarrow[h\nu]{Cl_2}$

(d) $(CH_3)_2CCl \xrightarrow{C_2H_5OH}$

5. Sample of 2, 3-dibromo-3-methylpentane is heated with zinc dust. The resulting product is isolated and heated with *HI* in the presence of phosphorus. Indicate which is the structure that represent the final organic product formed in the reaction **[1991]**

(a) $CH_3 - CH_2 - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_2 - CH_3$

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

(c) $CH_3 - CHI - \underset{\displaystyle CH_3}{\underset{|}{CH}} - CH_2 - CH_3$

(d) $CH_2 = CH - \underset{\displaystyle CH_3}{\underset{|}{C(I)}} - CH_2 - CH_3$

6. A liquid hydrocarbon can be converted to gaseous hydrocarbon by **[2010]**

(a) Cracking

(b) Hydrolysis

(c) Oxidation

(d) Distillation under reduced pressure

7. With respect to the conformers of ethane, which of the following statements is true **[2017]**

(a) Bond angle remains same but bond length changes

(b) Bond angle changes but bond length remains same

(c) Both bond angle and bond length changes

(d) Both bond angles and bond length remains same

8. Hydrocarbon (*A*) reacts with bromine by substitution to form an alkyl bromide which by Wurtz reaction is converted to gaseous hydrocarbon containing less than four carbon atoms. (*A*) is **[2018]**

(a) $CH \equiv CH$ (b) $CH_2 = CH_2$

(c) $CH_3 - CH_3$ (d) CH_4

9. In the following reactions,

(1) $CH_3 - \underset{\displaystyle OH}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{CH}} - CH}} - CH_3 \xrightarrow{H^+/\text{heat}} \underset{\text{(Major Product)}}{A} + \underset{\text{(Minor Product)}}{B}$

(2) $A \xrightarrow[\text{in absence of peroxide}]{\text{HBr, dark}} \underset{\text{(Major Product)}}{C} + \underset{\text{(Minor Product)}}{D}$

The major products (A) and (C) are respectively **[2011]**

(a) $CH_2 = \underset{\displaystyle CH_3}{\underset{|}{C}} - CH_2 - CH_3$ and $CH_3 - \underset{\displaystyle Br}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C}}}} - CH_2 - CH_3$

(b) $CH_2 = \underset{\displaystyle CH_3}{\underset{|}{C}} - CH_2 - CH_3$ and $\underset{\displaystyle Br}{\underset{|}{CH_2}} - \overset{\displaystyle CH_3}{\overset{|}{CH}} - CH_2 - CH_3$

(c) $CH_3 - \underset{\displaystyle CH_3}{\underset{|}{C}} = CH - CH_3$ and $CH_3 - \underset{\displaystyle Br}{\underset{|}{\overset{\displaystyle CH_3}{\overset{|}{C}}}} - CH_2 - CH_3$

(d) $CH_3 - \underset{\displaystyle CH_3}{\underset{|}{C}} = CH - CH_3$ and $CH_3 - \overset{\displaystyle CH_3}{\overset{|}{CH}} - \underset{\displaystyle Br}{\underset{|}{CH}} - CH_3$

10. When 3, 3-dimethyl-2-butanol is heated with H_2SO_4 the major product obtained is **[1995]**

(a) *Cis* and *trans* isomers of 2, 3-dimethyl-2-butene

(b) 3, 3-dimethyl-1-butene

(c) 2, 3-dimethyl-2-butene

(d) 2, 3-dimethyl-1-butene

11. The disappearance of the characteristic purple colour of $KMnO_4$ in its reaction with an alkene is the test for unsaturation. It is known as **[1990]**

(a) Markownikov's test (b) Baeyer's test

(c) Wurtz's test (d) Grignard test

12. Which of the following is not used to distinguish ethene from ethane **[2002]**

(a) Iodine in CCl_4 (b) Bromine in CCl_4

(c) Alkaline $KMnO_4$ (d) Ammonical Cu_2Cl_2

13. The reaction, $CH_2 = CH_2 + H_2 \xrightarrow[250-300^\circ C]{Ni} CH_3 - CH_3$ is called **[2001]**

(a) Wurtz's reaction

(b) Kolbe's reaction

(c) Sabatier and Senderen's reaction

(d) Carbylamine reaction

14. $H_3C-\underset{\underset{CH_3}{|}}{CH}-CH=CH_2+HBr \rightarrow A$

A (Predominantly) is **[2008]**

(a) $CH_3-\underset{\underset{Br}{|}}{CH}-\underset{\underset{CH_3}{|}}{CH}-CH_3$

(b) $CH_3-\underset{\underset{CH_3}{|}}{CH}-\underset{\underset{Br}{|}}{CH}-CH_3$

