



CHEMISTRY

BOOKS - G.R. BATHLA & SONS CHEMISTRY (HINGLISH)

SATURATED ALIPHATIC HYDROCARBONS

Some Solved Problems

1. Why are alkanes relatively unreactive ?



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



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3. Methane does not react with chloride in dark . Explain by giving reason

.



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4. the free of burning liquid paraaffin cannot be extinguished by throwing over this Explain by giving reason .



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5. how will you obtain ? Give equations only :

(a) methane from acetone

(b) ethane from acetone acid .

(c) methane and ethane from sodium acetate,



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6. why is the Wurtz synthesis not a good method for preparing propane ?



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7. write the structural formulae and IUPAC names of the different alkanes formed when a mixture of 1-bromopropane and 2-bromopropane is reacted with sodium in presence of ether. What is the name of the reaction ?



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8. An alkane with molecular mass 72 formed only one substitution product. Suggest a structure for the alkane.



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9. Indicate the stereochemistry of the following hydrogenation reaction .



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10. Prepare butane from chloroethane using the Corey - House synthesis .

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11. A sample of diesel has the same characteristics 60ml mixture of centane and α - methyl naphthalene mixed in 2:1 ratio (V/V) . What is the cetane number of the diesel sample ?

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Problems For Practice

1. what happen when :

- (a) Dry sodium propionate is heated with sodaalkali ?
- (b) Electrolysis of an aqueous solution of potassium acetate is done ?
- (C) Ethyl iodine is treated with phosphorus and hydrogen iodine ?
- (d) Electrolysis of an aqueous solution of potassium acetate is done ?,
- (e) Ethyl iodine dissolved in dry ether is treated with sodium metal ?
- (f) Methane is treated with iodine in presence of an oxidising agent ?
- (g) n- Hexane is treated with Cr_2O_3 supported over alumina at 873 K?
- (h) Ethane is treated with conc , nitric acid at 723 K?
- (i) Lithium dimethyl cuprate is treated with ethyl bromide?



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2. How will you prepare the following ?

- (a) n-Butane from ethyl bromide .
- (b) Ethane from acetic acid .
- (c) Ethane from ethane .
- (d) Methane from acetic acid .

(e) Ethane from methane in two steps.

(f) Ethane from ethanol in one step,

(g) Methyl chloride from aluminum carbide in two steps.

(h) propane from methane .



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3. Complete the following reactions



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4. Answer the following :

(a) How many molecules of oxygen would be required for the complete combustion of one molecule of butane ?

(b) How many chain isomers are possible in C_5H_{12} ?

(c) what is the octane number of 2,2,4 - trimethylpentane ?

(d) what is the octane number of n- hexane ?

(f) Name the two methods used for the synthesis of petrol .

(g) what is the flash point fixed in india ?

(h) what is the name of the process in which normal alkanes are converted into their branched chain isomers in the presence of aluminium chloride and HCl?



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5. How do you account for the following ?

(a) Alkanes are account for the following ?

(B) chlorination of methane does not need chemical reagents .

(C) iodination of methane occurs of methane occurs in presence of iodic acid .

(d) why the cracked gasoline is considered to be superior to straight distilled gasoline

(e) the boiling points of branched chain alkanes are lower than than their normal isomers .

(f) Alkanes containing even number of carbon atoms have higher than expected point .

(g) Although combustion of alkanes is a strongly exothermic process it does not occur at moderate temperature

(h) tetraethyl lead $(C_2H_5)_4Pb$ initiates the chlorination of methane in the dark at 423 K .

(j) why does an oil slick form on the surface of the ocean after a spill ?

(j) A tertiary carbon atom can be oxidised with relative ease .

(K) Out of 2-methylhexane and 2,2- dimethylbutane which one has higher point and which one has higher boiling point?



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6. Select from each of the following sets the hydrocarbons having lowest and higher boiling point :

(a) n- butane ,n-hexane , n-pentane

(b) n- pentane ,n-hexane ,2,3-dimethylbutane

(C) 3,3- dimethylpentane ,2,3-methylhexane ,n- heptane ,n- heptane



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7. (i) write equations for the preparation of n- heptane

(a) n- Butyl bromide (B) Ethyl bromide

(C) i- Butane ,(d) 2- butane

(ii) which of the following reagents will react with ethane ?

(a) Aqueous KO ,

(b) Alkaline $KMnO_4$,

(C) Bromine in presence of light ,(D) Nitric acid at 723 K.

(iii) write the structural and IUPAC names for all the dibromo derivatives of propane .

(iv) write the structural formula and IUPAC names for all the trichloro derivatives of propane ,

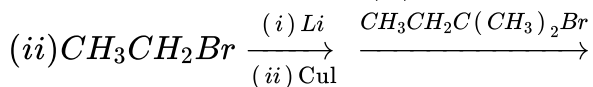
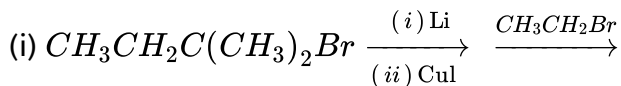
(v) starting with bromoethane and bromomethane , prepare propane using the Corey -House synthesis (vi) prepare n- hexane from i-bromopropane using the corey -House synthesis .

(vii) prepare 2- deuterio propane from isopropyl bromide .



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8. (A) which is better of (i) and (ii) ?



Also identify the product formed .

(B) sodium salt of which and will be needed for the preparation of propane ?

(C) when sulphuryl chloride (SO_2Cl_2) is used for chlorination of an alkane , explain mechanism of chlorination .

(D) give the condensed formulae for the alkanes (i) C_8H_{18} and (ii) $\text{C}_{11}\text{H}_{24}$ with the greatest number of methyl groups ,

(e) place the three isomeric pentanes in order of increasing stability at room temperature .

(F) write the structure of all the alkanes that can be hydrogenated to form 2-methylpentane .

(G) in the halogenation of alkanes other than methane , there is another chain terminating reaction called disproportionation write the mechanism of this reaction for $\dot{\text{C}}_2\text{H}_5$

(h) write the structure of an alkane , C_8H_{18} which gives only one monochloro substitution product.

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9. Give the total number of isomers including stereoisomers obtained on monochlorination of isopentane .

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10. Which of the isomers hexane gives five monochloro derivatives when chlorinated ?

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11. 

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1. what volume of methane (NTP) is formed from 16.4 g of sodium acetane by fucioon with sodalime ?



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2. If a rocket was fuelled with Kerosene and liquid oxygen , what mass of oxygen would be requird every litre of kerosene ?

(assume kerosene to have average compostion $C_{14}H_{30}$). the density of ker sone is 0.764 g,/mL)



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3. Write the struture of all the alkanes that can be hydrogenated to from 2- methpyloentane .



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4. In the study of chlorination of propane, four products (A, B, C and D) of the formula $C_3H_6Cl_2$ were isolated. Each was further chlorinated to produce trichloro products ($C_3H_5Cl_3$). It was found that A provided one trichloro product, B gave two and C and D each gave three. What are the structural formulae of A, B, C and D?



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5. Calculate the heat of combustion of methane at room temperature from the given bond energies:

C-H = 98.7 kcal/mol

O=O = 119.1 kcal/mol

C=O = 192.0 kcal/mol

O-H = 110.6 kcal/mol



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6. N-Butane is produced by monobromination of ethane followed by the Wurtz reaction, calculate the volume of ethane at NTP required to produce 55 g n-butane, if the bromination takes place with 90% yield and the Wurtz reaction with 85% yield.



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7. An alkane, C_7H_{16} , is produced by the reaction of lithium di-(3-pentyl) cuprate with ethyl bromide. What is the structure of alkane?



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8. The alkane, (a) C_5H_{12} and (b) C_8H_{18} , on treatment with chlorine give only one monochloride. Give the structures of each alkane and its chloride.



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9. Calculate the ΔH for two propagation steps in the reaction of methane with chlorine, the bond energies for $CH_3 - H$, $CH_3 - Cl$, and $Cl - Cl$ are respectively 105, 85, 103 and 58 kcal / mol



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10. The relative reactivity of $1^\circ : 2^\circ : 3^\circ$ hydrogens to chlorination is 1:3:8:5 respectively. Calculate the percentage of isomers formed during monochlorination of 2-methylbutane.



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11. The relative of $1^\circ : 2^\circ : 3^\circ$ hydrogen to bromination is 1:82:1600. Calculate relative amount of each product on monobromination of isobutane.



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12. (A) what are the different products obtained on insertion of n-pentane using diazomethane ?

