SRIGAYATRI EDUCATIONAL INSTITUTIONS

INDIA

ALKANES (UT-05 QB)

1. Which compound cannot be formed from Wurtz reaction?

(a) Methane (b) Butane (c) Ethane (d) Propane

2. Which of the following can be used for the preparation of propane?

(a) $CH_3CH_2CH_2I \xrightarrow{HCl/\Delta.150^\circ C}$ (b $CH_3CH_2CH_2CH_2COONa \xrightarrow[\Delta]{NaOH(CaO)}$

(c) $CH_3CH_2CH_2Cl \dfrac{1\cdot Mg/ether}{2\cdot H_2O_2}$ (d) $CH_3CH=CH_2 \dfrac{1\cdot B_2H_6}{2\cdot Ag\,NO_3/NaOH}$

3. Which of the following reagents converts both acetaldehyde and acetone to alkanes?

a) Z n-H g / conc. b) $LiAlH_4$ c) $I_2/NaOH$ d) Ni/H_2

4. When 2 -chloro- 2 - methyl butane is heated with alcoholic KOH the possible product/s is /Are

i)$(CH_3)_2C=CHCH_3$ ii)$CH_2=C(CH_3)CH_2CH_3$ iii)$(CH_3)_2CHCH=CH_2$

a) (i), (ii) and (iii) b) (ii) and (iii) c) (i) and (iii) d) (i) and (ii)

5. When 1 -dichloride propane are reacted separately with aqueous KOH solution compound A & D are formed both A & B formed both A & B gives the same product C on reduction using amalgamated Zinc and HCl. Identified C

a) propane b) isopropyl alcohol c) propyl alcohol d) propyl chloride

6. Which one of the following compounds gives methane on treatment with water?

a) Al_4C_3 b) B_4C c) CaC_2 d) SiC

7. Wet ether is not used as a solvent in Wurtz reaction, because the water present in it

a) reacts with R-R b) destroy the N a metal

c) reduces RX to RH d) hydrolyses RX to ROH

8. In which of the following reactions, ethyl chloride is obtained in good yield?

a) Ethane $+Cl_2 \xrightarrow{h\nu}$ b) Ethane $+Cl_2$(excess) $\xrightarrow{hv}$

c) Ethene $+Cl_2$, in dark d) Benzene $+Cl_2 \rightarrow$

9. n -pentane and iso-pentane can be distinguished by

a) $KMnO_4$ b) conc.H_2SO_4 c) Br_2 d) O_3

10. Sodium acetate can be converted to ethane by

a) Heating with $LiAlH_4$ b) Electrolysing its aqueous solution

c) Heating with sodalime d) Heating with calcium acetate

11. Which of the following reactions will not give propane?

(a) $CH_3CH(OH)-CH_3 \xrightarrow{P/HI}$ (b) $CH_3CH=CH_2 \xrightarrow[CH_3COOH]{B_2H_6}$

(c) $CH_3COCl \xrightarrow[H_2O]{CH_3MgX}$ (d) $CH_3CH_2CH_2Cl \xrightarrow[H_2O]{M_g/ether}$

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

a) Methane b) Propane c) Ethane d) Butane

13. Which of the following does not give alkane?

a) reaction of sodium acetate with sodalime

b) Reaction ofCH_3IwithNain ether

c) Reaction of ethyl chloride with alc. KOH

d) Electrolysis of concentrated sodium acetate solution

14. The reaction $CH_3CH_2Cl - \xrightarrow[2-CuI]{1-Li} \xrightarrow{CH_3CH_2Cl} n-$ **butane is knows as**

a) Friedel-Craft's synthesis
b) Corey-House synthesis
c) Kolbe synthesis
d) Wurtz synthesis

15. 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

a) $CH_2 = CH - CI - CH_2 - CH_3$ (with CH_3 branch)

b) $CH_3 - CHI - CH - CH_2 - CH_3$ (with CH_3 branch)