(c) $CH_3-\underset{\underset{CH_3}{|}}{CH}-CH_2-CH_2Br$

(d) $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{Br}{|}}{C}}-CH_2CH_3$

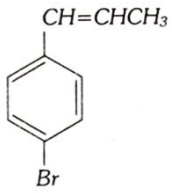
15. Alkene $R-CH=CH_2$ reacts readily with B_2H_6 and the product on oxidation with alkaline hydrogen peroxides produces **[1995]**

(a) $R-CH_2-CHO$ (b) $R-CH_2-CH_2-OH$

(c) $R-\underset{\underset{O}{||}}{C}-CH_3$ (d) $R-\underset{\underset{OH}{|}}{CH}-\underset{\underset{OH}{|}}{CH_3}$

16. The reaction of $C_6H_5CH=CHCH_3$ with HBr produces **[2005; 2015]**

(a) $C_6H_5CH_2\underset{\underset{Br}{|}}{C}HCH_3$ (b) $C_6H_5CH_2CH_2CH_2Br$

(c) 

(d) $C_6H_5\underset{\underset{Br}{|}}{C}HCH_2CH_3$

17. Reaction of HBr with propene in the presence of peroxide gives **[1989, 2004]**

(a) Allyl bromide (b) *n*-propyl bromide

(c) Isopropyl bromide (d) 3-bromo propane

18. Indicate the organic structure for the product expected when 2-methyl propene is heated with acetyl chloride in presence of anhydrous zinc chloride **[1989]**

(a) $CH_3-\underset{\underset{Cl}{|}}{\overset{\overset{CH_3}{|}}{C}}-CH_2-CO-CH_3$

(b) $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{H}{|}}{C}}-CH_2-CO-CH_3$

(c) $CH_3-\overset{\overset{O}{||}}{C}-O-C\begin{matrix}\nearrow Me\\ \rightarrow Me\\ \searrow Me\end{matrix}$

(d) $CH_3-\overset{\overset{O}{||}}{C}-\overset{\overset{CH_3}{|}}{C}=CH_2$

19. The reaction

$CH_2=CH-CH_3+HBr \longrightarrow CH_3CHBr-CH_3$ is **[1996]**

(a) Nucleophilic addition (b) Electrophilic addition

(c) Electrophilic substitution (d) Free radical addition

20. Using anhydrous $AlCl_3$ as catalyst, which one of the following reaction produces ethylbenzene (*PhEt*) **[2004]**

(a) $H_2C=CH_2+C_6H_6$

(b) $H_3C-CH_3+C_6H_6$

(c) $H_3C-CH_2OH+C_6H_6$

(d) $CH_3-CH=CH_2+C_6H_6$

21. Identity Z in the sequence of reactions,

$CH_3CH_2CH=CH_2 \xrightarrow{HBr/H_2O_2} Y \xrightarrow{C_2H_5ONa} Z$ **[2014]**

(a) $CH_3(CH_2)_4-O-CH_3$

(b) $CH_3CH_2-CH(CH_3)-O-CH_2CH_3$

(c) $CH_3-(CH_2)_3-O-CH_2CH_3$

(d) $(CH_3)_2CH_2-O-CH_2CH_3$

22. The compound $CH_3-\underset{\underset{CH_3}{|}}{C}=CH-CH_3$ on reaction with $NaIO_4$ in the presence of $KMnO_4$ gives **[2003]**

(a) $CH_3CHO+CO_2$

(b) CH_3COCH_3

(c) $CH_3COCH_3+CH_3COOH$

(d) $CH_3COCH_3+CH_3CHO$

23. Which of the compounds with molecular formula C_5H_{10} yields acetone on ozonolysis **[2007]**

(a) 2–methyl–2–butene (b) 3–methyl–1–butene

(c) Cyclopentane (d) 2 methyl–1–butane

24. In the following reaction

$$H_3C-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-CH=CH_2 \xrightarrow{H_2O/H^+} \underset{\text{Major Product}}{A} + \underset{\text{Minor Product}}{B}$$

The major product is **[2012]**

(a) $H_3C-\underset{\displaystyle OH}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-\underset{\displaystyle CH_3}{\overset{\displaystyle |}{CH}}-CH_3$ (b) $CH_2-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-CH_2-CH_3$ (with OH on CH_2)

(c) $H_3C-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-\underset{\displaystyle OH}{\overset{\displaystyle |}{CH}}-CH_3$ (d) $H_3C-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-CH_2-\underset{\displaystyle OH}{\overset{\displaystyle |}{CH_2}}$

25. In a reaction

$$CH_2=CH_2 \xrightarrow[\text{acid}]{\text{Hypochlorous}} M \xrightarrow{R} \underset{\displaystyle CH_2-OH}{\overset{\displaystyle CH_2-OH}{|}}$$

Where M = molecule; R = reagent; M and R are

[1997; 2001]