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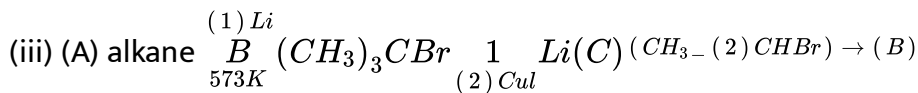
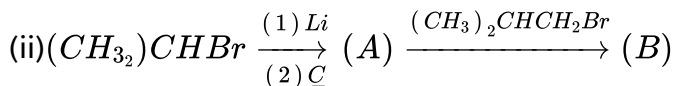
13. Give the major products of monobromination of following compounds

.



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14. Complete the following reaction :



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15. (A) An alkane, C_6H_{14} gives two monochloro derivatives. Give its structure.
 (B) C_6H_{12} (A) has a chiral centre, when it is hydrogenated gives C_6H_{14} (B) in which there is no chiral centre. Identify (A) and (B).
 (C) $C_5H_{11}Cl$ gives 2,2,5,5-tetramethylhexane as the main products on Wurtz-Fittig reaction. Give the structure of $C_5H_{11}Cl$.



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16. How many monocarboxylic acids are possible which on decarboxylation from isopentane?



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17. How many monocarboxylic acids are possible, which on decarboxylation give neopentane?



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18. Suggest a combination of organic halide and cuprate reagent appropriate for the preparation of each of the following compounds :

(a) 2-methylbutane (B) i-Butylcyclohexene



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19. Complete the following reaction :



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20. Indicate the reactivity of vinylic allylic and aliphatic hydrogen in cyclohexene.



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1. The name fire-damp is given to :

A. Methane

B. ethane

C. propane

D. butane

Answer: a



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2. Marsh gas mainly contains :

A. C_2H_2

B. CH_4

C. H_2S

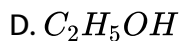
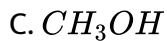
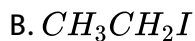
D. CO

Answer: B



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3. Both methane and ethane may be obtained by a suitable one step reaction from :



Answer: A



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4. Formation of alkane by action of Zinc and alkyl halide called :

- A. Wurtz reaction
- B. Frankland reaction
- C. Kolbe's reaction
- D. Clemmensen reaction

Answer: B



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5. Which one of the following has the lowest boiling point

- A. 2-Methylbutane
- B. 2-Methypropane
- C. 2,2 Dimethylpropane
- D. n- pentane

Answer: B



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6. When water vapours are passed over aluminium carbide , we get :

- A. acetaldehyde
- B. ethylene
- C. methane
- D. methyl alcohol

Answer: C



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7. When eletrolysis of potassium acetate is carried out , get

- A. Methane
- B. ethylene
- C. ethane

D. acetylene

Answer: C



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8. When Grignard reagent (CH_3MgBr) is treated with water , we get:

A. ethane

B. ethyl alcohol

C. methyl alcohol

D. methane

Answer: D



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9. Action of heat on a mixture of sodium propionate and sodalime produces :

- A. Methane
- B. ethane
- C. propane
- D. ethylene

Answer: B



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10. Ethane can be prepared by :

- A. heating sodalime with sodium acetane
- B. electrolysis of sodium succinate
- C. electrolysis of sodium acetate
- D. all of the above

Answer: C



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11. Wurtz reaction is used to prepare :

- A. methane only
- B. symmetrical alkanes
- C. unsymmetrical alkanes
- D. all of these

Answer: B



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12. For the conversion of CH_3OH into methane, the reagent used is :

- A. sodium

B. p and HI

C. hydrogen

D. sodium hydroxide

Answer: B



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13. The products formed when the mixture of methane and steam is passed over finely divided nickel at 1273K, are :

A. CO_2 and H_2

B. CO and H_2

C. CH_3OH and H_2

D. none of these

Answer: B



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14. Carbon black is obtained when methane is :

- A. heated in absence of air
- B. Heated in presence of nitrogen
- C. heated in presence of ammonia
- D. heated with steam

Answer: A



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15. What is the volume of oxygen required for the complete combustion of 4 litre of ethane ?

- A. 4 litre
- B. 8 litre
- C. 12 litre

D. 14 litre

Answer: D



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16. Kerosene is a mixture of :

- A. Aromatic hydrocarbons
- B. aliphatic hydrocarbons
- C. saturated hydrocarbons
- D. Alicyclic hydrocarbons

Answer: B



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17. Which of the following substance is used as antiknock compound ?

A. TEL

B. Lead trtrachloride

C. Lead acetate

D. C_2H_5PbCl

Answer: A



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18. Which branched chain isomer of the hydrocarbon with molecular mass 720 gives only one isomer of monosubstitued alkyl halide ?

A. Neopentane

B. Isohexane

C. Neohexane

D. Teritiary butyl choride

Answer: A

19. The knocking will be maximum when the mixture of fuel is :

- A. Straight chained
- B. iso-carbonation
- C. neo-carbonation
- D. none of these

Answer: C

20. Petroleum is a mixture of :

- A. alkanes
- B. cycloalkanes
- C. aromatic hydrocarbons

D. all of these

Answer: D



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21. Iso-octane is added to petrol :

A. to precipitate inorganic material

B. to prevent freezing of petrol

C. to increase the boiling point

D. as an antiknock agent

Answer: D



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22. The fraction obtained between temperatures 423-573 K during fractional distillation of crude petroleum is :

- A. paraffin wax
- B. heavy oil
- C. kerosene
- D. naphtha

Answer: C



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23. Hydrogenation of coal is done for the production of synthetic petrol in :

- A. sabatier process
- B. Bergius process
- C. cracking proess

D. none of these

Answer: B



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24. The number of chain isomers of alkane containing carbon atoms is :

A. 3

B. 4

C. 5

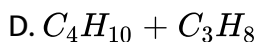
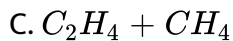
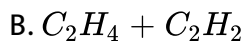
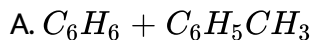
D. 6

Answer: C



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25. The compressed gas available in cooking gas cylinders is a mixture of :



Answer: D



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26. By Wurtz reaction , a mixture of methyl iodine and ethyl iodine gives :

A. Propane

B. ethane

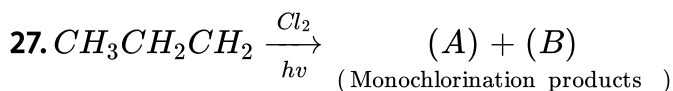
C. butane

D. a mixture of the above three

Answer: D



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the approximate ratio of percentage yields of (A) and (B) formed in the above reaction is :

A. 60 : 40

B. 50 : 50

C. 45 : 55

D. 28 : 72

Answer: D



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28. Reaction of $R'-OH$ with $R'-MgX$ produces :

A. $R-H$

B. $R'-H$

C. $R-R$

D. $R'-R'$

Answer: B



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29. It is necessary to use In the iodination of alkane .

A. alcohol

B. oxidising agent

C. benzene

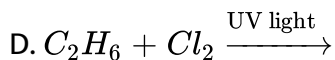
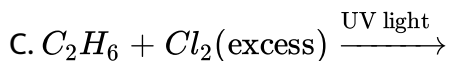
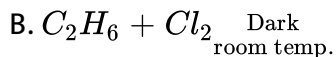
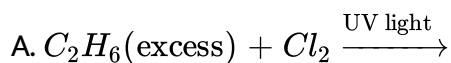
D. reducing agent

Answer: B



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30. The reaction conditions leading to best yields of C_2H_5Cl are :



Answer: A



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31. A mixture of CS_2 and H_2S on passing over heated copper gives :

A. methane

B. ethane

C. complex mixture

D. propane

Answer: A



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32. For the preparation of alkanes ,a saturated solution sodium or potassium salt of carboxylic acid is subjected to :

A. hydrolysis

B. oxidation

C. hydrogenation

D. electrolysis

Answer: D



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33. The gas supplied in cylinders for cooking is :

- A. March gas
- B. LPG
- C. Mixture of CH_4 and C_2H_6
- D. Mixture of ethane and propane

Answer: B



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34. Tthe thermal decomposition of alkanes is known as :

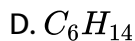
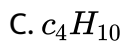
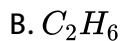
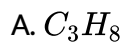
- A. cracking
- B. isomerisation
- C. dehydration
- D. reformaing

Answer: A



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35. Which of the following is not prepared by Kolbe's electrolytic process?



Answer: A



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36. When n-hexane is passed over Cr_2O_3 / Al_2O_3 at 873 K Is formed

.

