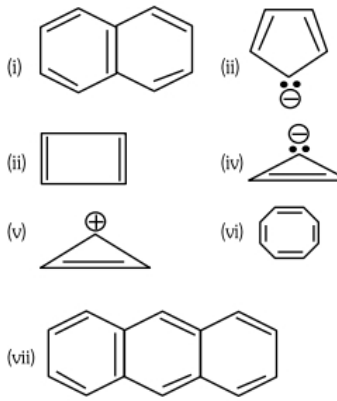
KD EDUCATION ACADEMY (9582701166)

Time : 5 Hour | STD 11 Science | Total Marks : 600

kd 700+ neet ch-9 hydrocarbon

*** Chemistry** [600]

1. Consider the following compounds/species:
The number of compounds/species which obey Huckel's rule is .....



(A) 6 (B) 4 (C) 5 (D) 2

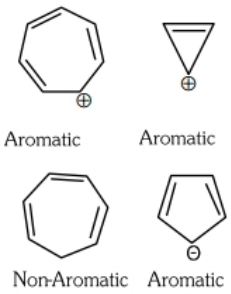
Ans. : b

Huckle's rule $=(4n+2)\pi$ electrons Comp $(i),(ii),(v),(vii)$ obey Huckle's rule.

2. Which compound amongst the following is not an aromatic compound?

(A) (B) (C) (D)

Ans. : c

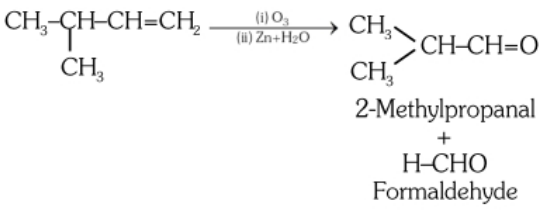


3. Compound X on reaction with O_3 followed by $Zn/\ H_2O$ gives formaldehyde and $2-$methyl propanal as products. The compound X is :

(A) $2-$Methylbut$-1-$ene (B) $2-$Methylbut$-2-$ene

(C) Pent$-2-$ene (D) $3-$Methylbut$-1-$ene

Ans. : d



4. $CH_3CH_2COO^-Na^+ \xrightarrow[\text{Heat}]{NaOH,+?} CH_3CH_3 + Na_2CO_3.$

Consider the above reaction and identify the missing reagent/chemical.

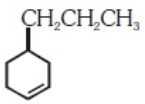
(A) B_2H_6 (B) Red Phosphorus (C) CaO (D) $DIBAL-H$

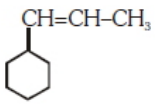
Ans. : c

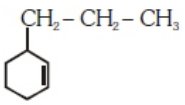
$$CH_3 - CH_2 - COONa \xrightarrow[\Delta]{NaOH+?} CH_3 - CH_3$$

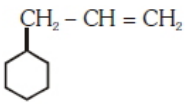
It's decarboxylation in presence of sodalime so missing reagent is CaO. $(NaOH + CaO)$ sodalime

5. An alkene on ozonolysis gives methanal as one of the product. Its structure is

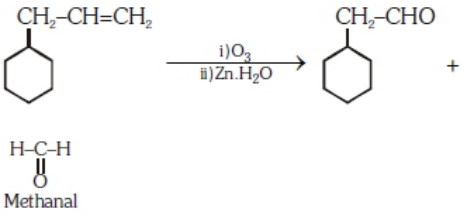
(A) 

(B) 

(C) 

(D) 

Ans. : d



6. Which of the following alkane cannot be made in good yield by Wurtz reaction?

(A) n−Butane (B) n−Hexane

(C) $2,3-$Dimethylbutane (D) n−Heptane

Ans. : d

n−Heptane can not be made in good yield using Wurtz reaction since it is unsymmetrical alkane.

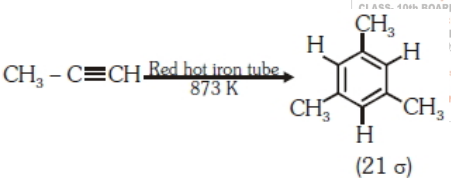
7. In the following reaction,

$$CH_3 - C \equiv CH \xrightarrow[873\ K]{\text{red hot iron tube}} A$$

the number of sigma(σ) bonds present in the product A is

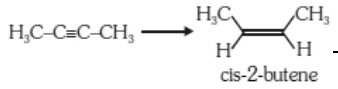
(A) 21 (B) 9 (C) 24 (D) 18

Ans. : a



(21 σ)

8. The most suitable reagent for the following conversion is



cis-2-butene

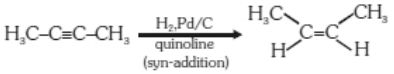
(A) $Na/liquid\ NH_3$

(B) $H_2, Pd/C$, quinoline

(C) Zn/HCl

(D) $Hg^{2+}/H^+, H_2O$

Ans. : b



9. Match the catalyst with the process

Catalyst	Process
$(i)\ Na_2O$	(a) The oxidation of ethyne to ethanal
$(ii)\ TiCl_4 + Al(CH_3)_3$	(b) Polymerisation of alkynes
$(iii)\ PdCl_2$	(c) Oxidation of SO_2 in the manufacture of H_2SO_4

(iv) Nickel complexes	(d) Polymerisation of ethylene

Which of the following is the correct option ?

(A) $i-c, ii-d, iii-a, iv-b$ (B) $i-a, ii-b, iii-c, iv-d$

(C) $i-a, ii-c, iii-b, iv-d$ (D) $i-c, ii-a, iii-d, iv-b$

Ans.: (A) $i-c, ii-d, iii-a, iv-b$

10. Which one is the correct order of acidity ?

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

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

(C) $CH_3-CH_3 > CH_2CH_2 > CH_3-C \equiv CH > CH \equiv CH$

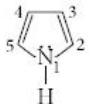
(D) $CH_2=CH_2 > CH_3-CH=CH_2 > CH_3-C \equiv CH > CH \equiv CH$

Ans. : a

$CH \equiv CH > CH_3-C \equiv CH > CH_2=CH_2 > CH_3-CH_3$

acc. to EN and Inductive effect.

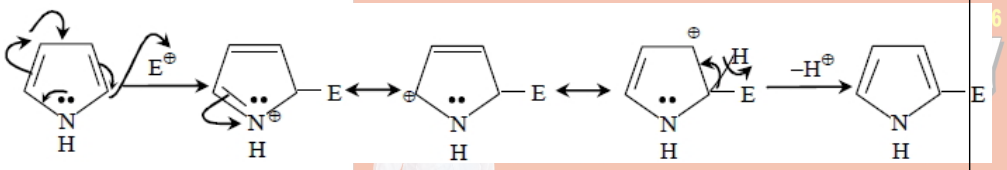
11. In pyrrole the electron density is maximum on



(A) 2 and 3 (B) 3 and 4 (C) 2 and 4 (D) 2 and 5

Ans. : d

Pyrrole has highest electron density at C_2 and C_5 due to highest stability of protonated intermediate

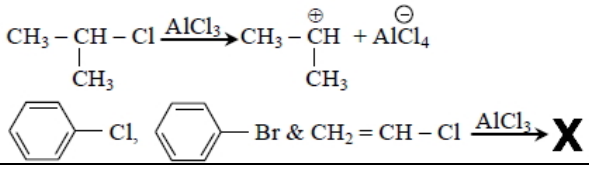


12. Which of the following can be used as the halide component for Friedel-Crafts reaction ?

(A) Chlorobenzene (B) Bromobenzene

(C) Chloroethane (D) Isopropyl chloride

Ans. : d



$\because$ Resonance Stable

13. The pair of electrons in the given carbanion, $CH_3C \equiv C^-$, is present in which of the following orbitals ?

(A) sp^2 (B) sp (C) $2p$ (D) sp^3

Ans. : b

$CH_3-\overset{sp}{C} \equiv \overset{sp}{C}^-$

Thus, pair of electrons is present in sp-hybridised orbital.

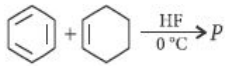
14. The compound that will react most readily with gaseous bromine has the formula

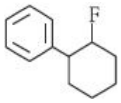
(A) C_3H_6 (B) C_2H_2 (C) C_4H_{10} (D) C_2H_4

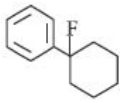
Ans. : a

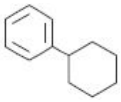
Propene is most reactive towards Br_2 (gaseous) than $CH_2=CH_2, HC=CH$& butane due to most electron density.

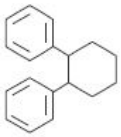
15. In the given reaction, the product P is



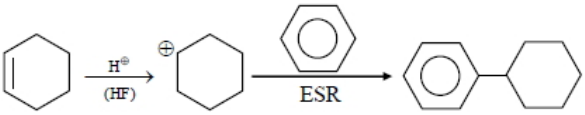
(A) 

(B) 

(C) 

(D) 

Ans. : c



16. In the reaction

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

$$\xrightarrow[(ii)\ CH_3CH_2Br]{(i)\ NaNH_2\ /\ liq.\ NH_3} Y$$

X and Y are

(A) $X=2-$Butyne, $Y=2-$Hexyne

(B) $X=1-$Butyne, $Y=2-$Hexyne

(C) $X=1-$Butyne, $Y=3-$Hexyne

(D) $X=2-$Butyne, $Y=3-$Hexyne.