(a) CH_3CH_2Cl and $NaOH$

(b) CH_2Cl-CH_2OH and aq. $NaHCO_3$

(c) CH_3CH_2OH and HCl

(d) $CH_2=CH_2$ and heat

26. Identify the product D in the following series of reaction

$$CH_3COOH \xrightarrow{LiAlH_4} A \xrightarrow[443K]{H^+} B \xrightarrow{Br_2} C \xrightarrow[KOH]{alc.} D$$

[1998]

(a) Methane (b) Alcohol

(c) Acetylene (d) Benzaldehyde

27. $R-CH_2-CCl_2-R \xrightarrow{\text{Reagent}} R-C\equiv C-R$

The reagent is **[1989]**

(a) Na (b) HCl and H_2O

(c) KOH in C_2H_5OH (d) Zn

28. Which is the most suitable reagent among the following to distinguish compound (iii) from rest of the compounds

(i) $CH_3-C\equiv C-CH_3$

(ii) $CH_3-CH_2-CH_2-CH_3$

(iii) $CH_3-CH_2-C\equiv CH$

(iv) $CH_3-CH=CH_2$ **[1989]**

(a) Bromine in carbon tetrachloride

(b) Bromine in acetic acid

(c) Alkaline $KMnO_4$

(d) Ammoniacal silver nitrate reagent

29. Products of the following reaction

$CH_3C\equiv CCH_2CH_3 \xrightarrow[(2)\ Hydrolysis]{(1)\ O_3}$ ..... are **[2005]**

(a) $CH_3CHO+CH_3CH_2CHO$

(b) $CH_3COOH+CH_3CH_2CHO$

(c) $CH_3COOH+HOOCCH_2CH_3$

(d) $CH_3COOH+CO_2$

30. Which of the following reagents will be able to distinguish between 1-butyne and 2-butyne **[2012]**

(a) $NaNH_2$ (b) HCl

(c) O_2 (d) Br_2

31. Predict the product C obtained in the following reaction of butyne–1

$$CH_3CH_2-C\equiv CH+HCl \longrightarrow B \xrightarrow{HI} C$$ **[2007]**

(a) $CH_3-\underset{\displaystyle Cl}{\overset{\displaystyle |}{CH}}-CH_2CH_2I$

(b) $CH_3-CH_2-CH_2-\underset{\displaystyle Cl}{\overset{\displaystyle I}{\overset{|}{\underset{|}{C}}}}-H$

(c) $CH_3-CH_2-\underset{\displaystyle |}{\overset{\displaystyle I}{CH}}-CH_2Cl$

(d) $CH_3CH_2-\underset{\displaystyle Cl}{\overset{\displaystyle I}{\overset{|}{\underset{|}{C}}}}-CH_3$

32. Acetylenic hydrogens are acidic because

[1989]

(a) Sigma electron density of C–H bond in acetylene is nearer to carbon, which has 50% s-character

(b) Acetylene has only one hydrogen on each carbon

(c) Acetylene contains least number of hydrogens among the possible hydrocarbons having two carbons

(d) Acetylene belongs to the class of alkynes with molecular formula C_nH_{2n-2}

33. Which of the following organic compounds has same hybridization as its combustion product $-(CO_2)$ **[2014]**

(a) Ethene (b) Ethanol

(c) Ethane (d) Ethyne

34. The compound that will react most readily with gaseous bromine has the formula **[2016]**

(a) C_2H_4 (b) C_3H_6

(c) C_2H_2 (d) C_4H_{10}

35. In the reaction

$$H-C\equiv CH \xrightarrow[(2)CH_3CH_2Br]{(1)NaNH_2/liq.NH_3} X \xrightarrow[(2)CH_3CH_2Br]{(1)NaNH_2/liq.NH_3} Y$$

X and Y are : **[2016]**

(a) X = 1-Butyne ; Y = 3-Hexyne

(b) X = 2-Butyne ; Y = 3-Hexyne

(c) X = 2-Butyne ; Y = 2-Hexyne

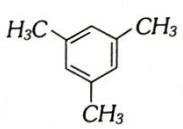
(d) X = 1-Butyne ; Y = 2-Hexyne

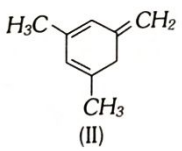
36. Cyclic hydrocarbon molecule A has all the carbon and hydrogens in a single plane. All the carbon-carbon bonds are of same length and less that 1.54 Å but more than 1.34 Å. $C-C-C$ bond angle will be **[1989]**

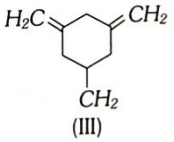
(a) 120^o (b) 180^o

(c) 100^o (d) $109^o28'$

37. Given


(I)


(II)

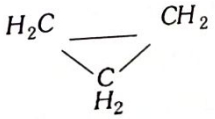

(III)