- A. hexane
- B. hexyne
- C. benzene
- D. I-Hexene

Answer: C



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37. Which of the following compounds has been given an octane number of 100 ?

- A. n- Hexane
- B. Iso - Octane
- C. Neopentane
- D. NEO - Octane

Answer: B

38. The number of different substitution products possible when bromine and ethane are allowed to react, is :

A. 6

B. 8

C. 7

D. 9

Answer: D

39. The reagents and conditions to convert methyl iodide to methane are :

A. action of dry Ag_2O

B. KCN followed by refluxing with dil HCl

C. aqueous NaOH followed by boiling Al_2O_3 at 640K

D. Mg in dry ether followed by boiling with water

Answer: D



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40. A gaseous hydrocarbon 'X' on reaction with bromine in light forms a mixture of two monobromo alkanes and HBr . The hydrocarbon 'X' is :

A. C_2H_6

B. C_3H_6

C. C_3H_8

D. C_4H_{10}

Answer: C



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41. Which of the following is not linked with methane ?

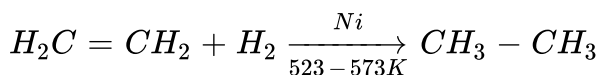
- A. Marsh gas
- B. Natural gas
- C. Producer gas
- D. coal gas

Answer: C



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42. The reaction



is called :

- A. Wutrz's reaction
- B. Kolbe 's synthesis
- C. Sabatier and senderen 's reaction

D. Carbylamine reaction

Answer: C



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43. Paraffin wax is :

A. ester

B. alcohol

C. unsaturated hydrocarbons

D. saturated hydrocarbons

Answer: D



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44. Octane number fo gasoline can be increased by addition of BTX.BTX stands for :

- A. butane , tetraethyl lead and xylene
- B. butane , tetremethyl lead and xylene
- C. benzane , tetrathy lead and xy lene
- D. benzane , tetraehtyl lead and xy lene

Answer: C



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45. he flash point in india is fixed at :

- A. 317K
- B. 308K
- C. 295.8K
- D. 303K

Answer: A



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46. photochemical chlorination of alkane is initiated by process of :

- A. pyrolysis
- B. substitution
- C. homolysis
- D. peroxidation

Answer: C



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47. Zinc - copper couple that be used as a reducing agent is obtained by :

- A. mixing zinc dust and copper

B. zinc coated with copper

C. copper coated with zinc

D. zinc and copper wires welded together

Answer: B



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48. 2.84 g of methyl iodine was completely converted into methyl magnesium iodine and the product was decomposed by excess of ethanol ,the volume the gaseous hydrocarbion produced at NTP will be :

A. 22.4 litre

B. 22400 mL

C. 0.448 litre

D. 0.224 litre

Answer: C

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49. Decarboxylation of isobutyric acid gives n - alkane but reduction of isobutyric acid with phosphorus and hydrogen iodine gives :

- A. n- propane
- B. isobutane
- C. n- butane
- D. none of these

Answer: B

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50. Correct IUPAC name obtained in the reaction of 2- chloropropane + sodium and dry ether is :

- A. 2,3 dimethylbutane

B. 2-isopropylpropane

C. n- hexane

D. none of these

Answer: A



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51. The IUPAC name of nec - pentane is :

A. 2,-methylbutane

B. 2,2 dimethylbutane

C. 2- methypropane

D. 2,2 - dimehtypropane

Answer: D



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52. In the complete combustion of C_nH_{2n+2} , the number of oxygen moles required is :

A. $\frac{n}{2}O_2$

B. $\left(\frac{n+1}{2}\right)O_2$

C. $\left(\frac{3n+1}{2}\right)O_2$

D. $\left(\frac{n+2}{2}\right)O_2$

Answer: C



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53. Which of the following isomers of the pentane gives four monochloropentane on chlorination ?

A. n-pentane

B. isopentane

C. neopentane

D. 2,2 Dimethylpropane

Answer: B



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54. Number of di - substituted isomers of the product of the reaction ,
 $CH_3CH_2CH_3 + Br_2$ would be :

A. 2

B. 1

C. 3

D. 4

Answer: D



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55. Aqueous solution of sodium acetate and sodium propionate on electrolysis yields :

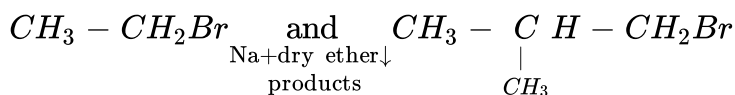
- A. ethane
- B. butane
- C. propane
- D. all of these

Answer: D



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56. What is the maximum number of carbon atoms in the expected products of the Wurtz reaction ?



- A. 8
- B. 6

C. 4

D. 2

Answer: A



View Text Solution

57. The reactivity of hydrogen atoms attached to carbon atom in an alkane has the order .

A. tertiary gt primary gt secondary

B. secondary gt primary gt tertiary

C. tertiary > Secondary gt tertiary

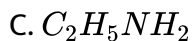
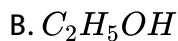
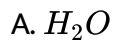
D. primary gt secondary gt tertiary

Answer: C



View Text Solution

58. Grignard reagent gives alkane with :



D. all of these

Answer: D



View Text Solution

59. A fuel has the same knocking property as a mixture of 70% iso - octane (2,2,4 -trimethylpentane) and 30% n- heptane by volume , the octane number of a fuel is :

A. 70

B. 40

C. 100

D. 50

Answer: A



View Text Solution

60. Kolbe 's synthesis of sodium salt of butane acid gives :

A. n- Hexane

B. iso-butane

C. n- butane

D. propane

Answer: A



View Text Solution

61. The function of sodium (a mixture of solid NaOH and solid CaO) in the decarboxylation reaction is :

- A. to increase the rate of reaction
- B. to decrease the rate of reaction
- C. to increase the rate of reaction
- D. none is correct

Answer: B



[View Text Solution](#)

62. Which of the following is the correct sequence of step in the halogenation of an alkane ?

- A. propagation , initiation , termination
- B. initiation , termination , propagation
- C. initiation , propagation , termination

D. propagation , temnation , initiation

Answer: C



View Text Solution

63. An alkane with the formula C_6H_{14} can be prepared by the hydrohengation of only two alkanes (C_6H_{12}) IUPAC name of the alkane is :

A. 2,2-dimehtylbutane

B. 2,3 - dimethylbutane

C. 2- methylpentane

D. n- hexane

Answer: B



View Text Solution

64. Fisher - Tropsch process is used in the manufacture of :

- A. ethane
- B. benzene
- C. synthetic petrol
- D. LPG

Answer: C



[View Text Solution](#)

65. A hydrocarbon with formula C_8H_{12} gives one monochloro derivative , the hydrocarbon is:

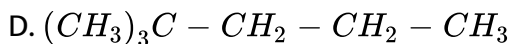
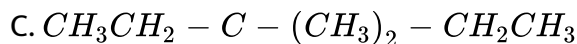
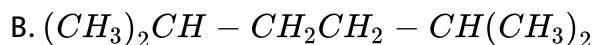
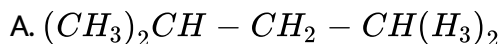
- A. n- octane
- B. 2- methylheptane
- C. 2,2,4- trimethylpentane
- D. 2,2,3,3- tetramethylbutane

Answer: D



View Text Solution

66. Which of the following alkanes can be synthesised in good yield by the Wurtz reaction ?



Answer: B



View Text Solution

67. The order of appearance of the following with increasing temperature during refining of crude oil is :

A. kerosene, gasoline , diesel

B. diesel, gasoline , kerosene

C. gasoline , kerosene,diesel

D. gasoline , diesel , kerosene

Answer: C



View Text Solution

68. Which of the following fractions of petroleum has the lowest boiling point ?

A. Gasoline

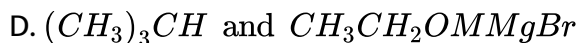
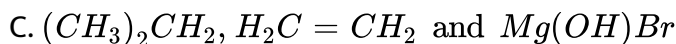
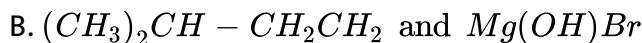
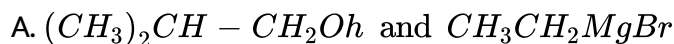
B. Kerosene

C. Diesel oil

D. Heavy oil

Answer: A

69. Isobutyl magnesium bromide with dry ether and absolute alcohol gives :



Answer: D

70. Which of the following is not a greenhouse gas ?

A. Nitrogen

B. Carbon dioxide

C. Ozone

D. Mehtane

Answer: A



View Text Solution

71. N- Heptane on heating to 773 K at 10-20 atm presure in the presence of V_2O_5 a

A. benzene

B. 2- heptene

C. toluene

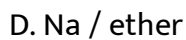
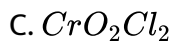
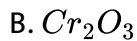
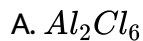
D. cycloheptane

Answer: C



View Text Solution

72. Butane can be converted into 2- methylpropane if heated with :

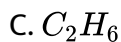
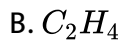
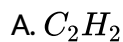


Answer: A



[View Text Solution](#)

73. Percentage of hydrogen is maximum in :



Answer: D



View Text Solution

74. Domestic cooking gas consists of mostly:

- A. methane and ethane
- B. liquefied butane and iso - butane
- C. ethylene and carbon monoxide
- D. hydrogen and acetylene

Answer: B



View Text Solution

75. An alkane with a molecular formula, C_6H_{14} reacts with chlorine in the presence of light and heat to give two constitutionally $C_6H_{13}Cl$.