Ans. : c

$$H-C\equiv C-H \xrightarrow[liq.\ NH_3]{Na\ NH_2/} HC\equiv C\,Na \xrightarrow[-NaBr]{CH_3CH_2-Br} CH\equiv C-CH_2-CH_3$$

$$CH_3-CH_2-C\equiv CH \xrightarrow[liq.\ NH_3]{Na\ NH_2/}$$

$$CH_3-CH_2-C\equiv C-CH_2-CH_3$$

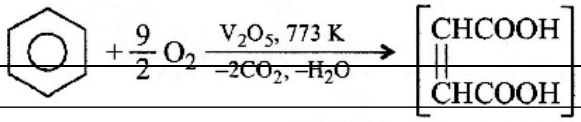
$$3-Hexyne$$

$$CH_3-CH_2-C\equiv C\,Na \xrightarrow[-NaBr]{CH_3CH_2-Br}$$

17. The oxidation of benzene by V_2O_5 in the presence of air produces and high tempreture

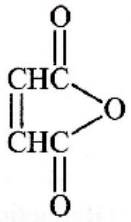
(A) maleic anhydride (B) benzoic acid (C) phenol (D) benzoic anhydride.

Ans. : a



Maleic acid

Δ $-H_2O$



Maleic anhydride

18. Which of the following chemical system is non aromatic ?

(A) 

(B) 

(C) 

(D) 

Ans. : d

The molecules which do not satisfy Huckel rule or $(4n+2)\pi$ -electron rule are said to be nonaromatic. The compound (d) has total $4\pi e^-$. It does not follow $(4n+2)$ rule. So it is non-aromatic compound. All other compounds (a,b,c) are planar and have $6\pi e^-$, so they are aromatic.

19. Which of the following compounds will not undergo Friedal-Craft's reaction easily?

(A) Nitrobenzene (B) Toluene (C) Cumene (D) Xylene

Ans. : a

Friedal Craft reaction fails when strong deactivating group is attached with benzene ring.

20. Some $meta-$ directing substituents in aromatic substitution are given. Which one is most deactivating?

(A) $-COOH$ (B) $-NO_2$ (C) $-C\equiv N$ (D) $-SO_3H$

Ans. : b

$-\mathrm{NO_2}$ is most deactivating due to - I and $-\mathrm{M}$ effect.

21. The bond length between the hybridised carbon atom and other carbon atom is minimum in

(A) Butane (B) Propyne (C) Propene (D) Propane

Ans. : b

(b)Bond length decreases with increase in number of bonds.

22. Ozonolysis of acetylene gives

(A) Glycol (B) Glyoxal,formic acid

(C) Formaldehyde (D) None

Ans. : b

It's obvious.

23. 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

Ans. : a

A acetylene is passed through an electric arc, heated therein above about $1,000^\circ F.$, and immediately mixed with nitrogen or a nitrogencontaining compound, which mixture immediately reacts to form hydrogen cyanide and other products, which products are quenched

24. $KMnO_4$ will oxidise acetylene to

(A) Ethylene glycol (B) Ethyl alcohol (C) Oxalic acid (D) Acetic acid

Ans. : c

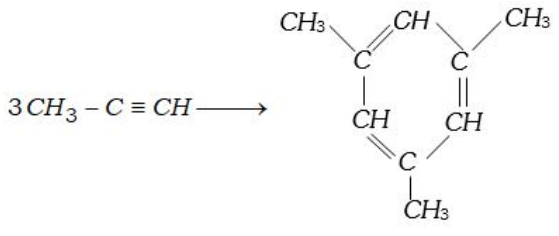
(c) $\underset{\text{Acetylene}}{\overset{CH}{\overset{\|}{CH}}} \xrightarrow{KMnO_2} \underset{\text{Oxalic acid}}{\overset{COOH}{\overset{|}{COOH}}}$

25. Propyne on polymerisation gives

(A) Mesitylene (B) Benzene (C) Ethyl benzene (D) Propyl benzene

Ans. : a

(a)



Mesitylene or 1,3,5–trimethyl benzene

26. A gas decolourises bromine in CCl_4 and forms a precipitate with ammoniacal silver nitrate. The gas is

(A) C_2H_2 (B) C_2H_4 (C) C_2H_6 (D) CH_4

Ans. : a

(a) $CH \equiv CH + 2Br_2 \xrightarrow{CCl_4} \underset{Br}{\overset{Br}{|}}CH - \underset{Br}{\overset{Br}{|}}CH$

$CH \equiv CH + NH_4OH + AgNO_3 \rightarrow \underset{\text{Di-silver acetylide white ppt.}}{Ag - C \equiv C - Ag}$

27. Which of the following reacts with sodium with the elimination of hydrogen

(A) CH_4 (B) C_2H_6 (C) C_2H_4 (D) C_2H_2

Ans. : d

(d) $2CH \equiv CH + 2Na \rightarrow 2CH \equiv C^-Na^+ + H_2$

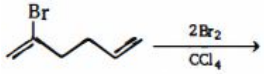
28. A salt producing hydrocarbon among these compounds is

(A) Ethane (B) Methane (C) Ethene (D) Ethyne

Ans. : d

(d) Ethyne have acidic hydrogen to form salt.

29. How many stereoisomeric pentabrornides will be formed in the following reaction ?

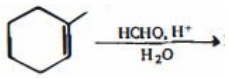


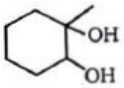
(A) 2 (B) 3 (C) 4 (D) None of these

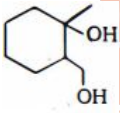
Ans. : a

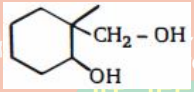
(a)

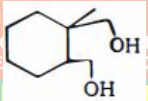
30. major product of this reaction is



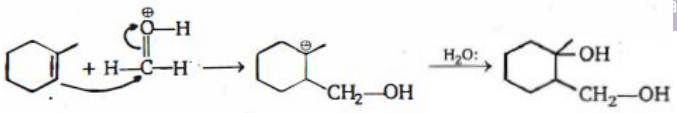
(A) 

(B) 

(C) 

(D) 

Ans. : b



31. An organiccompound C_4H_6 on ozonolysis give $HCHO, CO_2, CH_3CHO$. Compound will be

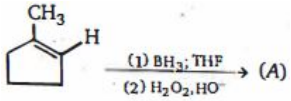
(A) $H_2C = CH - CH = CH_2$ (B) $CH_3 - CH = C = CH_2$

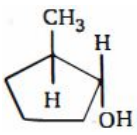
(C) $CH_3 - C \equiv C - CH_3$ (D)

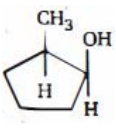
Ans. : b

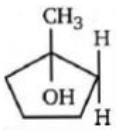
(b) Cumulative dienes.

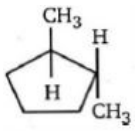
32. Product of the reaction is



(A) 

(B) 

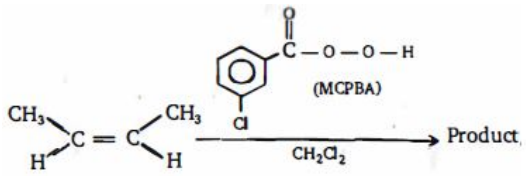
(C) 

(D) 

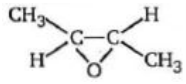
Ans. : a

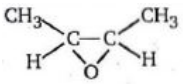
(a) Hydroboration-oxidation take place.

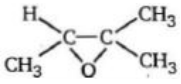
33. Product is

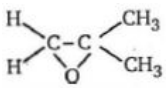


MCPBA ⟶ Metachloroperbenzoic acid

(A) 

(B) 

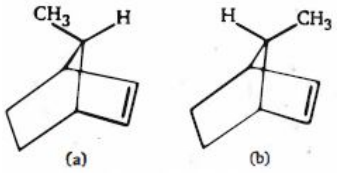
(C) 

(D) 

Ans. : b

(b) Oxidation take place i.e., epoxidation

34. Rate of reaction towards reduction using (H_2/Pt)



(A) $a > b$

(B) $a = b$

(C) $b > a$

(D) Reduction of given molecule is not possible

Ans. : a

(a) Less steric hinderance site will be attacked. Approach of H_2 is more hindered in (b).

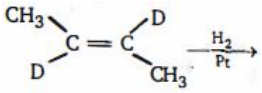
35. cis- 2 -butene $\xrightarrow[Peroxide]{HBr}$ product ; Product of the reaction is

(A) Racemic (B) Diastereomer (C) Meso (D) E anq Z isomer

Ans. : a

$CH_3 - CH_2 - \overset{*}{C}H - CH_3$ (racemic mixture)
$|$
Br

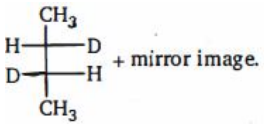
36. Product of the reacion is



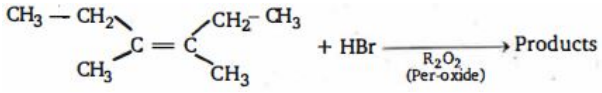
(A) Racemic (B) Diastereomers

(C) Meso (D) Pure enantiomers

Ans. : a

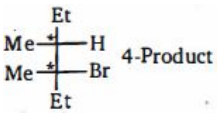


37. How many products will be formed in above reaction ?



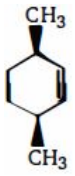
(A) 2 (B) 4 (C) 3 (D) 6

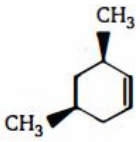
Ans. : b

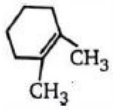


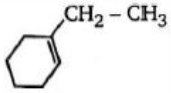
4-Product

38. An optically active compound A with molecular formula C_8H_{14} undergoes catalytic hydrogenation to give mesa compound, the structure of (A) is

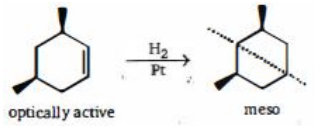
(A) 

(B) 

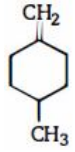
(C) 

(D) 

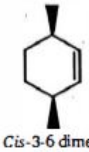
Ans. : b



39. Which of the following will give a mixture of cis and trans- $1,4$ -dimethyl cyclohexane, when undergo catalytic hydrogenation ?