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

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

16. The correct order of boiling points of 2,2 –dimethylpropane

a) 2, 2-dimethylpropane >2- methylbutane >n -pentane
b) 2 -methylbutane > n-pentane >2,2 -dimethyipropane
c) 2-methylbutane >2,2 -dimethylpropane >n -pentane
d) n -pentane >2 -methylbutane >2,2 -dimethylpropane
e) n-pentane >2,2 -dimethylpropane >2 -methyl butane

17. Normal butane convert into isobutene by

a) $NaBH_4$ b) $LiAlH_4$ c) $AlCl_3$ d) Zn / HCl

18. Which is the best antiknock compound or Which One of the following substances used as an antiknock compound?

a) Tetraethyl lead (TEL)
b) Lead acetate
c) Zinc ethyl
d) Lead tetrachloride

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

a) Propene b) Ethene c) Propane d) Propyne

20. Which of the following reaction is expected to readily give a hydrocarbon product in good yields?

a) $CH_3 - CH_3 - \xrightarrow[h\nu]{Cl_2}$
b) $(CH_3)_2 CCl \xrightarrow{C_2H_5OH}$
c) $RCOOK \xrightarrow{\text{Oxidation Electrolysis}}$
d) $RCOOAg \xrightarrow{I_2}$

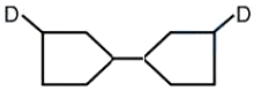
21. Which branched chain isomer of the hydrocarbon with molecular mass 72 u gives only one isomer of mono substituted alkyl halide?

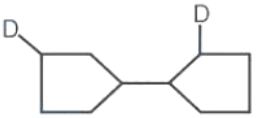
(a) Tertiary butyl chloride (b) Neopentane (c) Isohexane (d) Neohexane

22. **In the reaction,**

The compound (C) is?

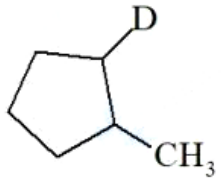
(A) 

(B) 

(C) 

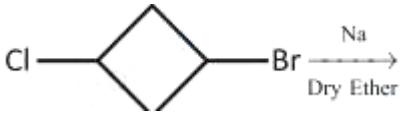
(D) 

23. Which of the following is used for the conversion of 1 -methylcyclopentene to

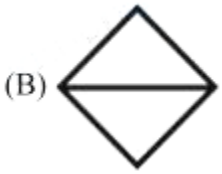


(A)BD_3THF followed by CH_3COOH (B)BH_3.THF followed byCH_3COOD

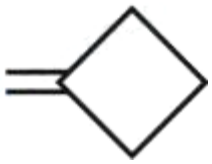
(C)BD_3THF followed by CH_3COOD (D)BH_3THF followed by CH_3COOH

24. Single choice : 

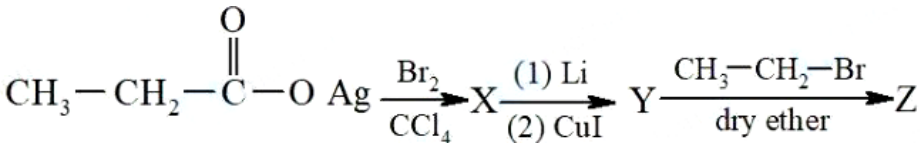
(A) 

(B) 

(C) 

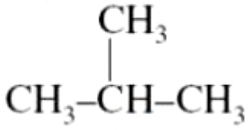
(D) 

25.



Z is :

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

(D) 

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

KEY

1) **A**	2) **A**	3) **A**	4) **C**	5) **A**	6) **A**	7) **B**	8) **A**	9) **A**	10) **B**
11) **C**	12) **A**	13) **C**	14) **B**	15) **D**	16) **D**	17) **C**	18) **A**	19) **C**	20) **C**
21) **B**	22) **B**	23) **B**	24) **B**	25) **C**	26)	27)	28)	29)	30)

SOLUTIONS

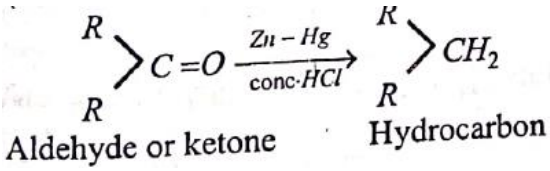
1. Compounds containing two or more carbon atoms are prepared by Wurtz reaction. Thus, methane, CH_4 cannot be prepared by Wurtz reaction.