What is the most reasonable starting alkane?

- A. n- Hexane
- B. 2,2 Dimehtylbutane
- C. 2,3 Dimehtybutane
- D. 3- Methypentane

Answer: C



View Text Solution

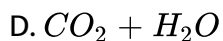
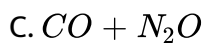
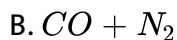
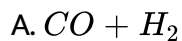
76. Liquid hydrocarbons is converted into a mixture of gaseous hydrocarbon by :

- A. cracking
- B. hydrolysis
- C. Oxidation
- D. Distillation

Answer: A

 [View Text Solution](#)

77. The complete combustion of CH_4 gives :



Answer: D

 [View Text Solution](#)

78. How many types of carbon atoms are present in 2,2,3 - trimethylpentane ?

A. one

B. two

C. three

D. four

Answer: D



View Text Solution

79. Which one of the following is called Raney's Nickel ?

A. Nickel in free state of Division

B. nickel -aluminum alloy

C. Nickel - Aluminalloy alloy

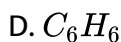
D. Nickel - aluminum alloy

Answer: A



View Text Solution

80. Finely divided platinum and palladium commonly known as platinum and palladium black, may be reducing their soluble salts with :



Answer: C



[View Text Solution](#)

81. Aluminium amalgam used as a reducing agent, is obtained by :

A. Dipping aluminium foil in mercuric chloride solution

B. Mixing aluminium nitrate with mercury

C. mixing aluminium nitrate with mercuric oxide

D. adding mercury to aluminium chloride solution

Answer: A



View Text Solution

82. Adm 's catalyst is :

A. platinum metal

B. palladium

C. nickel metal

D. PtO_2

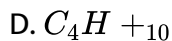
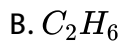
Answer: D



View Text Solution

83. A gas believed to be the cause of explosion in coal mines is :

A. CH_4

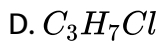
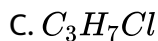
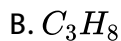
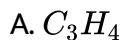


Answer: A



View Text Solution

84. When propanal is heated with $Al-Hg$ and conc. HCl , which is formed ?



Answer: C



View Text Solution

85. Catalytic reduction of water gas gives :

A. Acetylene

B. ethylene

C. ethane

D. methane

Answer: D



View Text Solution

86. The number of enantiomeric pairs that can be product during monochlorination Of 2- mehtybutane is :

A. 2

B. 3

C. 4

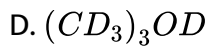
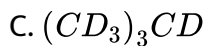
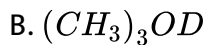
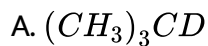
D. 1

Answer: A



View Text Solution

87. $(CH_3)_3C - MgCl$ on reaction with D_2O produces:



Answer: A



View Text Solution

88. The most stable conformation of n- butane is :

A. skew boat

B. Gauche

C. staggered anti

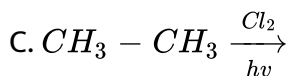
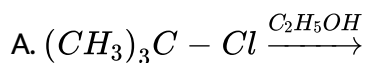
D. eclipsed

Answer: C



View Text Solution

89. Which of the following reactions is expected to readily give a hydrocarbon product in good yield?



Answer: B



View Text Solution

90. octane number is zero for :

A. iso-heptane

B. n-heptane

C. iso-octane

D. n- octane

Answer: B



View Text Solution

91. Main constituent (S) LPG is / are :

A. methane

B. H_2 , CH_4 iso - butane

C. iso-butane , produce

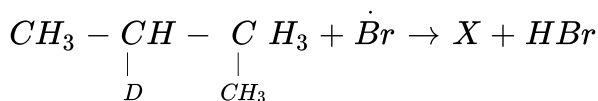
D. none of these

Answer: C

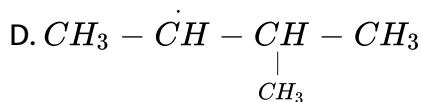
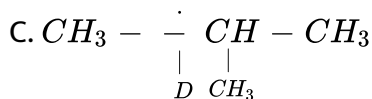
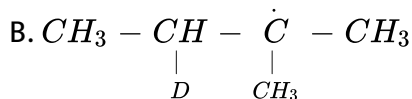
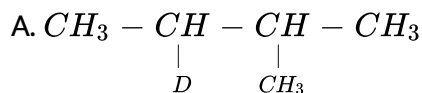


View Text Solution

92. Consider the following reaction ,



identify the structure fo major product X:



Answer: B



View Text Solution

93. Which hydrocarbon is mainly present in gobar gas ?

A. Butane

B. Propane

C. Methane

D. Ethane

Answer: C



View Text Solution

94. On mixing certain alkane with chlorine and irradiating it with Ultraviolet light, it forms only one monochloro alkane.

the alkane could be :

A. Propane

B. Pentane

C. Isopentane

D. Neopentane

Answer: D



[View Text Solution](#)

95. Which one of the following is reduced with Zinc and hydrochloric acid to give the corresponding hydrocarbon ?

A. Ethyl acetate

B. Acetic acid

C. Acetamide

D. butan -2- one

Answer: D



[View Text Solution](#)

96. A petroleum fraction having boiling range $70 - 200^{\circ}\text{C}$ and containing 6-10 carbon atoms per molecule is called :

- A. natural gas
- B. gas oil
- C. gasoline
- D. Kerosene

Answer: C



View Text Solution

97. The compound which does not have any primary hydrogen atoms is :

- A. butane
- B. isobutane
- C. cyclohexane
- D. 2,3 - dimethylbutane

Answer: C



View Text Solution

98. Octane number can be changed by :

A. isomerisation

B. alkylation

C. cyclisation

D. all of these

Answer: D



View Text Solution

99. Which of the following yields both alkane and alkene ?

A. Kolbe's reaction

B. Williamson 's synthesis

C. Wurtz reaction

D. Sandmeyer's reaction

Answer: A



View Text Solution

100. 2- methylbutane on reaction with bromine in the presence of sunlight gives mainly :

A. 1- bromo-2-methylbutane

B. 2- bromo-2-methylbutane

C. 2-bromo-3- methylbutane

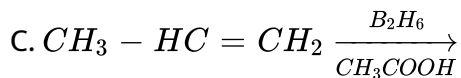
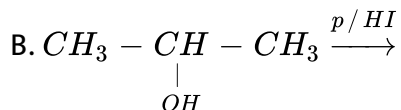
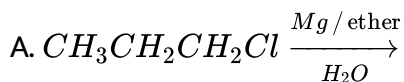
D. 1-bromo-3- methylbutane

Answer: B



View Text Solution

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



Answer: D



View Text Solution

102. Of the five isomeric hexane , the isomer which can give two monochlorinated compounds is :

A. n- hexane

B. 2,3 -dimethylbutane

C. 2,2- dimethylbutane

D. 2- methylpentane

Answer: B



View Text Solution

103. X is heated with sodalime and gives ethane X is :

A. ethanoic acid

B. methanoic acid

C. propanoic acid

D. ether (a) or (c)

Answer: C



View Text Solution

104. In order to get propane gas, which of the following should be subjected to sodalime decarboxylation?

- A. Sodium formate
- B. Mixture of sodium acetate and sodium ethanoate
- C. Sodium butyrate
- D. Sodium propionate

Answer: C



View Text Solution

105. Methyl bromide is converted into ethane by heating it in ether medium with:

- A. Al
- B. Zn
- C. Na

D. Cu

Answer: C



View Text Solution

106. Petroleum is obtained from water gas name of the reaction involved is :

A. Fischer -Tropsch

B. Begius

C. Dow's

D. Kjeldahl's

Answer: A



View Text Solution

107. When CH_3COOH reacts with CH_3MgX , then :

- A. CH_3COX is formed
- B. hydrocarbon is formed
- C. acetone is formed
- D. alcohol is formed

Answer: B



[View Text Solution](#)

108. which of the following liberates methane on treatment with water ?

