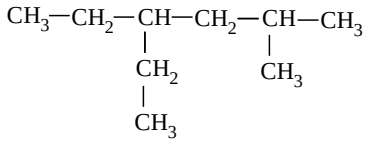
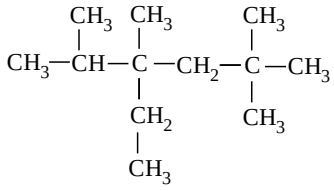
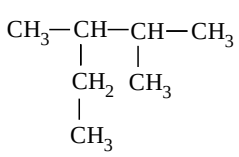
ALKANES

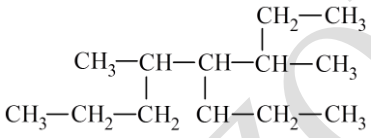
1. Draw the structural formulas of the following compounds
A. 2,3-dimethyl butane
B. 3,4-dimethyl-4-ethylheptane
C. 2,4-dimethyl-4-ethylheptane
D. 2-methyl-3-ethylpentane
E. Isobutane
F. Neopentylbromine
G. Neohexane
H. 2,5-dimethyl-4-isopropylheptane

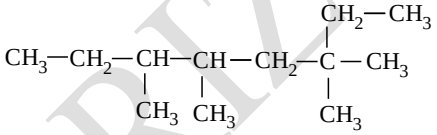
2. Write down the IUPAC naming of the following compounds

A. 

B. 

C. 

D. 

E. 

3. Draw the possible structures for C_5H_{12} and name them.

4. Draw the possible structures of $C_3H_6Cl_2$ and name them.

5. What is the structural formula of alkane obtained by the reaction of 2-bromobutane with sodium metal?

6. Write equation for the preparation of 2,3-dimetylhexane by the Wurtz reaction.

7. Write an equation for the following reaction, using structural formula;
Methyliodide+2Na+2-iodobutane $\rightarrow$

8. Write equations for each of the following reactions
A. $2CH_3CH_2I + 2Na \rightarrow$
B. $CH_3COO^-Na^+ + NaOH \rightarrow$

9. Write down the following synthesis reactions.
A. n-butylbromide $\rightarrow$ n-pentane
B. iso-butylbromide $\rightarrow$ n-butane
C. 2-butene $\rightarrow$ n-butane
D. t-butylchloride$\rightarrow$ 2,2,3,3-tetramethyl butane
E. propylchloride $\rightarrow$ n-hexane
F. hexylbromide $\rightarrow$ n-hexane

10. Complete the following equations
A. $CH_4 + Cl_2 \rightarrow$ ^{hv}
B. $C_3H_8 + O_2 \rightarrow$

11. Write an equation for each of the following reactions.
A. Propane + oxygen $\rightarrow$
B. Hexane + oxygen $\rightarrow$
C. Butane + chlorine gas $\rightarrow$
D. Pentane + chlorine gas $\rightarrow$

12. If 0.2mol of an alkane weighs 8.8 g, what is its molecular formula?

13. 14.4 g of an alkane, when analyzed, is found to contain 12 g of carbon. What is its molecular formula?

14. If 0.15 g of an alkane occupies 112 cm^3 at STP, what is its molecular formula?

15. How many grams of oxygen at 87^oC and 3 atm are required to burn a sample of alkane, which is obtained from 30 g of sodium propionate (CH_3CH_2COONa) that is 80% pure in a bottle?

16. When 8.8 g of an alkane is burned completely, 26.4 g of carbon dioxide and 14.4 g of water are produced. What is the molecular formula of the alkane?

17. An 11.2 L mixture of CH_4 and C_2H_6 gases at STP weighs 12.2 g. What is the mole of each gas in the mixture?

18. The volume of carbon dioxide produced by the combustion of 2.2 g of a hydrocarbon is 3.36 L at STP. What is the molecular formula?

19. If a 3 g sample of a hydrocarbon is burned, 5.4 g of water vapor is produced. What is the molecular formula of the hydrocarbon?