2. Alkyl halides undergo reduction with red phosphorus and hydrogen iodide and result in the formation of alkane.

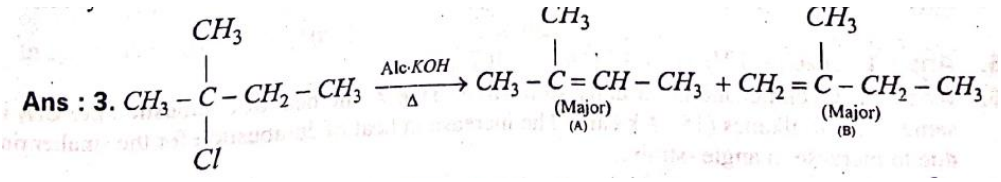
$$CH_3CH_2CH_2I \xrightarrow[150^\circ C]{Red P / HI} CH_3CH_2CH_3$$

3. Clemmensen's reduction (conç. HCl / Zn-Hg) or Wolff-Kishner reduction

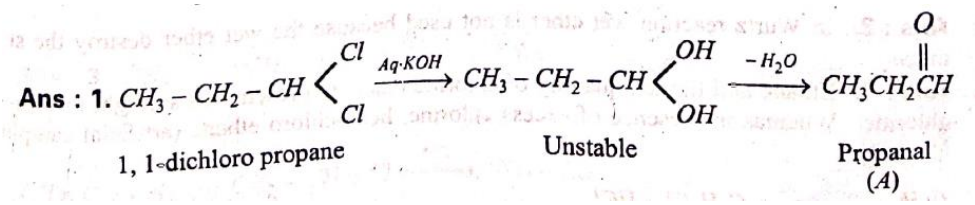
$$R-COOK + 2H_2O \xrightarrow{\text{Electrolysis}} \underset{\text{Alkanes}}{R-R} + CO_2 + 2KOH + H_2$$



4.



5.

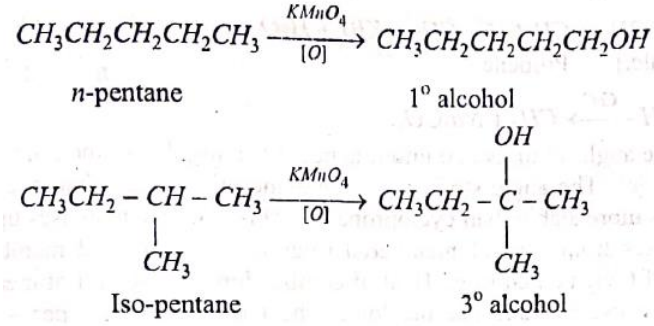


6. $Al_4C_3 + 12H_2O \rightarrow 4Al(OH)_3 + 3CH_4$

7. In Wurtz reaction wet ether is not used because the wet ether destroy the sodium metal

8. Ethane and limited quantity of chlorine reacts in presence of sunlight to form ethyl chloride. Whereas in presence of excess chlorine, hexa-chloro ethane (artificial camphor) is obtained. $C_2H_6 + Cl_2 \xrightarrow{h\nu} C_2H_5Cl + HCl$

9. On oxidation with $KMnO_4$ n -pentane and iso-pentane give different oxidation prod- ucts. So, by identifying these products we can distinguish n - pentane and iso-pentane.



10. $\underset{\text{Sodium acetate}}{2CH_3COONa} + 2H_2O \xrightarrow{\text{Electrolysis}} CH_3 - CH_3 + 2CO_2 + 2NaOH + H_2$

11. With calculated amount of Grignard reagent, acetyl chloride forms ketones

$$CH_3COCl + XMgCH_3 \rightarrow CH_3COCH_3 + Mg\begin{matrix} Cl \\ X \end{matrix}$$