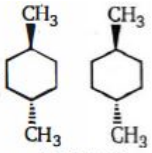
(A) 

(B) 

(C) 
Cis-3-6 dimethyl cyclohexene

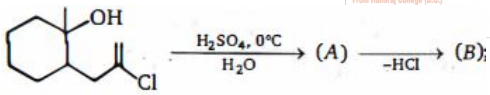
(D) both (a) & (b)

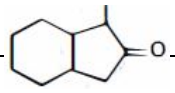
Ans. : d

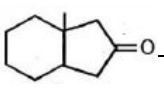
(a), (b) and (c) gives 

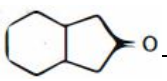
(cis & trans)

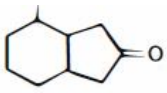
40. Product (B) of the reaction is



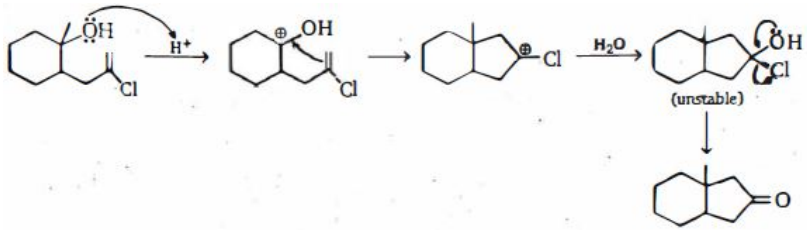
(A) 

(B) 

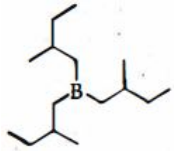
(C) 

(D) 

Ans. : b



41. Which of the following compound would yield trialkylborane shown below when treated with BH_3/THF?



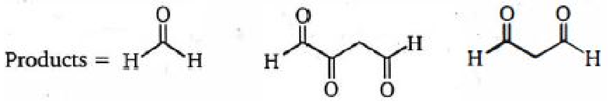
(A) 2 -methylbut- 1 -ene (B) 2 -methylbut- 2 -ene

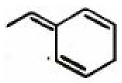
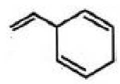
(C) 3 -methylbut- 1 -ene (D) 3 -methylbut- 1 -yne

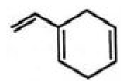
Ans. : a

$$\begin{array}{l} \quad\quad CH_3 \\ \quad\quad\ | \\ H_2C=C-CH_2-CH_3 \end{array}$$

42. A triene is treated with ozone followed by zinc in acetic acid to give the following three products. What is the structure of the triene ?



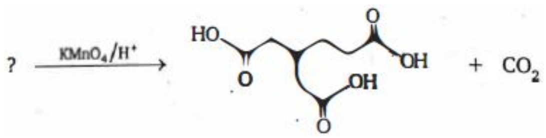
(A)

(B)

(C)

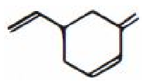
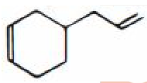
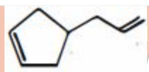
(D)


Ans. : d

(d) Reductive ozonolysis

43. Which of the following compound was the starting material for the oxidation shown below ?

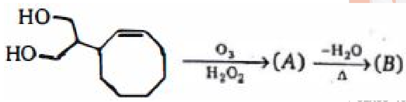


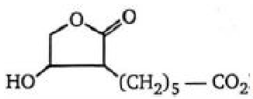
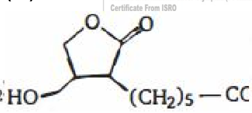
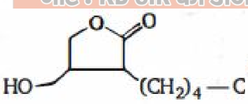
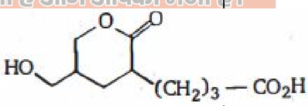
(A)

(B)

(C)

(D)


Ans. : b

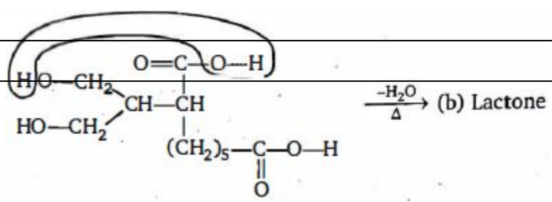
(b) Hot $KMnO_4$ is similar to oxidative ozonolysis.

44. Identify (B)



(A)

(B)

(C)

(D)


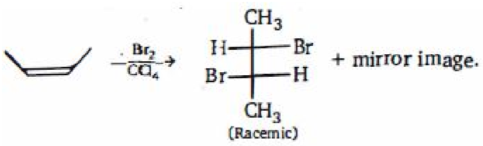
Ans. : b



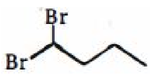
45. Addition of Br_2 to cis- 2 -butene would give a product which is

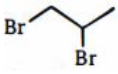
(A) achiral (B) racemic (C) meso (D) optically active

Ans. : b

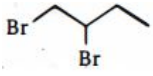


46. Which compound is a possible product from addition of Br_2 to 1 -butene ?

(A)


(B) 

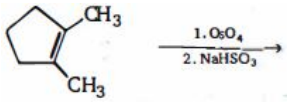
(C) 

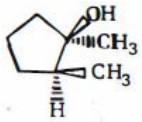
(D) 

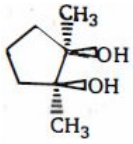
Ans. : d

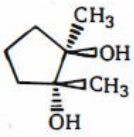
(d) Anti-addition take place.

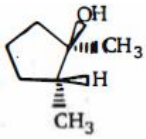
47. Product of the reaction is



(A) 

(B) 

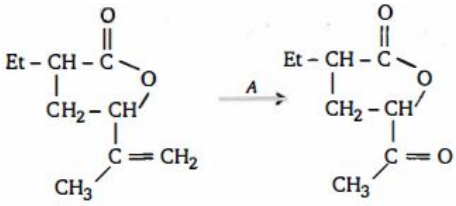
(C) 

(D) 

Ans. : b

(b) cis-diol will form

48. Reagent (A) in the reaction is

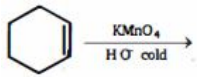


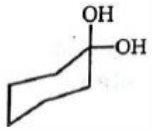
(A) $O_3/Zn(H_2O)$ (B) HIO_4 (C) CrO_3 (D) Cold dil. $KMnO_4$

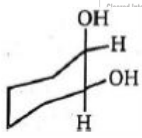
Ans. : a

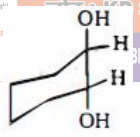
(a) Alkene will be cleaved by ozonolysis.

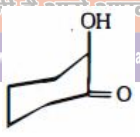
49. What is the major product expected from the following reaction ?



(A) 

(B) 

(C) 

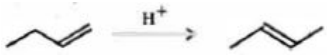
(D) 

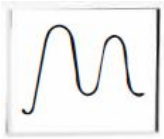
Ans. : b

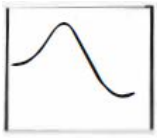
(b) cis-diol will form (syn addition takes place)

50. Consider the following reaction in which the intermediate carbocation loses H^+ to give the final product ?

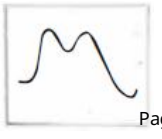
Which of the following energy profiles best represents the overall reaction ?



(A) 

(B) 

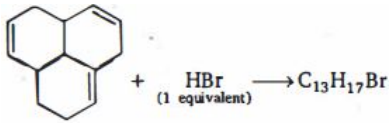
(C) 

(D) 

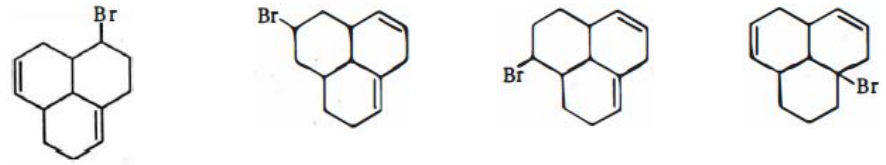
Ans. : d

(d) Reaction is exothermic because of formation of stable alkene.

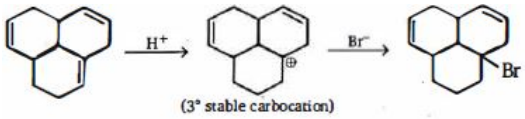
51. Which of the following bromides is the major product of the reaction shown below, assuming that there are no carbocation rearrangement ?



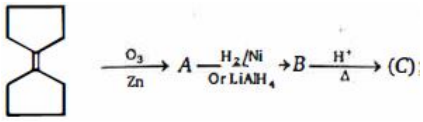
(A) (B) (C) (D)



Ans. : d

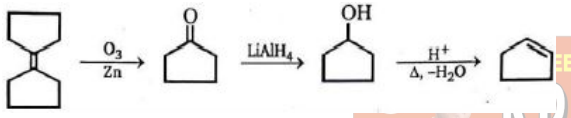


52. Product (C) of the reaction is

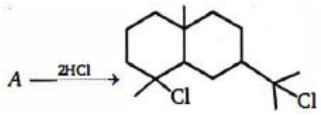


(A) (B) (C) (D)

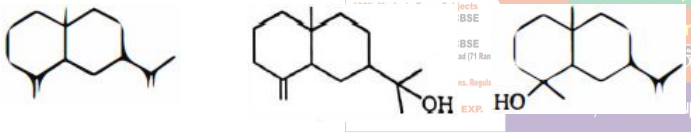
Ans. : c



53. Reactant (A) can be

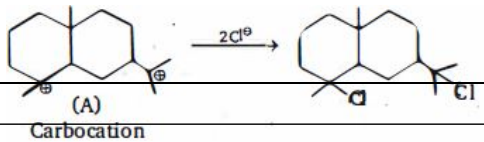


(A) (B) (C) (D) All of these



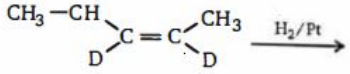
Ans. : d

Source of this carbocation can be $(a), (b)$ and (c).