- A. Silicon carbide
- B. Calcium carbide
- C. Beryllium carbide
- D. Magnesium carbide

Answer: C



View Text Solution

109. The geometry of methane molecule is :

- A. tetrahedral
- B. pyramidal
- C. octanahedral
- D. square planer

Answer: A



View Text Solution

110. Alkyl halides react with Diakyl copper reagents to give :

- A. alkenyl halides

B. alkanes

C. alkyl copper halides

D. alkanes

Answer: B



View Text Solution

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

A. 2,3 Dimethylpentane

B. 2,2-Dimethylpentane

C. 3-methylhexane

D. 2-methylhexane

Answer: C



View Text Solution

112. Which of the following has highest knocking property ?

- A. aromatic hydrocarbons
- B. Olefins
- C. Breanched chain paraffins
- D. staight chain paraffins

Answer: D



View Text Solution

113. Octane number can be changed by :

- A. Isomerisation
- B. alkylaton
- C. cyclisation
- D. all of these

Answer: D



View Text Solution

114. Which of the following has lowest octane number ?

A. n-Hexadecane

B. Iso- octane

C. n- Hexane

D. n- Heptane

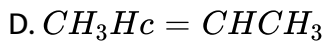
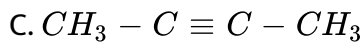
Answer: A



View Text Solution

115. The treatment of CH_3MgX with $CH_3 - C \equiv C - H$ produces :

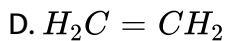
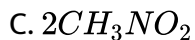
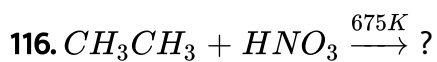
A. CH_4



Answer: A



View Text Solution



Answer: B



View Text Solution

117. Methane can be converted into ethane by the reaction :

- A. chlorination followed by the reaction with alcoholic KOH
- B. chlorination followed by the reaction with aqueous KOH
- C. chlorination followed by Wurtz reaction
- D. chlorination followed by Decarboxylation

Answer: C



[View Text Solution](#)

118. 2- Methyl propane on monochlorination under photochemical condition give :

- A. 2-chloro-2-Methylpropane as major product
- B. (1:1) mixture of 1- chloro-2-methylpropane and 2-chloro-2-methylpropane
- C. 1-chloro-2-methylpropane
- D. (1:9) mixture of 1- chloro-2- methylpropane

Answer: C



View Text Solution

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

A. C_3VBr and MeVH_2BR in Na/ ether

B. $(\text{Me}_3\text{C})_2\text{CULi}$ and MeCH_2Br

C. $(\text{MeCH}_2)_2\text{CULi}$ and Me_3CBr

D. Me_3CMgl and MeCH_2I

Answer: B



View Text Solution

120. When n- hexane is heated with anhydrous AlCl_3 and HCl gas , the major product obtained is :

A. 1- chlorohexane

B. 2- chlorohexane

C. 3-chlorohexane

D. Mixture of 2- methypentane and 3- methylpetane

Answer: D



View Text Solution

121. How many monochloro strutural isomers are expected in free radical monochloronation of 2- methybutane ?

A. 2

B. 3

C. 4

D. 5

Answer: C

 [View Text Solution](#)

122. The total number of monohalogenated products formed by halogenation of 2,4,4 trimethylhexane is :

A. 8

B. 7

C. 6

D. 5

Answer: C

 [View Text Solution](#)

Objective Questions Level B

1. Methane can be prepared by :

A. witting reaction

B. Wurtz method

C. Kolbe's method

D. Decarboxylation

Answer: D



View Text Solution

2. Amtch List I with List I and select the correct answer from the given codes

List I

Reaction

A. Wurtz reaction

B. Sabatier senderen's reaction

c. Frankland reaction

D. Corey -House synthesis

List II

Metals used

1. Ni

2. Zn

e. Li

4. Na

A.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
1	2	3	4

B.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
4	1	2	3

C.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
3	2	4	1

D.

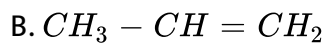
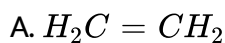
<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
2	4	2	3

Answer: B



[View Text Solution](#)

3. Which of the following compounds will give the maximum yield of alkane on hydrogenation ?

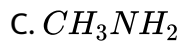


Answer: A



[View Text Solution](#)

4. If a mixture of methane , ammonia and oxygen is passed over Pt - gauge at 973K then the products will be :



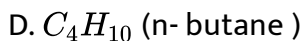
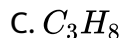
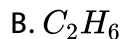
D. all of these

Answer: B



View Text Solution

5. Which of the following alkanes is affected by $AlCl_3$?

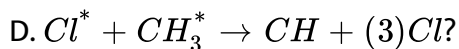
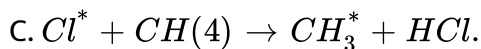
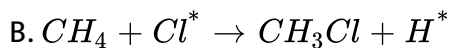
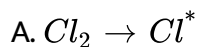


Answer: D



View Text Solution

6. Which of the following cannot be considered as a mechanistic step in chain reaction of methane with Cl_2 ?



Answer: B



View Text Solution

7. The nitration of which of the following alkanes will give the maximum number of products ?

- A. propane
- B. Neopentane
- C. Ethane
- D. Methane

Answer: A



View Text Solution

8. Which among the following reagents convert alkyl halides into alkane ?

- A. Bu_3SnH
- B. Na ..dry ether
- C. R_2CuLi
- D. all of these

Answer: D



View Text Solution

9. Which among the following genera (plants) is the future source of hydrocarbons ?

- A. Cassia
- B. Accasia
- C. Euphoribia
- D. Thia

Answer: C



View Text Solution

10. Antiknocking agent used for unleaded gasoline is :

- A. BXT
- B. TBA
- C. MTBE

D. all of these

Answer: D



View Text Solution

11. By which of the following reagents , butanoic acid can be converted into butane ?

A. Red p/HI

B. NaOH/CaO

C. CH_3MgBr

D. All of these

Answer: A



View Text Solution

12. Which among the following is known as silman reagent ?

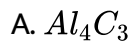


Answer: A



View Text Solution

13. Which among the following carbides on hydrolysis give alkane ?



Answer: A



View Text Solution

14. Methane cannot be synthesised by which of the following methods ?

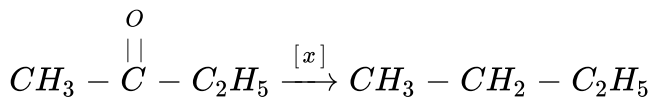
- A. Wurtz reaction
- B. Kilbe's reaction
- C. Corey-House synthesis
- D. All of the above

Answer: D

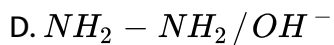
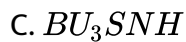
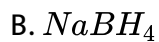
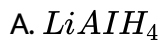


View Text Solution

15. In the given reaction ,



X will be :



Answer: D



View Text Solution

16. What will be the least molecular mass of an alkane which is optically active ?

A. 70

B. 80

C. 90

D. 100

Answer: D

 [View Text Solution](#)

17. Chlorination of propane is carried out in the presence of sunlight, The % yield major and minor alkyl halides will be :

A. 90%,8%

B. 70%,30%

C. 80%,20%

D. 86%,14%

Answer: A

 [View Text Solution](#)

18. The high boiling point is expected for :

A. iso-octane

B. n-octane

C. 2,2,3,3-tetramethylbutane

D. n- pentane

Answer: B



View Text Solution

19. Tetraethyl lead (TEL) in petrol was used as antinocking agent ,which creates lead pollution in order to avoid lead pollution the substitute of TEL is used in unleaded -petrol the . Substitute is denoted as :

A. AK-33-X

B. BK-33-K

C. CK-33-X

D. DK-33-X

Answer: A



View Text Solution

20. If an alkane has number of carbon atoms equal to n , then the number of moles of oxygen required for its complete combustion is :

A. $\frac{3n + 1}{2}$

B. $2n$

C. $\frac{n}{2}$

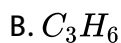
D. $(2n + 1)$

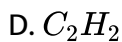
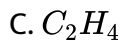
Answer: A