The enthalpy of hydrogenation of these compounds will be in the order as **[2015]**

(a) III > II > I (b) II > III > I

(c) II > I > III (d) I > II > III

38. Which of the following compounds shall not produce propene by reaction with HBr followed by elimination or direct only elimination reaction **[2016]**

(a) $H_3C-\overset{H_2}{\underset{}{C}}-CH_2Br$ (b) 

(c) $H_3C-\overset{H_2}{\underset{}{C}}-CH_2OH$ (d) $H_2C=C=O$

39. Treatment of cyclopentanone with methyl lithium gives which of the followings species **[2015]**

(a) Cyclopentanonyl cation

(b) Cyclopentanonyl radical

(c) Cyclopentanonyl biradical

(d) Cyclopentanonyl anion

40. Predict the correct intermediate and product in the following reaction

$$H_3C-C\equiv CH \xrightarrow[HgSO_4]{H_2O,H_2SO_4} \underset{(A)}{\text{intermediate}} \longrightarrow \underset{(B)}{\text{product}}$$

[2017]

(a) A : $H_3C-\underset{\underset{SO_4}{|}}{C}=CH_2$ B : $H_3C-\underset{\underset{O}{||}}{C}-CH_3$

(b) A : $H_3C-\underset{\underset{OH}{|}}{C}=CH_2$ B : $CH_3-\underset{\underset{SO_4}{|}}{C}-CH_2$

(c) A : $CH_3-\underset{\underset{O}{||}}{C}-CH_3$ B : $H_3C-C\equiv CH$

(d) A : $H_3C-\underset{\underset{OH}{|}}{C}=CH_2$ B : $H_3C-\underset{\underset{O}{||}}{C}-CH_3$

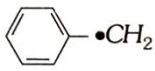
41. Which one is the correct order of acidity **[2017]**

(a) $CH_2=CH_2 > CH_3-CH=CH_2 > CH_3-C\equiv CH > CH\equiv CH$

(b) $CH\equiv CH > CH_3-C\equiv CH > CH_2=CH_2 > CH_3-CH_3$

(c) $CH\equiv CH > CH_2=CH_2 > CH_3-C\equiv CH > CH_3-CH_3$

(d) $CH_3-CH_3 > CH_2=CH_2 > CH_3-C\equiv CH > CH\equiv CH$

42. The radical,  is aromatic because it has **[2013]**

(a) 6p–orbitals and 7 unpaired electrons

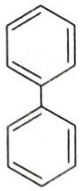
(b) 6p–orbitals and 6 unpaired electrons

(c) 7p–orbitals and 6 unpaired electrons

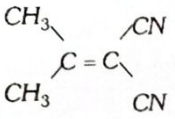
(d) 7p–orbitals and 7 unpaired electrons

43. In which of the following molecules, all atoms are coplanar **[2016]**

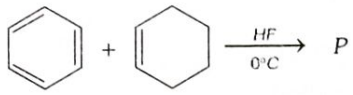
(a) 

(b) 

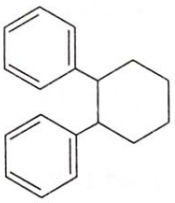
(c) 

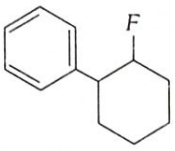
(d) 

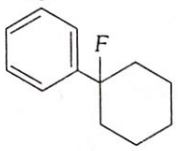
44. In the given reaction

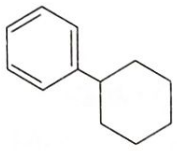


The product P is **[2016]**

(a) 

(b) 

(c) 

(d) 

45. Benzene reacts with CH_3COCl in the presence of $AlCl_3$ to give **[1991]**

(a) C_6H_5Cl (b) C_6H_5COCl

(c) $C_6H_5CH_3$ (d) $C_6H_5COCH_3$

46. Select the true statement about benzene from amongst the following **[1992]**

(a) Because of unsaturation benzene easily undergoes addition reactions

(b) There are two types of C - C bonds in benzene molecule

(c) There is a cyclic delocalisation of π electrons in benzene

(d) Monosubstitution of benzene group gives three isomeric substances

47. Benzene reacts with CH_3Cl in the presence of anhydrous $AlCl_3$ to form **[2009]**

(a) Toluene (b) Chlorobenzene

(c) Benzylchloride (d) Xylene

48. Nitrobenzene on reaction with conc. HNO_3 / H_2SO_4 at $80-100^\circ C$ forms which one of the following products **[2013]**

(a) TNT (b) 1, 3-dinitrobenzene

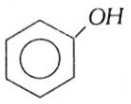
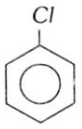
(c) Picric acid (d) 1, 4-dinitrobenzene