(A)
Carbocation

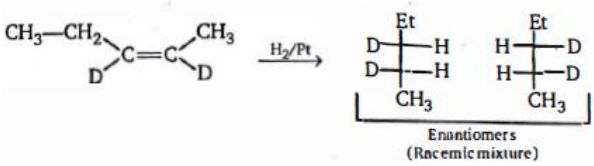
54. Product of the above reaction will be



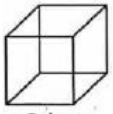
(A) Racemic mixture (B) Diastereomers

(C) Meso (D) Constitutional isomers

Ans. : a



55. Double bond equivalent of cubane is



Cubane

(A) 4 (B) 5 (C) 6 (D) 7

Ans. : b

(b) Cubane has molecular formula (C_8H_8) from the given structure.

56. $n-$pentane and iso pentane can be distinguished by

(A) Br_2 (B) O_3 (C) conc. H_2SO_4 (D) $KMnO_4$

Ans. : d

(d) On oxidation, with $KMnO_4$, they give different alcohols

$$\underset{n\ penten}{CH_3CH_2CH_2CH_2CH_3} \xrightarrow[[O]]{KMnO_4} \underset{1^\circ\ alcohol}{CH_3CH_2CH_2CH_2CHOH_2}$$

$$CH_3CH_2-\underset{\underset{CH_3}{|}}{CH}-CH_3 \xrightarrow[[O]]{KMnO_4} \underset{3^o\ alcohol}{CH_3CH_2-\overset{\overset{CH_3}{|}}{\overset{OH}{\overset{|}{C}}}-CH_3}$$

57. Which kind of isomerism will butene-2 show

(A) Geometrical (B) Optical (C) Position (D) None of these

Ans. : a

(a) $2-$ butene shows geometrical isomerism.

$$\underset{\text{cis}-\text{Butene}-2}{\begin{matrix}H-C-CH_3 \\ \| \\ H-C-CH_3\end{matrix}} \qquad \underset{\text{trans}-\text{Butene}-2}{\begin{matrix}H-C-CH_3 \\ \| \\ CH_3-C-H\end{matrix}}$$

58. The reaction $CH_3CH=CH_2 \xrightarrow[H^+]{(CO+H_2)} \underset{\underset{COOH}{|}}{CH_3-CH-CH_3}$ is known as

(A) Wurtz reaction

(B) Koch reaction

(C) Clemmensen reduction

(D) Kolbe's reaction

Ans. : b

(b) Koch reaction : (Carboxylation of Alkene)

$$CH_3-CH=CH_2 \xrightarrow[400\ ^oC, H_3PO_4]{\text{Water gas } (CO+H_2)} \underset{Isobutyric\ acid}{\overset{\overset{COOH}{|}}{CH_3-CH-CH_3}}$$

59. Which of the following aliphatic compounds will discharge red colour of bromine

(A) C_2H_4 (B) C_3H_6 (C) C_4H_8 (D) All of these

Ans. : d

(d) C_2H_4, C_3H_6 and C_4H_8 all an alkene. Therefore they discharge the red colour of bromine.

60. Which one of the following reactions would be the best for the formation of $2-$ bromobutane

(1) $CH_3CH=CHCH_2CH_3 \xrightarrow{HBr}$

(2) $CH_3CH_2CH=CH_2 \xrightarrow{HBr}$

(3) $CH_3CH=CHCH_3 \xrightarrow{Br_2}$

(4) $CH_3CH_2CH=CH_2 \xrightarrow[Proxide]{HBr}$

(A) 1 (B) 2 (C) 3 (D) 4

Ans. : b

(b) $CH_3-CH_2-CH=CH_2 \xrightarrow{HBr} \underset{2-\text{Bromo butane}}{CH_3-CH_2-\underset{Br}{\underset{|}{CH}}-CH_3}$

61. The order of increasing reactivity towards HCl of the following compounds will be

(1) $CH_2=CH_2$

(2) $(CH_3)_2C=CH_2$

(3) $CH_3CH=CHCH_3$

(A) $1<2<3$ (B) $1<3<2$ (C) $3<2<1$ (D) $2<1<3$

Ans. : c

The correct order of increasing reactivity towards HCl is

$CH_3CH=CHCH_3 < (CH_3)_2C=CH_2 < CH_2=CH_2$.

As the number of alkyl groups attached to the carbon atoms increases, the $+I$ effect of the alkyl groups increases and the alkene becomes electron rich.

Hence, the reactivity towards HCl increases as pi electrons of the double bond are donated to proton.

Also as the stability of alkene decreases (cis isomer is less stable than trans isomer), the reactivity towards acid catalyzed hydration increases.

62. Ethylene is a member of..... series

(A) Alkyne (B) Olefin (C) Paraffin (D) Amine

Ans. : b

(b)Olefin because double bond is present.

63. Ethyl alcohol on heating with conc. H_2SO_4 gives

(A) $CH_3COOC_2H_5$ (B) C_2H_6 (C) C_2H_4 (D) C_2H_2

Ans. : c

(c) $CH_3-CH_2-OH \xrightarrow[H_2SO_4]{Conc.} CH_2=CH_2+H_2O$

64. The final product formed by the ozonolysis of compound $RCH=CR_2$ is

(A) $RCHO$ (B) R_2CO (C) Both (a) and (b) (D) None of these

Ans. : c

(c) $\underset{R}{\overset{R-CH=C-R}{|}} \xrightarrow[(2)Zn/H_2O]{(1)O_3} \underset{\text{Aldehyde}}{R-CHO} + \underset{\text{Ketone}}{R_2CO}$

65. 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

Ans. : c

(c) $CH_3-\underset{H}{\underset{|}{CH}}-\underset{Cl}{\underset{|}{CH}}-\underset{H}{\underset{|}{CH_2}} \xrightarrow[alc.NaOH]{-HCL} CH_3CH=CH-CH_3$

66. Alkene can be prepared from alkyl halide by the following reagent

$R-X+Nu^- \rightarrow \text{Alkene}+NuH$

(A) Alc. KOH + heat (B) Aq. KOH + cold water

(C) $NaOH$ (D) $LiOH$

Ans. : a

When heated with strong bases, alkyl halides typically undergo a $1,2$-elimination reactions to generate alkenes. Typical bases are KOH in the alcohol as solvent.

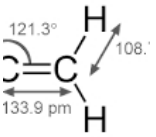
67. Bond length between carbon-carbon in ethylene molecule is.....$\overset{o}{A}$

(A) 1.54 (B) 1.35 (C) 1.19 (D) 2.4

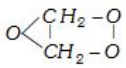
Ans. : b

A typical carbon-carbon single bond has a length of $154\,pm$, while a typical double

bond and triple bond are $134\,pm$ and $120\,pm$, respectively.

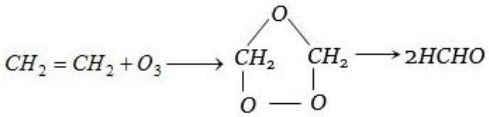


68. Ethylene reacts with ozone gas to form the compound

(A) $HCHO$ (B) C_2H_5OH (C)  (D) CH_3CHO

Ans. : a

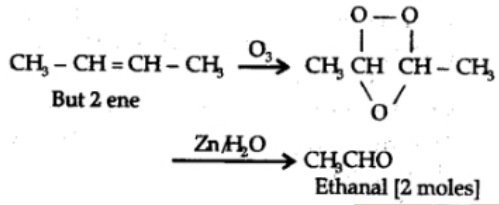
(a)



69. Ozonolysis of which one of the following will give two molecules of acetaldehyde

(A) $1-$butene (B) $2-$butene (C) $1-$pentene (D) $2-$pentene

Ans. : b



70. Which of the following compounds represents acrylonitrile

(A) Vinyl cyanide (B) Cyanoethene

(C) Prop$-2-$ene nitrile (D) All of them

Ans. : d

Acrylonitrile is an organic compound with the formula CH_2CHCN. It is a colorless volatile liquid although commercial samples can be yellow due to impurities. It has a pungent odor of garlic or onions. In terms of its molecular structure, it consists of a vinyl group linked to a nitrile. It is an important monomer for the manufacture of useful plastics such as polyacrylonitrile. It is reactive and toxic at low doses. Acrylonitrile was first synthesized by the French chemist Charles Moureu $(1863-1929)$ in 1893.

71. Which of the following has highest knocking

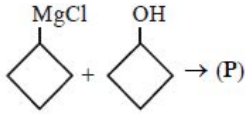
(A) Olefins (B) Branched chain olefins

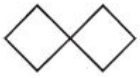
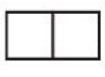
(C) Straight chain olefins (D) Aromatic hydrocarbons

Ans. : c

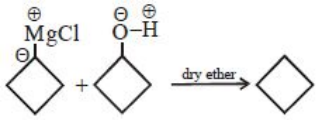
(c) Straight chain olefins has highest knocking.