View Text Solution

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





Answer: A



View Text Solution

22. An alkane with even number of carbon only, can result in :

A. Sagatier senderens reaction

B. Wurtz reaction

C. Kolbe's electrolytic reaction

D. Grignard reaction

Answer: C



View Text Solution

23. N- Hexane can be converted to benzene by the treatment with :

A. *alk.* $KMnO_4$

B. *alc.* KOH

C. Cr_2O_3 at $770K$

D. $LiAlH_4$

Answer: C



[View Text Solution](#)

24. An unknown carboxylic of their salt on Kolbe's electrolysis forms cyclobutane, the carboxylic acid can be :

A. adipic acid

B. Hexanoic acid

C. succinic acid

D. fumaric acid

Answer: A



View Text Solution

25. Pertrol is a mixture hydrocabons from C_6 to C_{15} the quality of petrol is determind in terms of octane number ,The higher the octane number better is the quality of fuel . The correct order of octane number is :

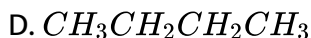
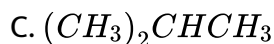
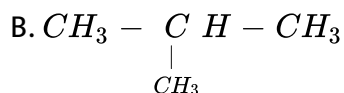
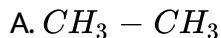
- A. cycloalknes It alkanes Italkanes It aromatic hydrocarbons
- B. alkanes It aromatic hydrocarbons It cycloalkanes
- C. alkanes Itaromatic hydrocarbons It cycloalkanes Italkanes
- D. alkanes Italkanes It cycloalkanes It aromatic hydrocarbons

Answer: D



View Text Solution

1. Which of the following cannot be prepared by the Wurtz reaction ?



Answer: B,C



View Text Solution

2. Select the correct statements among the following

A. Methane is present in the atmosphere of Jupiter

B. In Fischer-Tropsch process, alkane is synthesised by liquefaction of coal

C. Methane on pyrolysis gives carbon black

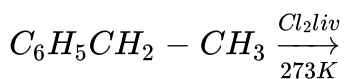
D. pyroproducts obtained in the reaction ,

Answer: A,B,C

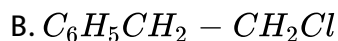


View Text Solution

3. The products obtained in the reaction ,



is / are :



Answer: A,C



View Text Solution

4. A compound has molecule mass 42. it should be :

- A. Propane
- B. cycloprpane
- C. Propene
- D. butane

Answer: B,C



View Text Solution

5. Which of the following can be used prepare methane by its action with water ?

- A. Aluminium carbide
- B. Beryllium carbide
- C. Calcium carbide
- D. Silicon carbide

Answer: A,B



View Text Solution

6. Methane can be prepared by :

A. alkyl magnesium bromide

B. Wurtz reaction

C. decarboxylation

D. Friedel - Crafts reaction

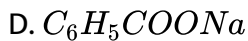
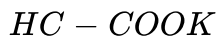
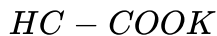
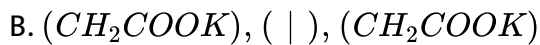
Answer: A,C



View Text Solution

7. Kolbe's electrolytic method can be applied on :

A. CH_3COONa

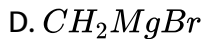
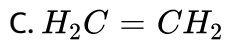
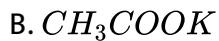


Answer: A,B,C



View Text Solution

8. Both methane and ethane may be obtained by one step reacton form :

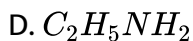
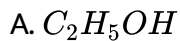


Answer: A,B



View Text Solution

9. Grignard reagent gives alkane with :



Answer: A,B,C,D



View Text Solution

10. $CH_3CH_2CH_3 \xrightarrow{673-873K} X + Y$ and X and Y are:

A. H_2 and methane

B. H_2 and ethylene

C. H_2 and Propylene

D. Methane and ethylene

Answer: C,D



View Text Solution

11. On mixing a certain alkane with chlorine and irradiating it with ultraviolet light it forms two monochloro derivatives .

the alkane could be :

A. Propane

B. pentane

C. iso-butane

D. neopentane

Answer: A,C



View Text Solution

Assertion Reason Type Question

1. (A) Corey-House reaction can be used to prepare both symmetrical and asymmetrical alkane.

(R) the reaction involves the interaction between lithium dialkylcopper with an alkyl halide both of which may contain even or odd number of carbon atoms

A. if both (A) and (R) are correct and (R) is the correct explanation of the (A)

B. if both (A) and (R) are correct but (R) is not the correct explanation of the (A)

C. if (A) is correct but (R) is incorrect

D. (A) is incorrect but (R) is correct

Answer: A



View Text Solution

2. (A) the octane number of branched chain hydrocarbon is higher than that of unbranched chain hydrocarbon .

(R) the branched chain hydrocarbons are more volatile as compared to unbranched chain hydrocarbons .

A. if both (A) and (R) are correct and (R) is the correct explanation of the (A)

B. if both (A) and (R) are correct but (R) is not the correct explanation of the (A)

C. if (A) is correct but (R) is incorrect

D. is (A) is incorrect but (R) is correct

Answer: B



View Text Solution

3. (A) the boiling point of n- alkanes increase with increase in number of carbon atoms,

(R) Van der Waals force of attraction increase with increase in number of carbon and molecular mass .

A. if both (A) and (R) are correct and (R) is the correct explanation of the (A)

B. if both (A) and (R) are correct but (R) is not the correct explanation of the (A)

C. if (A) is correct but (R) is incorrect

D. is (A) is incorrect but (R) is correct

Answer: A



View Text Solution

4. (A) in cracking of alkanes C-C bond is broken but not C-H bond

(R) Bond energy for C-C bond is less than C-H bond.

A. if both (A) and (R) are correct and (R) is the correct explanation of the (A)

B. if both (A) and (R) are correct but (R) is not the correct explanation of the (A)

C. if (A) is correct but (R) is incorrect

D. (A) is incorrect but (R) is correct

Answer: A



View Text Solution

5. (A) Melting point of neo pentane is greater than that of n-pentane but the boiling point of n-pentane is more than that of neo pentane.

(R) Melting point depends upon packing in crystal lattice whereas boiling point depends upon surface area of the molecule .

A. if both (A) and (R) are correct and (R) is the correct explanation of the (A)

B. if both (A) and (R) are correct but (R) is not the correct explanation of the (A)

C. if (A) is correct but (R) is incorrect

D. is (A) is incorrect but (R) is correct

Answer: A



View Text Solution

6. (A) Fuel in aeroplane has a high percentage of highly branched chain alkanes .

(R) Octane number of branched alkanes is less than that of straight chain alkanes .

- A. if both (A) and (R) are correct and (R) is the correct explanation of the (A)
- B. if both (A) and (R) are correct but (R) is not the correct explanation of the (A)
- C. if (A) is correct but (R) is incorrect
- D. is (A) in incorrect but (R) is correct

Answer: C



View Text Solution

7. (A) Propene and cyclopropane both give addition reactions only .

(R) propane and cyclopropane are chain isomer.

- A. if both (A) and (R) are correct and (R) is the correct explanation of the (A)

- B. if both (A) and (R) are correct but (R) is not the correct explanation of the (A)
- C. if (A) is correct but (R) is incorrect
- D. is (A) incorrect but (R) is correct

Answer: B



View Text Solution

Matrix Matchtype Questions

1. Match the following

Column I

(compound)

(A) 2-Methylbutane

(b) 2-3- dimethylbutane

(C) 2-Methylpropane

(d) Toluene

Column II

(monohalogenated product)

(p)1

(q)2

(r)3

(s)4

(t)optically active product



View Text Solution

2. Match the following

Column I

(A) C_8H_{18} (n-octane)

(b) C_8H_{18} (iso-octane)

(C) C_8H_{18} (2,2,3,3-Tetra)

(d) Hexadecane (Cetane)

Column II

(p) Require 25/2mole of oxygen for combustion of a mole

(q) Highest boiling point

(r) Lowest boiling point

(s) Grading the diesel oils



[View Text Solution](#)

Passage

1. Adolf von Baeyer suggested that, since carbon prefers to have tetrahedral geometry with bond angles of approximately 109° ring sizes other than five and six may be too strained to exist, Baeyer based his hypothesis on the simple geometrical notion that a three-membered ring (cyclopropane) should be an equilateral triangle with bond angles of 60° a four membered ring (cyclobutane) should be a square with bond angles of 90° and so on. According to Baeyer's analysis cyclopropane, with a bond angle compression of $109^\circ - 60^\circ = 49^\circ$, should have a large

amount of angle strain and must therefore be highly reactive cyclohexane becomes puckered to relieve its strain the angular deviation of cycloalkane is (-11°) , Greater is the angular deviation more is the torsional strain .

which of the following is most reactive cycloalkane ?