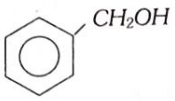
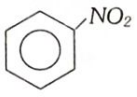
49. Electrophile in the case of chlorination of benzene in the presence of $FeCl_3$ is **[1996]**

(a) Cl^+ (b) Cl^-

(c) Cl (d) $FeCl_3$

50. Which one of the following is most reactive towards electrophilic attack **[2008]**

(a)  (b) 

(c)  (d) 

51. In the nitration of benzene with concentrated HNO_3 and H_2SO_4 the attack on ring is made by **[1994]**

(a) NO_2^- (b) NO_2^+

(c) NO_3^- (d) NO_2

52. Benzene vapour mixed with air when passed over V_2O_5 catalyst at $775K$ gives **[2015]**

(a) Glyoxal (b) Oxalic acid

(c) Maleic anhydride (d) Fumaric acid

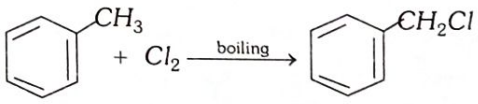
53. Some meta-directing substituents in aromatic substitution are given. Which one is most deactivating **[2013]**

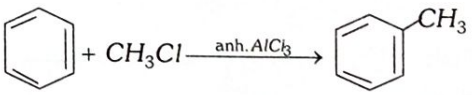
(a) $-NO_2$ (b) $-C \equiv N$

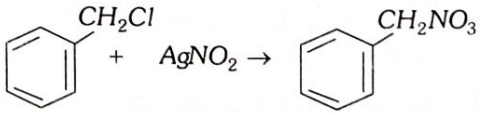
(c) $-SO_3H$ (d) $-COOH$

54. Which one of the following is a free-radical substitution reaction **[2003]**

(a) $CH_3CHO + HCN \rightarrow CH_3CH(OH)CN$

(b) 

(c) 

(d) 

55. Anhydrous $AlCl_3$ is used in the Friedel-Craft's reaction because it is **[1991]**

(a) Electron rich

(b) Soluble in ether

(c) Insoluble to chloride and aluminium ions

(d) Electron deficient

56. The reaction of toluene with Cl_2 in presence of $FeCl_3$ gives 'X' and reaction in presence of light gives 'Y'. Thus, 'X' and 'Y' are **[2010]**

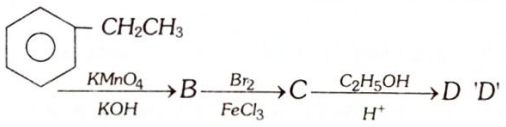
(a) X = benzyl chloride, $Y = m-$chlorotoluene

(b) X = benzal chloride, $Y = o-$chlorotoluene

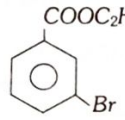
(c) X = m-chlorotoluene, $Y = p-$chlorotoluene

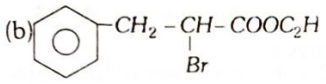
(d) $X = o-$ and $p-$chlorotoluene, Y = trichloromethyl benzene

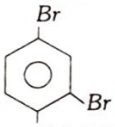
57. In a set of reactions, ethyl benzene yielded a product D

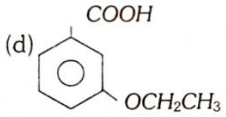


would be **[2010]**

(a) 

(b) 

(c) 

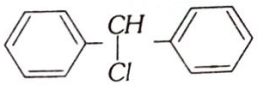
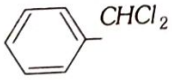
(d) 

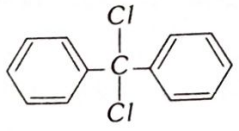
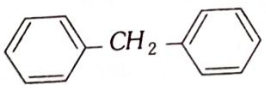
58. Which of the following compounds will not undergo Friedel-Crafts reaction easily **[2013]**

(a) Toluene (b) Cumene

(c) Xylene (d) Nitrobenzene

59. Which of the following structures correspond to the product expected, when excess of C_6H_6 reacts with CH_2Cl_2 in presence of anhydrous $AlCl_3$ **[1989]**

(a)  (b) 

(c)  (d) 

60. The compound C_7H_8 undergoes the following reactions

$$C_7H_8 \xrightarrow{3Cl_2/\Delta} A \xrightarrow{Br_2/Fe} B \xrightarrow{Zn/HCl} C$$

[2018]

The product 'C' is

(a) m – bromotoluene

(b) o – bromotoluene

(c) 3 – bromo –2, 4, 6 – trichlorotoluene

(d) p – bromotoluene

7. AIIMS

1. Which is the best antiknock compound or Which one of the following substances is used as an antiknock compound **[2000]**

(a) Lead tetrachloride (b) Lead acetate

(c) Zinc ethyl (d) Tetraethyl lead (TEL)