72. Compound (P) is



(A)  (B)  (C)  (D) 

Ans. : d



73. $cis-3$ -hexene $\xrightarrow{(a)}$ meso $3,4-$ hexanediol

$trans-3$ -hexene $\xrightarrow{(b)}$ meso $3,4-$ hexanediol

Choose pair of reagent (a,b) for above conversions

(A) Cold $KMnO_4, OsO_4$

(B) Cold $KMnO_4, RCO_3H/H_3O^{\oplus}$

(C) $RCO_3H/H_3O^{\oplus}$, cold $KMnO_4$

(D) None of these

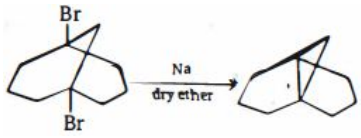
Ans. : b

$(b)\ a =$ Cold $KMnO_4$ (syn-addition)

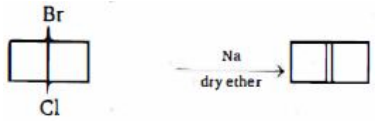
$b = RCO_3H/H_3O^{\oplus}$ (anti-addition)

74. Which of the following does not represent major product of that reaction ?

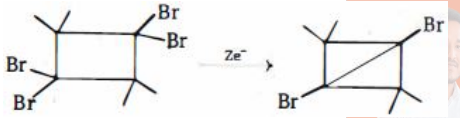
(A)



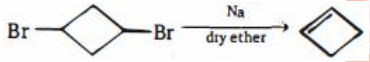
(B)



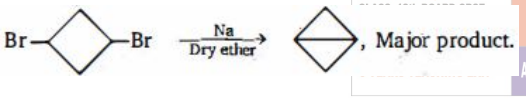
(C)



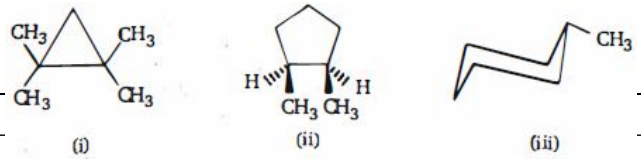
(D)



Ans. : d



75. Arrange the following compounds in decreasing order of their heats of combustion



(A) $(iii) > (ii) > (i)$ (B) $(ii) > (i) > (iii)$ (C) $(iii) > (i) > (ii)$ (D) $(i) > (ii) > (iii)$

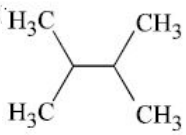
Ans. : d

(d) Stability of cyclic system $6 > 5 > 3$ $\therefore$ Heat of combustion $i > ii > iii$

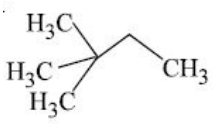
76. Which has maximum $B.P.$?

(A)

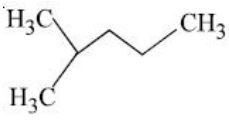
(B)



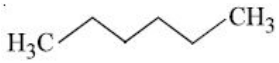
(C)



(D)



Ans.: (A)



77. 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

Ans. : d

(d) On petrol burning CO comes out which is so much poisonous gas.

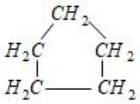
78. An alkane (molecular weight 72) forms only one monochlorinated product. Its formula is

(A) $(CH_3)_4C$

(B) $CH_3(CH_2)_3CH_3$

(C) $(CH_3)_2CHCH_2CH_3$

(D)



Ans. : a

(a) The alkane forms only one mono substituted product, it must have only one type of hydrogen atoms. there fore the alkane is $2,2-$ dimethyl propane.

79. Cetane is a compound which has very good ignition property. Chemically it is

(A) $CH_3(CH_2)_{14}CH_3$ (B) $(CH_3)_3C(CH_2)_{11}CH_3$

(C) $C_{17}H_{34}$ (D) None of these

Ans. : a

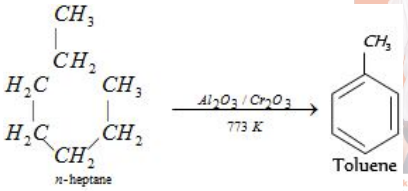
(a) Cetane is chemically hexadecane i.e, $CH_3(CH_2)_{14}CH_3$.

80. Aromatisation of $n-$ heptane by passing over $(Al_2O_3 + Cr_2O_3)$ catalyst at $773\,K$ gives

(A) Benzene (B) Toluene (C) Mixture of both (D) Heptylene

Ans. : b

(b)



81. Which of the following has highest knocking property

(A) Aromatic hydrocarbons

(B) Olefins

(C) Branched chain paraffins

(D) Straight chain paraffins

Ans. : d

(d) Octane number increases in the order

Straight chain alkanes < Branched chain alkanes < Olefins < Cyclo alkanes < Aromatic compounds

Since, straight chain alkane has minimum octane number. Hence, it produces maximum knocking.

82. When ethylene bromide is treated with Zn, we get

(A) Alkane (B) Alkene (C) Alkyne (D) All

Ans. : b

(b) $\underset{\underset{Br}{|}}{\overset{CH_2-CH_2}{|}}{\underset{Br}{|}} + Zn \rightarrow \underset{Alkene}{CH_2=CH_2} + Br_2$

83. CH_3MgI will give methane with

(A) C_2H_5OH (B) $CH_3-CH_2-NH_2$

(C) $CH_3-CO-CH_3$ (D) Both (a) and (b)

Ans. : d

(d) $CH_3MgI + CH_3-CH_2-NH_2 \rightarrow CH_4 + CH_3CH_2NHMgI$

$CH_3MgI + C_2H_5OH \rightarrow CH_4 + C_2H_5OMgI$

Alkyl group of Grignard's reagent is involved in the formation of alkane.

84. Which of the following is not linked with methane

(A) Marsh gas (B) Natural gas (C) Producer gas (D) Coal gas

Ans. : c

(c) Marsh gas, Natural gas and coal gas contains CH_4 but producer gas is a mixture of CO and N_2

$$\underset{\text{Coke}}{2C} + \underbrace{O_2 + 4N_2}_{\text{Air}} \longrightarrow \underbrace{2CO + 4N_2}_{\text{Producer gas}}$$

85. Natural gas is a mixture of

(A) $CO + CO_2$ (B) $CO + N_2$

(C) $CO + H_2 + CH_4$ (D) $CH_4 + C_2H_6 + C_3H_8$

Ans. : d

It's obvious.

86. How many types of carbon atoms are present in $2,2,3-$ trimethylpentane

(A) 1 (B) 2 (C) 3 (D) 4

Ans. : d

It's obvious.

87. Which one of the following compounds cannot be prepared by Wurtz reaction

(A) CH_4 (B) C_2H_6 (C) C_3H_8 (D) C_4H_{10}

Ans. : a

(a)It is not possible to prepare CH_4 by wurtz reaction.

88. Fischer Tropsch process is used for the manufacture of

(A) Synthetic petrol (B) Thermosetting plastics

(C) Ethanol (D) Benzene

Ans. : a

The Fisher-Tropscgh process is used in the manufacturing of Syntheticpetrol. The Fischer-Tropsch process is a collection of chemical reactions that converts a mixture of carbon monoxide and hydrogen into liquid hydrocarbons.... In the usual implementation, carbon monoxide and hydrogen, the feedstocks for FT, are produced from coal, natural gas, or biomass in a process known as gasification.

89. Which statement is not true concerning alkanes

(A) Large number alkanes are soluble in water

(B) All alkanes have a lower density than water

(C) At room temperature some alkanes are liquids, some solids and some gases

(D) All alkanes burn

Ans. : a

No alkanes are not soluble in water. Water is a polar solvent and has hydrogen bonding. For any compound to be soluble in water, it should be polar or have hydrogen bonding in it.

90. Formation of alkane by the action of Zn on alkyl halide is called

(A) Frankland's reaction (B) Wurtz reaction

(C) Cannizzaro reaction (D) Kolbe's reaction

Ans. : a

(i) wurtz reaction

$$2RX + 2Na \xrightarrow{\text{Ether}} \underset{\text{alkane}}{R-R}$$

(ii) Kolbe's reaction

$$RCOONa + H_2O \xrightarrow{\text{Electrolysis}} \underset{\text{alkane}}{R-R}$$

(iii) Ulmann's reaction

$$2C_6H_5I + 2Cu \rightarrow \underset{\text{biphenyl}}{C_6H_5 - C_6H_5}$$

(iv) Frankland reaction

$$\underset{\text{alkyl halide}}{2RX} + Zn \rightarrow \underset{\text{alkane}}{R-R}$$

91. Which of the following is not an endothermic reaction

(A) Dehydrogenation

(B) Ethane to ethene

(C) Combustion of propane

(D) Change of chlorine molecule into chlorine atoms.

Ans. : c

(c)The enthalpy of combustion i.e., ΔH is always negative. It means combustion is an exothermic reaction.

92. A sample of gasoline contains 81% iso-octane and 19% $n-$ heptane. Its octane number will be

(A) 19 (B) 81 (C) 100 (D) 62

Ans. : b

(b) Octane number is related to the percentage of iso-octane since iso-octane is 81% hence octane number is 81.

93. Water gas is

(A) $CO + CO_2$ (B) $CO + N_2$ (C) $CO + H_2$ (D) $CO + N_2 + H_2$

Ans. : c

The mixture of carbon monoxide (CO) and hydrogen (H_2) is called water gas.

Syn gas is a mixture of CO, CO_2 and H_2.

Producer gas is a mixture of flammable gases (principally carbon monoxide and hydrogen) and nonflammable gases (mainly nitrogen and carbon dioxide).

Semi-water gas is a mixture of water gas and producer gas made by passing a mixture of air and steam through heated coke.

94. Which of the following does not decolourise bromine solution in carbon disulphide

(A) Acetylene (B) Propene (C) Ethane (D) Propyne

Ans. : c

(c)Ethane does not decolourise bromine solution because it is a saturated compound.

95. Knocking sound occurs in engine when fuel

(A) Ignites slowly

(B) Ignites rapidly

(C) Contains water

(D) Is mixed with machine oil

Ans. : b

(b)Knocking - Sudden and irregular burning of the fuel mixture causing jerks against the piston and gives rise to violent sound. This is known as knocking.