- A. cyclopropane
- B. cyclobutane
- C. cyclopentane
- D. cyclohexane

Answer: A



[View Text Solution](#)

2. Adolf von Baeyer suggested that ,since carbon prefers to have tetrahedral geometry with bond angles of approximately 109° ring sizes other than five and six may be too strained to exist ,Baeyer based his hypothesis on the simple geometrical notion that a three -membered ring (cyclopropane) should be an equilateral triangle with bond angles to 60°

a four membered ring (cyclobutane) should be a square with bond angles of 90° and so on . According to Beayer's analysis cyclopropane, with a bond angle compression of $109^\circ - 60^\circ = 49^\circ$, should have a large amount of angle strain and must therefore be highly reactive cyclohexane becomes puckered to relieve its strain the angular deviation of cycloalkane is (-11°) , Greater is the angular deviation more is the torsional strain .

which among the following is most strained cycloalkane ?

- A. cyclopropane
- B. cyclobutane
- C. cyclopentane
- D. cyclohexane

Answer: A



View Text Solution

3. Adolf von Baeyer suggested that ,since carbon prefers to have tetrahedral geometry with bond angles of approximately 109° ring sizes other than

five and six may be too strained to exist, Baeyer based his hypothesis on the simple geometrical notion that a three-membered ring (cyclopropane) should be an equilateral triangle with bond angles of 60° and a four-membered ring (cyclobutane) should be a square with bond angles of 90° and so on. According to Baeyer's analysis cyclopropane, with a bond angle compression of $109^\circ - 60^\circ = 49^\circ$, should have a large amount of angle strain and must therefore be highly reactive. Cyclohexane becomes puckered to relieve its strain; the angular deviation of cycloalkane is (-11°) ; Greater is the angular deviation more is the torsional strain. The tendency of Cyclopropane (i) cyclobutane (ii) and cyclopentane (iii) to form addition compounds is in the order:

A. $\text{I} > \text{II} > \text{III}$

B. $\text{I} = \text{II} > \text{III}$

C. $\text{I} > \text{II} = \text{III}$

D. $\text{I} = \text{III} > \text{II}$

Answer: A



View Text Solution

4. Adolf von Baeyer suggested that, since carbon prefers to have tetrahedral geometry with bond angles of approximately 109° , ring sizes other than five and six may be too strained to exist. Baeyer based his hypothesis on the simple geometrical notion that a three-membered ring (cyclopropane) should be an equilateral triangle with bond angles of 60° , a four-membered ring (cyclobutane) should be a square with bond angles of 90° and so on. According to Baeyer's analysis, cyclopropane, with a bond angle compression of $109^\circ - 60^\circ = 49^\circ$, should have a large amount of angle strain and must therefore be highly reactive. Cyclohexane becomes puckered to relieve its strain; the angular deviation of cycloalkanes is (-11°) . Greater is the angular deviation, more is the torsional strain. Which among the following has the greatest bond angle?

- A. cyclobutane
- B. cyclopentane
- C. cyclopentane
- D. cyclopropane

Answer: D



View Text Solution

5. Adolf von Baeyer suggested that, since carbon prefers to have tetrahedral geometry with bond angles of approximately 109° ring sizes other than five and six may be too strained to exist. Baeyer based his hypothesis on the simple geometrical notion that a three-membered ring (cyclopropane) should be an equilateral triangle with bond angles of 60° a four-membered ring (cyclobutane) should be a square with bond angles of 90° and so on. According to Baeyer's analysis cyclopropane, with a bond angle compression of $109^\circ - 60^\circ = 49^\circ$, should have a large amount of angle strain and must therefore be highly reactive. Cyclohexane becomes puckered to relieve its strain. The angular deviation of cycloalkanes is (-11°) . Greater is the angular deviation, more is the torsional strain. Which of the following cycloalkanes has zero strain energy?

A. cyclobutane

B. cyclopentane

C. cyclohexane

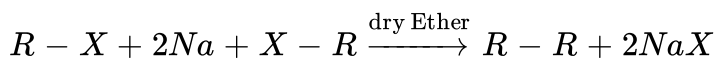
D. cyclopropane

Answer: C

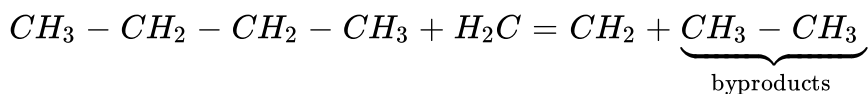


View Text Solution

6. Wurtz reaction involves the condensation of two molecules of alkyl halides in the presence of sodium and dry ether.



In this reaction, a small amount of alkene is also formed as a byproduct.



Tertiary alkyl halides do not give Wurtz reaction. Frankland reaction is similar but has certain advantages over Wurtz reaction. It is useful in the synthesis of symmetrical alkanes. Frankland's reaction is shown by primary, secondary as well as tertiary alkyl halides.

Which of the following alkanes is not obtained from Wurtz reaction?

A. Mehtane

B. Ethane

C. Propane

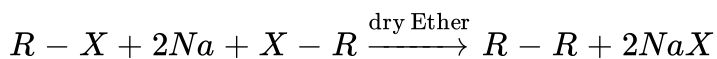
D. Butane

Answer: A

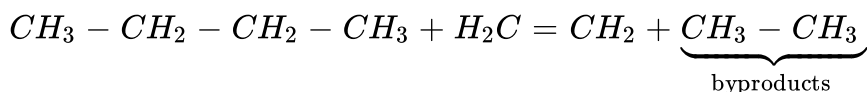


View Text Solution

7. Wurtz reaction involves the condensation of two molecules of alkyl halides in the presence of sodium and dry ether .



in this reaction small amount of alkene is also formed as byproduct.



Tertiary alkyl halides do not give Wurtz reaction. Frankland reaction is similar but has certain advantages over Wurtz reaction it is useful in the synthesis of symmetrical alkanes. Frankland's reaction is shown by primary ,

secondary as well as tertiary alkyl halide.

Disproportionation takes place in :

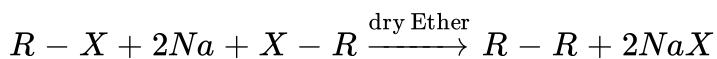
- A. Wurtz reaction
- B. Frankland reaction
- C. both of these
- D. none of these

Answer: A

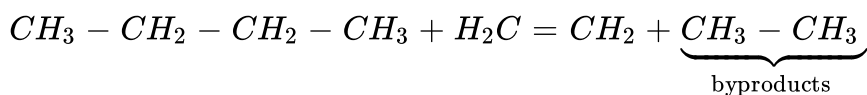


View Text Solution

8. Wurtz reaction involves the condensation of two molecules of alkyl halides in the presence of sodium and dry ether .

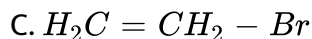
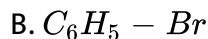
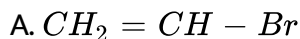


in this reaction small amount of alkene is also formed as byproduct.



Tertiary alkyl halides do not give Wurtz reaction. Frankland reaction is similar but has certain advantages over Wurtz reaction it is useful in the synthesis of symmetrical alkanes. Frankland's reaction is shown by primary, secondary as well as tertiary alkyl halide.

Which among the following compounds will give Wurtz reaction?



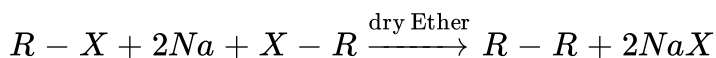
D. none of these

Answer: C

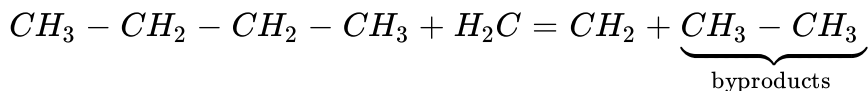
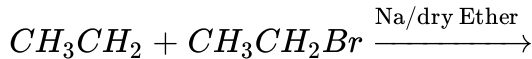


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9. Wurtz reaction involves the condensation of two molecules of alkyl halides in the presence of sodium and dry ether.



In this reaction small amount of alkene is also formed as byproduct.



Tertiary alkyl halides do not give Wurtz reaction. Frankland reaction is similar but has certain advantages over Wurtz reaction it is useful in the synthesis of symmetrical alkanes. Frankland's reaction is shown by primary, secondary as well as tertiary alkyl halides.