2. Petroleum refining is **[1996]**

(a) Distillation of petroleum to get different fractions

(b) Obtaining aromatic compounds from aliphatic compounds present in petroleum

(c) Cracking of petroleum to get gaseous hydrocarbons

(d) Purification of petroleum

3. B.P. of branched chain alkanes as compared to straight chain alkanes are **[1999]**

(a) Lower

(b) Equal

(c) Higher

(d) Independent of the chain

4. Which of the following statements is not true for ethane **[1996]**

(a) It can be chlorinated with chlorine

(b) It can be catalytically hydrogenated

(c) When oxidised produces CO_2 and H_2O

(d) It is a homologue of iso-butane

5. Which of the following is not formed by the reaction of Cl_2 on CH_4 in sunlight **[1987]**

(a) $CHCl_3$ (b) CH_3Cl

(c) CH_3CH_3 (d) $CH_3CH_2CH_3$

6. In the following reaction

$$CH_3-CH_2-CH_2-CH_3 \xrightarrow[475K]{H_2SO_4}$$ **[1983]**

(a) $CH_3CH = CHCH_3$ predominates

(b) $CH_2 = CHCH_2CH_3$ predominates

(c) Both are formed in equal amounts

(d) The amount of production depends on the nature of catalyst

7. Alkenes usually show which type of reaction **[1999]**

(a) Addition (b) Substitution

(c) Elimination (d) Superposition

8. Baeyer's reagent is used in the laboratory for **[1998]**

(a) Detection of double bonds

(b) Detection of glucose

(c) Reduction

(d) Oxidation

9. $CH_3 - CH = CH_2 + HBr \longrightarrow .....$, the product formed is **[1983, 99]**

(a) $CH_3 - CH_2 - CH_2 - Br$ (b) $CH_3 - CHBr - CH_3$

(c) $BrCH_2 - CH = CH_2$ (d) $CH_2 = C = CH_2$

10. Olefins can be hydrogenated by **[1991]**

(a) Zinc and HCl (b) Nascent hydrogen

(c) Raney Ni and H_2 (d) Lithium hydride in ether

11. Which of the following compound is produced when $CH_2 = CH - (CH_2)_2COOH$ reacts with HBr in presence of peroxides **[2000]**

(a) $CH_3CH(CH_2)_5COOH$

(b) $BrCH_2CH_2(CH_2)_2COOH$

(c) $CH_3CH_2CH_2(CH_2)_5COOH$

(d) $CH_3CH_2BrCH_2CH_2COOH$

12. Which of the following is the most stable alkene **[1998]**

(a) $R_2C = CR_2$ (b) $RCH = CHR$

(c) $RCH_2 = CH_2R$ (d) $CH_2 = CH_2$

13. Formation of polyethylene from calcium carbide takes place as follows

$$CaC_2 + 2H_2O \rightarrow Ca(OH)_2 + C_2H_2$$

$$C_2H_2 + H_2 \rightarrow C_2H_4$$

$$n(C_2H_4) \rightarrow (-CH_2 - CH_2-)_n$$

The amount of polyethylene obtained from 64 kg CaC_2 is **[1997]**

(a) 7 kg (b) 14 kg

(c) 21 kg (d) 28 kg

14. Identify Z in the series

$$CH_2 = CH_2 \xrightarrow{HBr} X \xrightarrow{aq.KOH} Y \xrightarrow[I_2 \text{ excess}]{Na_2CO_3} Z$$

[1983]

(a) C_2H_5I (b) C_2H_5OH

(c) CHI_3 (d) CH_3CHO

15. If ethylene, carbon monoxide and water is heated at high temperature, which of the following is formed **[2000]**

(a) $C_4H_8O_2$ (b) C_2H_5COOH

(c) CH_3COOH (d) $CH_2 = CH - COOH$

16. 1-butyne reacts with cold alkaline $KMnO_4$ to produce **[1997]**

(a) CH_3CH_2COOH

(b) $CH_3CH_2CH_2COOH$

(c) $CH_3CH_2COOH + CO_2$

(d) $CH_3CH_2COOH + HCOOH$

17. The reagent which is used to distinguish between propene and propyne is **[2000]**

(a) Bromine (b) Alkaline $KMnO_4$

(c) Ammoniacal $AgNO_3$ (d) Ozone

18. Hydrocarbon containing following bond is most reactive **[1987]**

(a) $C \equiv C$ (b) $C = C$

(c) $C - C$ (d) All of these

19. When acetylene is passed into dilute sulphuric acid containing Hg^{2+} ions, the product formed is **[2002]**

(a) Acetone (b) Acetic acid

(c) Acetaldehyde (d) Formaldehyde

20. What happens when a mixture of acetylene and hydrogen is passed over heated Lindlar's catalyst **[1987]**

(a) Ethane and water are formed

(b) Ethylene is formed

(c) Acetylene and ethane are formed

(d) None of these

21. $\begin{matrix} CH \\ \| \\ CH \end{matrix} \xrightarrow{O_3/NaOH} X \xrightarrow{Zn/CH_3COOH} Y$ 'Y' is **[1988]**