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

(A) Acetylene (B) Benzene

(C) Carbon tetrachloride (D) Methane

Ans. : d

(d) $CH_4 + O_2 \xrightarrow[\text{Limited supply of air}]{\Delta} C + 2H_2O$

It contains $98 - 99\%$ carbon. It is used in making black ink, paints and shoe polishes.

97. Gasoline is obtained from crude petroleum oil by its

(A) Fractional distillation

(B) Vacuum distillation

(C) Steam distillation

(D) Pyrolysis

Ans. : a

(a) Fractional distillation is used because the difference between the boiling point of different component is less.

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

(A) Pt/Ni (B) Pd (C) SiO_2 (D) Misch Metal

Ans. : a

(a) $Pt./Ni$ is used in catalytic reduction of hydrocarbon.

99. The organic compound used as antiknock agent in petroleum is

(A) $(C_2H_5)_4Pb$ (B) TNT (C) CH_3MgBr (D) $(C_2H_5)_2Hg$

Ans. : a

This abnormal combustion produces a specific type of sound, which we call knocking.

Knocking has adverse effects. It results in early wear-and-tear of the piston. Carbon is deposited in the inner part of the cylinders [Internal Combustion Engines have cylinders, inside which pistons move]. Also, Efficiency is reduced.

So we want to reduce knocking. We add something which can reduce it. Such substances are called Anti - knockingAgents.

A popular anti-knocking agent was Tetra Ethyl Lead (TEL) $(C_2H_5)_4Pb$.

100. Natural gas contains mainly

(A) Methane (B) $n-$ butane

(C) $n-$ octane (D) Mixture of octane

Ans. : a

(a) Methane is the main component of natural gas.

101. Tetraethyl lead is used as

(A) Fire extinguisher (B) Pain reliever

(C) Petroleum additive (D) Mosquito repellent

Ans. : c

Tetraethyl lead is used as petroleum additive to prevent knocking of engine.

102. Kerosene is a mixture of

(A) Alkanes

(B) Aromatic compounds

(C) Alcohols

(D) Aliphatic acids

Ans. : a

Kerosene is a thin, clear liquid formed from hydrocarbons obtained from the fractional distillation of petroleum between $150^{\circ}C$ and $275^{\circ}C$, resulting in a mixture with a density of $0.78-0.81\,g/cm^3$.It is composed of carbon chains that typically contain between 6 and 16 carbon atoms per molecule. It is miscible in petroleum solvents but immiscible in water. Kerosene's major components are branched and straight chain alkanes and naphthenes (cycloalkanes), which normally account for at least $70\,\%$ by volume.

103. Petroleum ether can be used as

(A) Solvent for fat, oil, varnish and rubber

(B) As a fuel

(C) Both (a) and (b)

(D) None of these

Ans. : a

(a)Solvent for fat, oil, varnish and rubber

104. Petroleum consists mainly of

(A) Aliphatic hydrocarbons (B) Aromatic hydrocarbons

(C) Aliphatic alcohols (D) None of these

Ans. : a

Liquefied Petroleum Gas or LPG (also called Autogas) consists mainly of Aliphatic hydrocarbons

(propane, propylene, butane, and butylene in various mixtures).

It is produced as a by-product of natural gas processing and petroleum refining.

Petroleum is a mixture of a very large number of different hydrocarbons; the most commonly found molecules are alkanes (paraffins), cycloalkanes (naphthenes), aromatic hydrocarbons, or more complicated chemicals like asphaltenes.

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

(A) CH_3I (B) C_2H_5I (C) CH_3OH (D) C_2H_5OH

Ans. : a

(a) $CH_3I + 2H \xrightarrow{Zn/HCl} CH_4 + HI$

$CH_3I + 2Na + ICH_3 \xrightarrow[Ether]{Dry} CH_3 - CH_3 + 2NaI$

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

(A) Methane (B) Ethane (C) Propane (D) Butane

Ans. : a

(a)

$$C_2H_5O\overset{\delta-}{H} + \overset{\delta+}{CH_3} - Mg - Br \rightarrow CH_4 + Mg\begin{matrix} Br \\ \diagdown \\ \diagup \\ OC_2H_5 \end{matrix}$$

107. In Wurtz reaction, the reagent used is

(A) Na (B) Na / liquid NH_3 (C) Na / Dry ether (D) Na / Dry alcohol

Ans. : c

(c) $RCl + 2Na + RCl \xrightarrow[Ether]{Dry} 2NaCl + \underset{\text{Alkane}}{R - R}$

108. The most volatile compound is

(A) $2,2-$ dimethyl propane

(B) $2-$ methyl butane

(C) Isobutane

(D) $n-$ pentane

Ans. : a

The boiling point is inversely proportional to the branch in the compound. Therefore, $2,2$-dimethyl propane has more branching, higher boiling point.

109. Iodoethane reacts with sodium in the presence of dry ether. The product is

(A) Pentane (B) Propane (C) Butene (D) Butane

Ans. : d

(d) $C_2H_5I + 2Na + IC_2H_5 \xrightarrow[Dry]{Ether} \underset{\text{Butane}}{C_2H_5 - C_2H_5} + 2NaI$

110. Which of petroleum corresponds to kerosene oil

(A) $C_{15} - C_{18}$ (B) $C_{10} - C_{12}$ (C) $C_5 - C_9$ (D) $C_1 - C_9$

Ans. : b

Kerosene is a mixture of hydrocarbons. The chemical composition depends on its source of isolation, usually, it consists of about 10 different hydrocarbons, each containing 11 to 16 carbon atoms per molecule.

The main constituents are saturated straight-chain and branched-chain hydrocarbons which are also called as paraffin, as well as ring-shaped cycloparaffins which are also known as naphthenes. Kerosene is less volatile liquid than gasoline.

111. Which of the following compounds is used in antiknock compositions to prevent the deposition of oxides of lead on spark plug, combustion chamber and exhaust pipe

(A) Glycerol (B) Glycol

(C) $1,2-$ dibromoethane (D) Benzene

Ans. : c

(c) $Pb(C_2H_5)_4 \xrightarrow{heat} Pb + \underset{\text{Ethyl radical}}{4CH_3CH_2}$

$$\begin{matrix} CH_2-CH_2 \\ | \quad\quad | \\ Br \quad Br \end{matrix} + Pb \rightarrow \underset{Ethene}{CH_2=CH_2} + \underset{Leadbromide}{PbBr_2}$$

As leaded gasoline burns, lead metal gets deposited in the engine which is removed by adding ethylene dibromide. The lead bromide is volatile and is carried off with the exhaust gases from the engine

112. 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

Ans. : a

As the boiling point of an alkane depends on the surface area of a molecule, higher the surface is, higher the boiling point of alkane. The branched-chain isomer of an alkane has a lower surface area than that of its straight-chain isomer, so the branched-chain isomer of an alkane has a lower boiling point than its straight-chain isomer.

So, higher the branches, lower is the boiling point.

So, the order of boiling point of isomeric pentanes is $n-$ pentane $>$ iso $-$ pentane $>$ neo $-$ pentane.

113. Cycloalkane has the formula

(A) C_nH_{2n+2} (B) C_nH_{2n-2} (C) C_nH_{2n} (D) $C_{2n}H_2$

Ans. : c

It's obvious.

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

(A) Pyrolysis of higher carbon number of hydrocarbons

(B) Electrolysis of salts of fatty acids

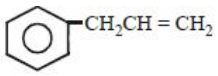
(C) Sabatier and Senderen's reaction

(D) Direct synthesis

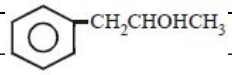
Ans. : a

$$\underset{\text{Hexane}}{C_6H_{14}} \xrightarrow[\Delta]{\text{Pyrolysis}} \underset{\text{Ethene}}{C_2H_4} + \underset{\text{Butane}}{C_4H_{10}}$$

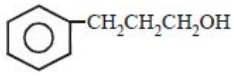
115. on mercuration and demercuration produces



(A)



(B)



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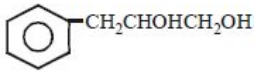
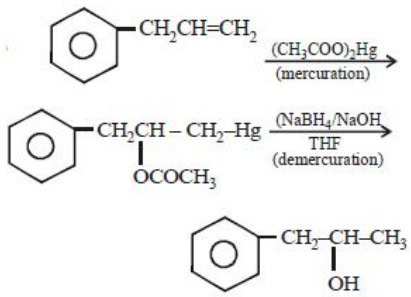


(D) none of these

Ans. : a



116. Below, some catalysts and corresponding proceses/reactions are matched. The mismatch is

(A) $[RhCl(PPh_3)_2]$: Hydrogenation

(B) $TiCl_4 + Al(C_2H_5)_3$: Polymerization

(C) V_2O_5 : Haber-Bosch process

(D) Nickel-Hydrogenation

Ans. : c

V_2O_5 is used as a catalyst in contact process for the manufacture of SO_3 and hence H_2SO_4. In Haber-Bosch process for the manufacture of NH_3, finely divided $Fe+$ molybdenum are used.

117. Pyridine is less basic than triethylamine because

(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

Ans. : d

(d) Basicity of amines is due to availability of an unshared pair (lone pair) of electrons on nitrogen. This lone pair of electrons is available for the formation of a new bond with a proton or Lewis acid.

Pyridine is less basic than triethylamine because lone pair of nitrogen in pyridine is delocalised.

118. Among the following the aromatic compound is

(A) 

(B) 

(C) 

(D) 

Ans. : a

(a) According to Huckel rule for aromaticity the molecule must be planar, cyclic system having delocalised $(4n+2)\pi$ electron where n is an integer equal to $0,1,2,3,$ thus the aromatic comp. have delocalised electron cloud of

$2,6,10$ or 14 π electron cyclopropenyl cation have the 2 π electron $(n=0)$ so it is aromatic.