A mixture of ethyl iodide and methyl iodide is subjected to the Wurtz reaction, the products formed are :

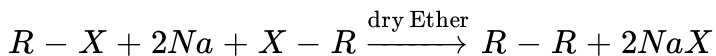
- A. ethane
- B. butane
- C. propane
- D. 2-methylpropane

Answer: A,B,C

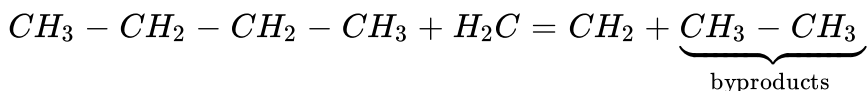


View Text Solution

10. Wurtz reaction involves the condensation of two molecules of alkyl halides in the presence of sodium and dry ether .



in this reaction small amount of alkene is also formed as byproduct.



Tertiary alkyl halides do not give Wurtz reaction. Frankland reaction is similar but has certain advantages over Wurtz reaction it is useful in the synthesis of symmetrical alkanes. Frankland's reaction is shown by primary, secondary as well as tertiary alkyl halide.

which of the following compounds cannot be prepared by Wurtz reaction ?

A. ethane

B. Iso-butane

C. n- Butane

D. neopentane

Answer: B,D



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11. Gasoline in fact is a poor fuel for internal combustion engine. When such fuels are used in an engine, combustion can be initiated before the spark plug fires. This produces 'Knocking' or 'Pinging' in the running engine. The quality of fuel is indicated by its octane number. Straight chain hydrocarbons have low octane number. A scale was set up to evaluate this important knock property of gasoline. Iso-octane, an excellent fuel with a highly branched structure, was arbitrarily given a rating (octane number = 100), n-Heptane being a poor fuel was given the octane number of zero.

The octane number of gasoline can also be increased by the addition of other compounds besides tetraethyl lead (TEL) which is a pollutant. The compounds used in gasoline to improve its quality or octane number are:

BTX: Benzene Toluene Xylene

TBA= Tertiary Butyl Alcohol

MTBE: Methyl Tertiary Butyl Alcohol

Quality of diesel fuel is measured in terms of cetane number . Cetane compound is already given 100 cetane number whereas α -methyl nepthalene is given the centane number zero .

Answer the following question :

what is the IUPAC name of the compound having octane number equal to 100?

- A. n- Heptane
- B. 2,2,4-Trimethylpentane
- C. ,2,2,3 -Trimethylhaptae
- D. 2,2,4,4-Tertramethylbutane

Answer: B



View Text Solution

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Answer the following question :

select the correct statements among the following :

- A. Cetane number is assigned for diesel Fuel
- B. cetane number is assigned for Kerosene oil
- C. greater is the cetane number more efficient is the fuel
- D. cetane number and octane number are same .

Answer: A,C



View Text Solution

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Answer the following question :

Hexadecane is commonly called :

- A. Octane
- B. cetane
- C. gasohol
- D. natalite

Answer: B



14. Gasoline in fact is a poor fuel for internal combustion engine. When such fuels are used in an engine, combustion can be initiated before the spark plug fires. This produces 'Knocking' or 'Pinging' in the running engine. The quality of fuel is indicated by its octane number. Straight chain hydrocarbons have low octane number. A scale was set up to evaluate this important knock property of gasoline. Iso-octane, an excellent fuel with a highly branched structure, was arbitrarily given a rating (octane number = 100), n-Heptane being a poor fuel was given the octane number of zero.

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Answer the following question :

Octane number for regular gasoline is 87. It has same knocking property as:

- A. A mixture containing 87% iso -octane and 13% heptane
- B. a mixture containing 13% iso - octane and 87% heptane
- C. 87 g iso - octane dissolved in 1 litre alcohol
- D. 13 g iso - octane dissolved in 1 litre water

Answer: A



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15. Gasoline in fact is a poor fuel for internal combustion engine. When such fuels are used in an engine, combustion can be initiated before the spark plug fires. This produces 'Knocking ' or 'Pinging ' in the running engine. The quality of fuel is indicated by its octane number . Straight

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Quality of diesel fuel is measured in terms of cetane number . Cetane compound is already given 100 cetane number whereas α -methyl naphthalene is given the cetane number zero .

Answer the following question :

select the correct statement about the efficiency of gasoline :

A. branched alkanes are better fuel than straight chain alkane

B. lesser is the octane number greater is the efficiency of fuel

C. high quality fuel has greater knocking property

D. All of the above

Answer: A



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16. 15 mL gaseous hydrocarbon (A) was required for complete combustion 357 ml of air (21% oxygen by volume) and gaseous products occupied

327 ml (all volume being measured at STP). $(A) \xrightarrow[\text{(monochlorination)}]{Cl_2 \cdot h\nu} (B)$

(number of isomers including stereoisomers)

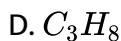
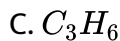
$(A) \text{ and } (B) \xrightarrow[\text{(dichlorination)}]{Cl_2 h\nu} (C)$

(number of isomers including stereoisomers)

the molecular formula of the hydrocarbon (A) is :

A. C_2H_6

B. C_2H_4



Answer: D



View Text Solution

17. 15 mL gaseous hydrocarbon (A) was required for complete combustion 357 ml of air (21% oxygen by volume) and gaseous products occupied 327 ml (all volume being measured at STP). (A) $\xrightarrow[\text{(monochlorination)}]{Cl_2, h\nu}$ (B)

(number of isomers including stereoisomers)

(A) and (B) $\xrightarrow[\text{(dichlorination)}]{Cl_2, h\nu}$ (C)

(number of isomers including stereoisomers)

the number of isomers of (b) is :

A. 2

B. 3

C. 4

D. 5

Answer: A



View Text Solution

18. 15 mL gaseous hydrocarbon (A) was required for complete combustion 357 ml of air (21% oxygen by volume) and gaseous products occupied 327 ml (all volume being measured at STP). $(A) \xrightarrow[\text{(monochlorination)}]{Cl_2, h\nu} (B)$

(number of isomers including stereoisomers)

(A) and $(B) \xrightarrow[\text{(dichlorination)}]{Cl_2, h\nu} (C)$

(number of isomers including stereoisomers)

the number of isomers of (C) is "

A. 2

B. 3

C. 4

D. 5

Answer: D



View Text Solution

19. 15 mL gaseous hydrocarbon (A) was required for complete combustion 357 ml of air (21% oxygen by volume) and gaseous products occupied

327 ml (all volume being measured at STP). $(A) \xrightarrow[\text{(monochlorination)}]{Cl_2, h\nu} (B)$

(number of isomers including stereoisomers)

$(A) \text{ and } (B) \xrightarrow[\text{(dichlorination)}]{Cl_2, h\nu} (C)$

(number of isomers including stereoisomers)

which of (C) on reaction with Na or Mg will give cyclopropane ?

A. 

B. 

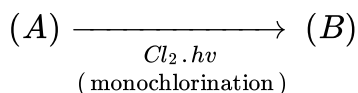
C. 

D. 

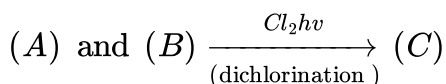
Answer: A



20. 15 mL gaseous hydrocarbon (A) was required for complete combustion 357 ml of air (21% oxygen by volume) and gaseous products occupied 327 ml (all volume geing mesured at STP).



(number of isomers including stereiosmers)



(number of isomers incuding stereoisomrs)

which isomer of (C) on reaction with diethylmalonate (DEM) will give cyclobutane derivative ?

A. 

B. 

C. 

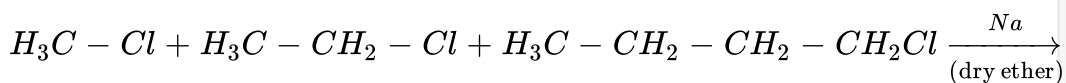
D. 

Answer: A

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Single Integer Answer Type Questions

1. Find out number of dimerize products obtained by the following reaction .



?

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2. How many different acyclic isomers of C_5H_8 on catalytic hydrogenation give the same n-pentane ?

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3. How many different acyclic isomers of C_6H_{12} on hydrogenation with H_2 / Ni give the same 3-methylpentane ?



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4. How many positional isomers would result on dichlorination of 2,4-dimethylpentane ?



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5. How many monochlorinated products are possible for the free radical chlorination of 2,2-dimethylbutane ?



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6. How many monochloro structural isomers are expected in free radical monochlorination of 2-methylbutane ?



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7. Find out the total number of isomers including stereoisomers obtained by dichlorination of propane .



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