(a) $\begin{matrix} CH_2OH \\ | \\ CH_2OH \end{matrix}$ (b) CH_3CH_2OH

(c) CH_3COOH (d) CH_3OH

22. Pyridine is less basic than triethylamine because **[2005]**

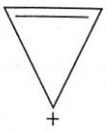
(a) Pyridine has aromatic character

(b) Nitrogen in pyridine is sp^2 hybridized

(c) Pyridine is a cyclic system

(d) In pyridine, lone pair of nitrogen is delocalized

23. Among the following the aromatic compound is **[2004, 15]**

(a) 

(b) 

(c) 

(d) 

24. On heating a mixture of sodium benzoate and sodalime, the following is obtained **[1996]**

(a) Toluene (b) Phenol

(c) Benzene (d) Benzoic acid

25. Catalytic hydrogenation of benzene gives **[1996]**

(a) Xylene (b) Cyclohexane

(c) Benzoic acid (d) Toluene

26. The compound that is most reactive towards electrophilic nitration is **[1998]**

(a) Toluene (b) Benzene

(c) Benzoic acid (d) Nitrobenzene

27. Which is formed when benzene is heated with chlorine in the presence of sunlight **[1999]**

(a) $C_6H_5CCl_3$ (b) $C_6H_5CHCl_2$

(c) $C_6H_5CH_2Cl_2$ (d) $C_6H_6Cl_6$

28. $C_6H_6 \xrightarrow[H_2SO_4]{HNO_3} X \xrightarrow[FeCl_3]{Cl_2} Y$. In the above sequence Y is **[1999]**

(a) 1-nitrochloro benzene (b) 3-nitrochlorobenzene

(c) 4-nitrochlorobenzene (d) 1,2-nitrochlorobenzene

29. Which one of the following will undergo meta substitution on monochlorination **[1991]**

(a) Ethoxy ethane (b) Chlorobenzene

(c) Ethyl benzoate (d) Phenol

30. $C_6H_6 + CH_3Cl \xrightarrow[AlCl_3]{\text{anhydrous}} C_6H_5CH_3 + HCl$

is an example of **[1998]**

(a) Friedel-Craft's reaction (b) Kolbe's synthesis

(c) Wurtz reaction (d) Grignard reaction

8. Assertion and Reason

Read the assertion and reason carefully to mark the correct option out of the options given below :

(a) If both assertion and reason are true and the reason is the correct explanation of the assertion.

(b) If both assertion and reason are true but reason is not the correct explanation of the assertion.

(c) If assertion is true but reason is false.

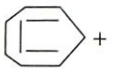
(d) If the assertion and reason both are false.

(e) If assertion is false but reason is true.

1. Assertion : Cyclolpentadienyl anion is much more stable than allyl anion. **[AIIMS 2008]**

Reason : Cyclopentadienyl anion is aromatic in character.

2. Assertion : Tropylium cation is aromatic in nature



Reason : The only property that determines its aromatic behaviour is its planar structure. **[AIIMS 2008]**

3. Assertion : Cyclobutane is less stable than cyclopentane.

Reason : Presence of bent bonds causes "loss of orbital overlap". **[AIIMS 1996]**

4. Assertion : Pyrrole is an aromatic heterocyclic compound.

Reason : It has a cyclic, delocalised 6π electrons. **[AIIMS 1995]**

5. Assertion : CH_4 does not react with Cl_2 in dark.

Reason : Chlorination of CH_4 takes place in sunlight. **[AIIMS 2001]**

6. Assertion : Alkyl benzene is not prepared by Friedel-Crafts alkylation of benzene.

Reason : Alkyl halides are less reactive than acyl halides. **[AIIMS 2003]**

7. Assertion : 2-Bromobutane on reaction with sodium ethoxide in ethanol gives 1-butene as a major product. **[AIIMS 2004]**

Reason : 1-Butene is more stable than 2-butene.

8. Assertion : Styrene on reaction with HBr gives 2-bromo-2- phenyl-ethane.

Reason : Benzyl radical is more stable than alkyl radical. **[AIIMS 2004]**

9. Assertion : Freezing point of neopentane is more than that of *n*-pentane.

Reason : Increase in van der Waals forces increases freezing point.

10. Assertion : Propene reacts with *HBr* in presence of benzoyl peroxide to yield 2-bromopropane.

Reason : In presence of peroxide, the addition of *HBr* to propene follows ionic mechanism.

11. Assertion : Addition of *HBr* on 2-butene gives two isomeric products.

Reason : Addition of *HBr* on 2-butene follows Markownikov's rule. **[AIIMS 2006]**

12. Assertion : Aryl halides are less reactive towards substitution of halogen atom.

Reason : Halogens are o, p – directing in nature.