119. If ethylene, carbon monoxide and water is heated at high temperature, which of the following is formed

(A) $C_4H_8O_2$ (B) C_2H_5COOH

(C) CH_3COOH (D) $CH_2 = CH - COOH$

Ans. : b

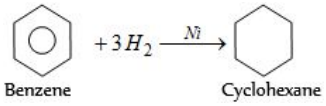
(b) $\underset{\text{Ethylene}}{C_2H_4} + CO + H_2O \xrightarrow{\text{Ligh temp.}} \underset{\text{Propionic acid}}{C_2H_5 - COOH}$

120. Catalytic hydrogenation of benzene gives

(A) Xylene (B) Cyclohexane (C) Benzoic acid (D) Toluene

Ans. : b

(b)



121. Olefins can be hydrogenated by

(A) Zinc and HCl (B) Nascent hydrogen

(C) Raney Ni and H_2 (D) Lithium hydride in ether

Ans. : c

(c) $\underset{\text{Ethene}}{CH_2=CH_2}+H_2\xrightarrow[300^o]{Ni}\underset{\text{Ethane}}{CH_3-CH_3}$

122. A compound 'X' on ozonolysis forms two molecules of $HCHO$. Compound 'X' is

(A) C_2H_4 (B) C_2H_2 (C) C_2H_6 (D) C_6H_6

Ans. : a

(a) $CH_2=CH_2\xrightarrow[(2)\ Zn/H_2O]{(1)\ O_3}HCHO+HCHO$

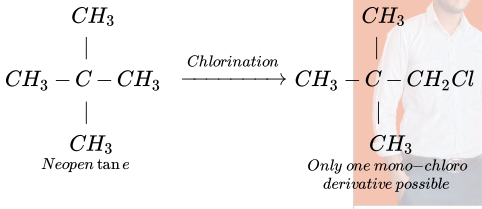
123. Which branched chain isomer of the hydrocarbon with molecular mass $72\,u$ gives only one isomer of mono substituted alkyl halide ?

(A) Tertiary butyl chloride (B) Neopentane

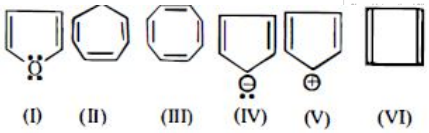
(C) Isohexane (D) Neohexane

Ans. : b

As the molecular mass indicates it should be pentane and neopentane can only form one mono substituted alkyl halide as all the hydrogens are equivalent in neopentane



124. Which of the following compounds are antiaromatic



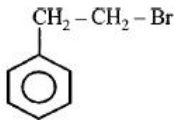
(A) (I) and (V) (B) (II) and (V) (C) (I) and (IV) (D) (V) and (VI)

Ans. : d

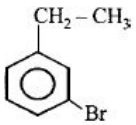
For a compound to be aromatic it must have $(4n+2)\pi e^-$ and system should be planar where n is an integer. (V) and (VI) both have $4\,e^-$ and planar structure. Hence are Antiaromatic

125. The product of the reaction between ethyl benzene and $N-$ bromosuccinamide is

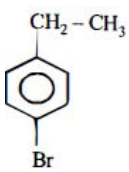
(A)



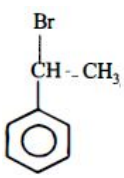
(B)



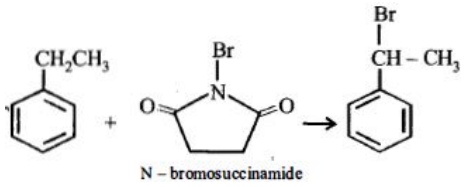
(C)



(D)



Ans. : d



N – bromosuccinamide

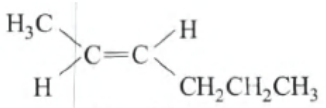
126. $2-$ Hexyne gives trans $-2-$ Hexene on treatment with :

(A) Pt/H_2 (B) Li/NH_3 (C) $Pd/BaSO_4$ (D) $LiAlH_4$

Ans. : b

Alkynes on treatment with alkali metals in liquid ammonia gives trans hydrogenation product:

$$CH_3 - C \equiv C - CH_2 - CH_2 - CH_3 \xrightarrow{Li/NH_3}$$



trans-2-hexene

127. Ozonolysis of an organic compound gives formaldehyde as one of the products. This confirms the presence of :

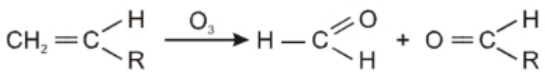
(A) two ethylenic double bonds

(B) a vinyl group

(C) an isopropyl group

(D) an acetylenic triple bond

Ans. : b



Presence of one vinyl group gives formaldehyde as one of the product in ozonolysis.

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

(A) propene (B) $1-$ butene (C) $2-$ butene (D) ethene

Ans. : c

$2-$ butene is symmetrical alkene

$CH_3 - CH = CH - CH_3 \xrightarrow[-2m_2O]{O_3} 2.CH_3CHO$

Also, molar mass of CH_3CHO is $44\,u$.

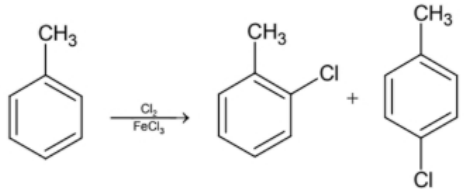
129. The reaction of toluene with Cl_2 in presence of $FeCl_3$ gives predominantly

(A) $m-$chlorobenzene (B) benzoyl chloride

(C) benzyl chloride (D) $o-$ and $p-$ chlorotoluene.

Ans. : d

Due to o- and p- directing nature of CH_3 group.



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

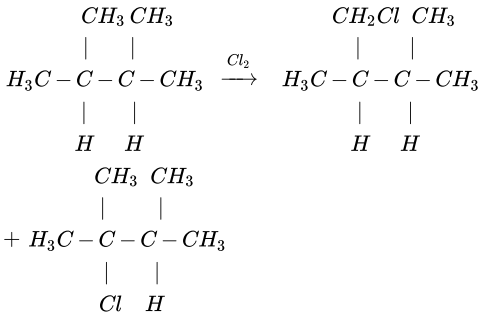
(A) $n-$hexane

(B) $2,3-$dimethylbutane

(C) $2,2-$dimethylbutane

(D) $2-$methylpentane

Ans. : b

(b) 

131. 2–Methylbutane on reacting with bromine in the presence of sunlight gives mainly

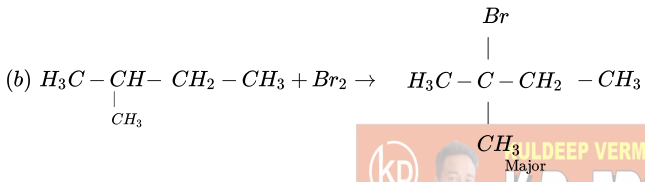
(A) 1–bromo–2–methylbutane

(B) 2–bromo–2–methylbutane

(C) 2–bromo–3–methylbutane

(D) 1–bromo–3–methylbutane

Ans. : b

(b) 

132. Which of these does not follow Anti-Markownikoff's rule

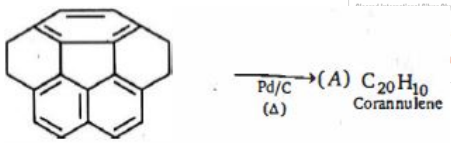
(A) 2–butene (B) 1–butene (C) 2–pentene (D) 2–hexene

Ans. : a

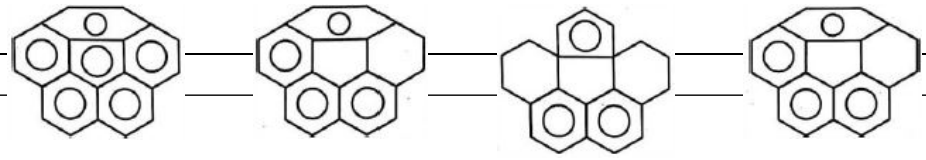
(a) Markownikoff as well as anti-Markownikoff's rule is valid only for unsymmetrical alkenes.

133. The step shown below is a recent synthesis of corannulene.

Product (A) is



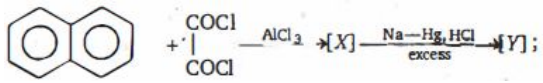
(A) (B) (C) (D)



Ans. : a

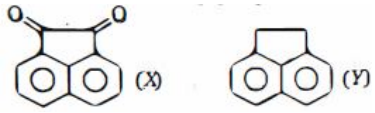
$(a)\ Pd/C$ (or) Se is used to aromatize the acyclic ring.

134. Product Y is



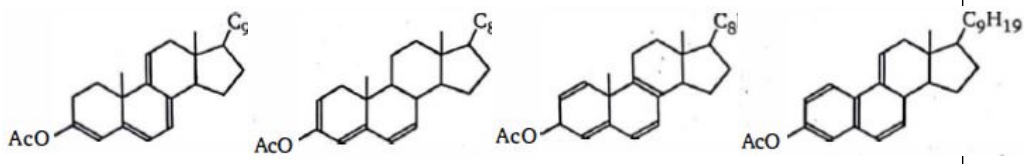
(A) (B) (C) (D)

Ans. : c



135. Which of the following compound is most stable ?

(A) (B) (C) (D)

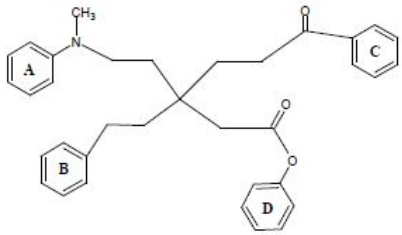


Ans. : d

(d) Aromatic ring is more stable than non-aromatic ring so $'d'$ is most stable

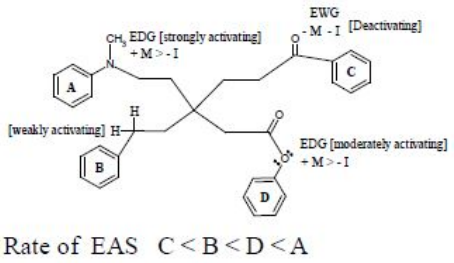
136. The following compound has four aromatic rings marked as A, B, C and D. Rank them in terms of increasing reactivity towards electrophilic aromatic substitution?