20. A 14.4 g sample of an alkane, when burned, produces 21.6 g of water vapor. Which alkyl halide must be reacted with ethyl halide 'C_2H_5-X' to produce this alkane by the Wurtz reaction?

21. The sum of masses of CO_2 and H_2O produced by the combustion of 1 mol of a hydrocarbon is 208 g larger than that of 1mol of the hydrocarbon. The mass of CO_2 produced is 86 g larger than the mass of H_2O produced. What is the molecular formula of the hydrocarbon?

22. A hydrocarbon contains 83.3% carbon and 16.67% hydrogen and 1L of the vapor at 40^0 and 740 mmHg weighs 2.73 g. It gives four different products when it reacts with chlorine gas. Draw the structural formula of this hydrocarbon.

23. A 5.82 g of a compound is burnt with oxygen. 17.1 g CO_2 and 10.5 g of H_2O is produced. What is the structural formula and name of the compound?

MULTIPLE CHOICES

1. The first and simplest alkane is
A) ethane
B) methane
C) methane
D) C_2H_2
E) CCl_4

2. Compounds that have the same composition but differ in structural formulas
A. are used for substitution products
B. are called isomers
C. are called polymers
D. have the same properties
E. are usually alkanes

3. When a substance having a general formula C_nH_{2n+2} is burned, the coefficient of oxygen is
A) n+1
B) (2n+1)/2
C) (3n+1)/2
D) n/2
E) n+2

4. Determine the hydrocarbon obtained from this reaction; C_2H_5-Br + 2Na + $C_2H_5Br \rightarrow$
A) Ethane
B) Propane
C) Ethylene
D) Butane
E) Methane

5. If an alkane yields 18 g water, 0.2 mol of it is burned. Which of the following must be used to obtain this alkane through Wurtz synthesis?
A) C_2H_5Br
B) CH_3Br
C) n-propylbromide
D) isopropyl bromide
E) vinyl chloride

6. How many moles of oxygen are required to burn 2 moles of an alkane formed from C_2H_5COONa and NaOH?
A) 2 B) 3 C) 4 D) 6 E) 7

7. How many moles of oxygen are required to burn 1mol of an alkane whose 0.25mol produces 16.8L CO_2 when it is burned under STP?
A) 1.5 B) 2.5 C) 3.0 D) 4.5 E) 5.0

8. 0.2 mol of an alkane burns to form 10.8 g of water. Which one of the following must be used to produce this alkane through Wurtz synthesis?
A) CH_3Br
B) C_2H_5Br
C) C_3H_7Br
D) CH_2=CHBr
E) C_4H_9Br

9. Complete combustion of 0.1 mol of an alkane produces 17.6 g of CO_2. Which one of the following alkyl halides must be used to obtain this alkane as pure by Wurtz synthesis?
A) C_2H_5Br
B) CH_3Br
C) CH_3Cl
D) C_3H_7Br
E) C_4H_9Br

10. What is the formula of an alkane of which 0.25 mol is 10.5 g?
A) C_2H_4 B) C_2H_6 C) C_3H_4 D) C_3H_6 E) C_3H_8

11. Which alkyl halide is required to obtain 2,3-dimethyl butane?
A) 1-bromo propane
B) 2-bromo propane
C) 2-bromo butane
D) 1-bromo butane
E) 2-bromo hexane

12. How many moles of O_2 are needed to burn 0.5 mol of an alkane which has been obtained from the reaction between CH_3COONa and NaOH?
A) 1 B) 2 C) 2.5 D) 3 E) 5

13. Complete combustion of 33.6 L of a mixture of CH_4 and C_2H_6 gases at STP produces 72 g H_2O. What is the weight (in grams) of this gas mixture?
A) 24 B) 30 C) 38 D) 45 E) 31

14. What is the name of the substance X in the following reaction reaction?

$$C_6H_5Br + CH_3Br + 2Na \rightarrow X + Y$$

A) benzene
B) bromobenzene
C) methane
D) propane
E) toluene