13. Assertion : Benzene is a solvent for the Friedel Craft's alkylation of bromobenzene.

Reason : Friedel Craft's reaction is used to introduce an alkyl or acyl group in benzene nucleus. **[AIIMS 2008]**

14. Assertion : Benzene forms benzene sulphonic acid with fuming H_2SO_4 at high temperature.

Reason : The attacking species is SO_3 .

15. Assertion : Cis-1, 3-dihydroxy cyclohexane exists in boat conformation.

Reason : In the chair form, there will not be hydrogen bonding between the two hydroxyl groups. **[AIIMS 2003]**

15. Hydrocarbons – Answers Keys

1. Alkane

1	d	2	b	3	a	4	c	5	b
6	c	7	c	8	d	9	c	10	c
11	d	12	a	13	b	14	a	15	c
16	a	17	d	18	a	19	a	20	b
21	a	22	a	23	b	24	a	25	a
26	a	27	b	28	a	29	c	30	d
31	d	32	d	33	d	34	d	35	a
36	d	37	c	38	c	39	a	40	c
41	d	42	a	43	c	44	d	45	c
46	b	47	b	48	c	49	a	50	a
51	c	52	d	53	b	54	d	55	b
56	c								

2. Alkene

1	a	2	a	3	d	4	a	5	c
6	c	7	b	8	d	9	a	10	b
11	c	12	c	13	a	14	d	15	c
16	a	17	a	18	a	19	a	20	b
21	d	22	a	23	d	24	d	25	a
26	d	27	d	28	c	29	a	30	d
31	d	32	a	33	a	34	b		

3. Alkyne

1	b	2	a	3	c	4	a	5	c
6	a	7	a	8	b	9	c	10	c
11	b	12	a	13	a	14	d	15	c
16	c	17	c	18	a	19	c	20	c
21	a	22	d	23	b	24	d	25	c
26	d	27	c	28	a	29	a	30	b
31	d	32	a	33	b	34	a	35	b

4. Aromatic Hydrocarbon

1	d	2	b	3	c	4	b	5	c
6	b	7	c	8	c	9	a	10	b
11	b	12	c	13	d	14	b	15	b
16	c	17	a	18	b	19	c	20	d
21	a	22	d	23	a	24	d	25	a
26	c	27	d	28	c	29	b	30	b
31	d	32	c	33	c				

5. IIT-JEE/ AIEEE

1	b	2	d	3	c	4	a	5	c
6	a	7	c	8	b	9	d	10	c
11	a	12	c	13	b	14	c	15	d
16	b	17	c	18	a	19	c	20	c
21	a	22	c	23	d	24	b	25	a
26	a	27	c	28	c	29	b	30	a
31	c	32	d	33	c	34	a	35	c

36	c	**37**	a	**38**	c	**39**	b	**40**	b
41	a	**42**	a	**43**	c	**44**	a	**45**	a
46	a	**47**	b	**48**	a	**49**	c	**50**	a
51	b	**52**	d	**53**	c	**54**	c	**55**	a
56	a	**57**	c	**58**	c	**59**	c	**60**	c

6. NEET/ AIPMT/ CBSE-PMT

1	a	**2**	d	**3**	c	**4**	a	**5**	a
6	a	**7**	d	**8**	d	**9**	c	**10**	c
11	b	**12**	d	**13**	c	**14**	d	**15**	b
16	d	**17**	b	**18**	a	**19**	b	**20**	a
21	b	**22**	d	**23**	a	**24**	a	**25**	b
26	c	**27**	c	**28**	d	**29**	c	**30**	a
31	d	**32**	a	**33**	d	**34**	b	**35**	a
36	a	**37**	a	**38**	d	**39**	d	**40**	d
41	b	**42**	b	**43**	b	**44**	d	**45**	d
46	c	**47**	a	**48**	b	**49**	a	**50**	a
51	b	**52**	c	**53**	a	**54**	b	**55**	d
56	d	**57**	a	**58**	d	**59**	d	**60**	a

7. AIIMS

1	d	**2**	a	**3**	a	**4**	b	**5**	d
6	a	**7**	a	**8**	a	**9**	b	**10**	c
11	b	**12**	a	**13**	d	**14**	c	**15**	b
16	c	**17**	c	**18**	a	**19**	c	**20**	b
21	a	**22**	d	**23**	a	**24**	c	**25**	b
26	a	**27**	d	**28**	b	**29**	c	**30**	a

8. Assertion & Reason

1	a	**2**	c	**3**	c	**4**	a	**5**	b
6	b	**7**	d	**8**	e	**9**	b	**10**	d
11	b	**12**	b	**13**	e	**14**	a	**15**	d