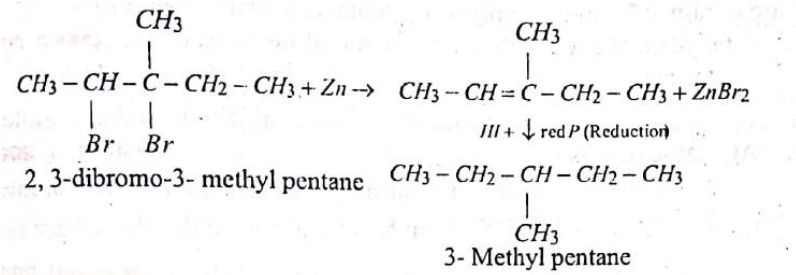
12. $C_2H_5O[H + CH_3] - Mg - Br \rightarrow CH_4 + Mg(OC_2H_5)Br$

13.

$$CH_3 \cdots CH_2 - Cl + KOH_{(alc)} \rightarrow \underset{\text{Ethene}}{CH_2 = CH_2} + KCl + H_2O$$

14. Conceptual

15.



16. Branching of the chain makes the molecule more compact and thereby decreases the surface area. The intermolecular forces which depend upon the surface area, become small in magnitude on account of branching. Consequently, the boiling points of branched chain alkanes are less than the straight chain isomers.

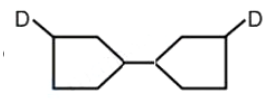
17. $CH_3CH_2CH_2CH_3 \xrightarrow{\text{anhyd}A/Cl_3} CH_3 - \underset{\underset{CH_3}{|}}{C}H - CH_3$

18. Tetraethyl lead (TEL) is an anti-knocking compound. When mixed petrol tend to improve the octane no. and therefore, decreases the knocking in the cylinder of the combustion engine.

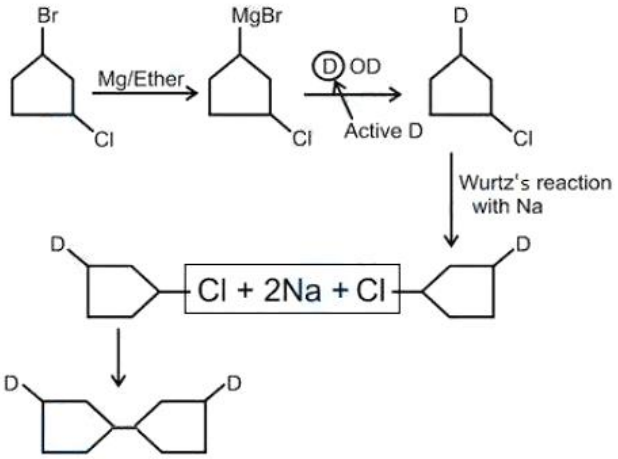
19. Propane is a saturated compound. Ozonide is formed only by alkenes or alkynes

20. $R - COOK + 2H_2O \xrightarrow{\text{Electrolysis}} \underset{\text{Alkanes}}{R - R} + CO_2 + 2KOH + H_2$

21. 

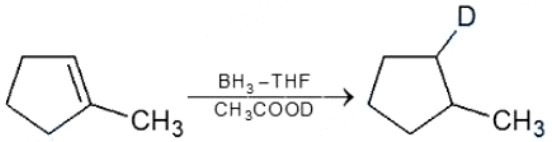
22. 

(C - Br) bond is weaker than (C - Cl) bond. Grignard's reagent is formed more predominantly with (C - Br).

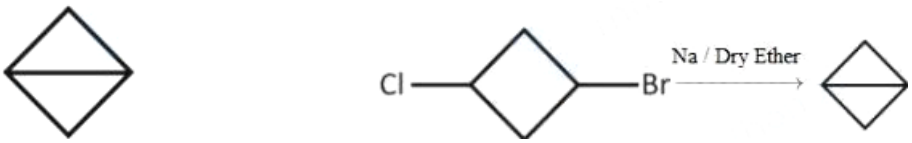


23. BH_3THF followed by CH_3COOD

The following reaction proceeds through Anti-Markownikoff's addition. Boron gets attached to the more substituted Carbon and the acidic Deuterium from CH_3COOD gets attached to the less substituted Carbon.



24.



25.

$CH_3-CH_2-CH_2-CH_3$