Compound is



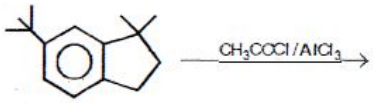
(A) $C < D < A < B$ (B) $C < B < D < A$ (C) $C < B < A < D$ (D) $B < C < D < A$

Ans. : b

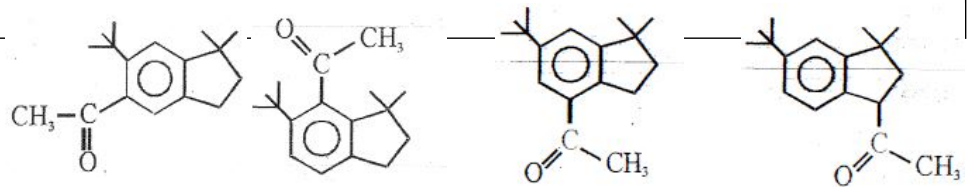


Rate of EAS C < B < D < A

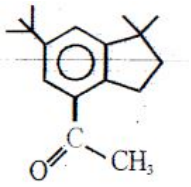
137. The major product of the reaction is



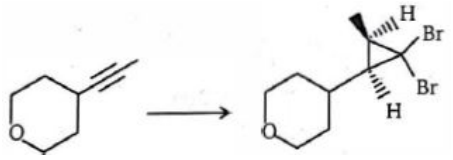
(A) (B) (C) (D)



Ans. : (C)



138. To carry out above conversion reagent used in decreasing order.



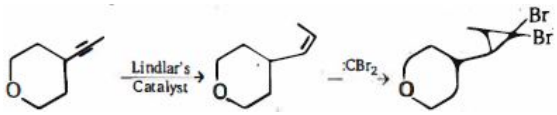
(A) $Na/liq.NH_3, CHBr_3/NaOH(\Delta)$

(B) $H_2/Pd-CaCO_3, CHBr_3/NaOH(\Delta)$

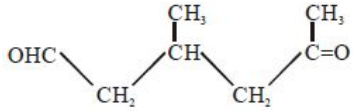
(C) $Na/liq.NH_3, CHCl_3/NaOH$

(D) $H_2/Pd-CaCO_3, CHCl_3/NaOH$

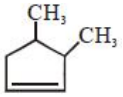
Ans. : b



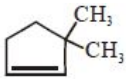
139. Ozonolysis of which compound gives



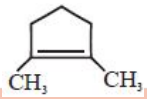
(A)



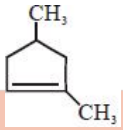
(B)



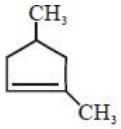
(C)



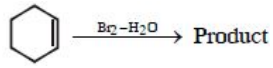
(D)



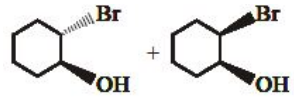
Ans. : (D)



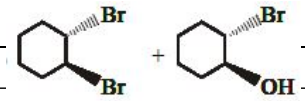
140. The product of following reaction will be



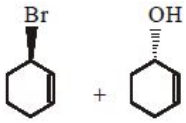
(A)



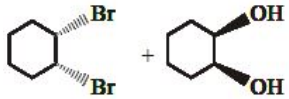
(B)



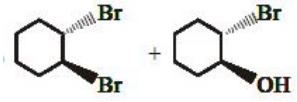
(C)



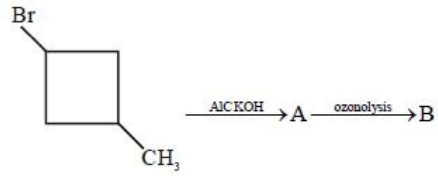
(D)

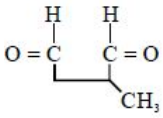


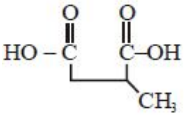
Ans. : (B)

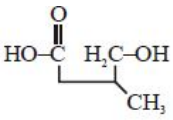


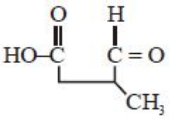
141. Identify the final product (B).



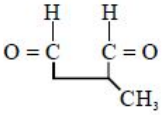
(A) 

(B) 

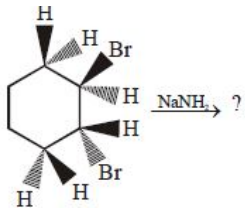
(C) 

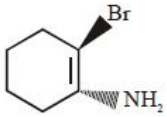
(D) 

Ans.: (A)



142.



(A) 

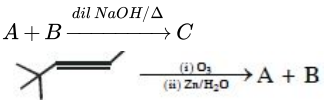
(B) 

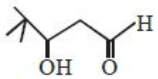
(C) 

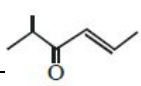
(D) 

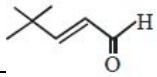
Ans. : (C)

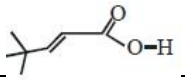
143. Consider reaction sequence and identify 'C'?



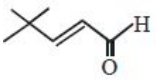
(A) 

(B) 

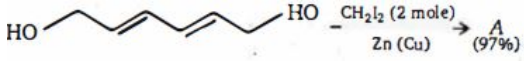
(C) 

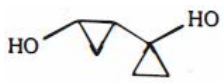
(D) 

Ans. : (C)



144. Product (A) will be



(A) 

(B) 

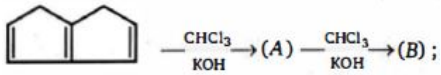
(C) 

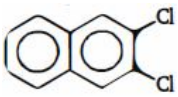
(D) 

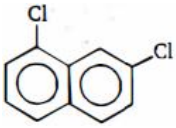
Ans. : b

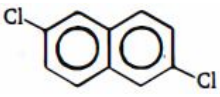
(b) Simmon smith reaction

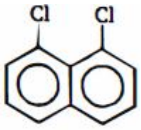
145. Product (B) is



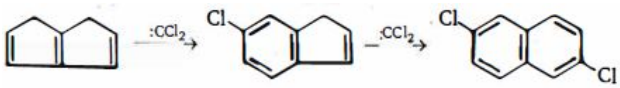
(A) 

(B) 

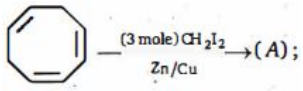
(C) 

(D) 

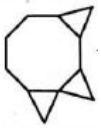
Ans. : c

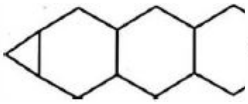


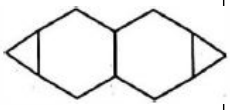
146. Compound (A) is



(A) 

(B) 

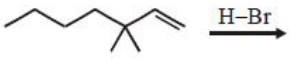
(C) 

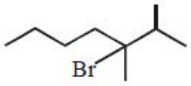
(D) 

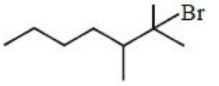
Ans. : a

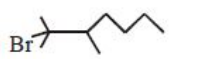
(a) Simmon-Smith reaction.

147. Give the major product of the reaction



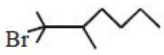
(A) 

(B) 

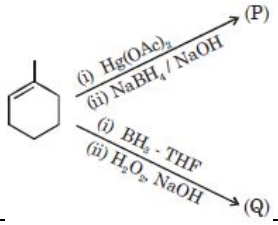
(C) 

(D) 

Ans. : (C)



148. Major products of following reactions are related as :



(A) Position isomers

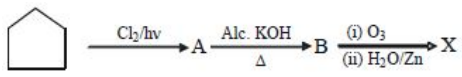
(B) Chain isomers

(C) Functional isomers

(D) Identical

Ans.: (A) Position isomers

149. X is -



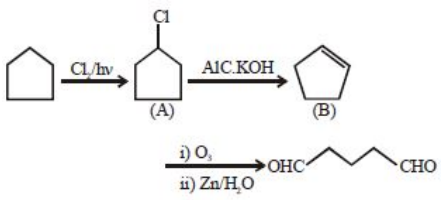
(A) $CHO-(CH_2)_3-CHO$

(B) $CHO-(CH_2)_2-CHO$

(C) $CHO-(CH_2)_3-CH_3$

(D) $CHO-CHO$

Ans. : a



150. Match the column and find correct answer

Column $-I$	Column $-II$
(i) $n-$ Butane $\rightarrow 2-$ methyl propane	(A) Free redical substitution
(ii) $CH_4 + Cl_2 \xrightarrow{hv} CH_3 + Cl$	(B) Wurtz reaction
(iii) $R - COONa \xrightarrow{soda-lime} R - H$	(C) Isomerism
(iv) $R - X + Na \xrightarrow{Ether} R - R$	(D) De-carboxylation

(A) $I - C, II - A, III - D, IV - B$ (B) $I - A, II - C, III - D, IV - B$

(C) $I - C, II - A, III - B, IV - D$ (D) $I - B, II - A, III - D, IV - C$

Ans.: (A) $I - C, II - A, III - D, IV - B$

----- Being the richest man in the cemetery doesn't matter to me. Going to bed at night saying we've done something wonderful . . . that's what matters to me. -----