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ORGANIC CHEMISTRY - STRUCTURES, IUPAC, OZONOLYSI, HYDROHALOGENATION

Class 11 - Chemistry

Time Allowed: 1 hour and 30 minutes **Maximum Marks: 50**

1. R_2CuLi is the intermediate formed in the Corey- House synthesis. It is called **[1]**

   a) Corey-House reagent
   b) Gilman reagent
   c) Schmidt reagent
   d) Frankland reagent

2. $C_5H_{11}Cl$ by Wurtz reaction forms 2,2,5,5-tetramethylhexane as the main product. Hence, $C_5H_{11}Cl$ is **[1]**

   a) 2-methyl-1-chlorobutane
   b) Both (2,2-dimethyl-1-chloropropane) and (2-methyl-1-chlorobutane)
   c) 2,2-dimethyl-1-chloropropane
   d) None of these

3. Eclipsed form of ethane has higher energy due to **[1]**

   a) angle strain
   b) torsional strain
   c) steric strain
   d) Both torsional strain and angle strain

4. In the iodination of alkane, some HIO_3 is also added so that **[1]**

   a) reaction is selective
   b) HI formed is oxidised to I_2
   c) reaction is made reversible
   d) reaction is made faster

5. n-propylmagnesium bromide on hydrolysis gives propane. Is there any other Grignard reagent which also gives propane? If so, give Its name, structure and equation for the reaction. **[1]**

6. Sodium salt of which acid will be needed for the preparation of propane? Write chemical equation for the reaction. **[1]**

7. Why do hydrocarbon molecules with an odd number of carbon atoms have lower melting points than those with an even number of carbon atoms? **[1]**

8. Convert 1-bromopropane to 2-bromopropane. **[1]**

9. Why is Wurtz reaction not preferred for the preparation of alkanes containing odd number of carbon atoms? Illustrate your answer by taking one example. **[2]**

10. Write structures for each of the following compounds. Why are the given names incorrect? Write correct IUPAC names. **[2]**

    i. 2-ethylpentane
    ii. 5-ethyl-3-methylheptane

11. Arrange 2,2-dimethylbutane, 3-methylpentane and n-hexane in increasing order of their boiling point. **[3]**

12. Write the structures and names of products obtained in the reactions of sodium with a mixture of 1-iodo-2-methylpropane and 2-iodopropane. **[3]**

13. Match the hydrocarbons in Column I with the number of 3^o carbon in Column II and choose the correct option using the codes given below: **[1]**

Column I	**Column II**
A. Neo-pentane	(i) 3
B. ISO-pentane	(ii) 2
C. 2,3-dimethylbutane	(iii) 1
D. 1, 2, 3-trimethyl cyclohexane	(iv) 0

a) A - (iv), B - (iii), C - (i), D - (ii)

b) A - (iv), B - (iii), C - (ii), D - (i)

c) A - (i), B - (ii), C - (iii), D - (iv)

d) A - (iii), B - (iv), C - (ii), D - (i)

14. Major product of the dehydration of the following compound is $(CH_3)_3C\underset{\underset{OH}{|}}{C}HCH_3$ **[1]**

a) $(CH_3)_2C = C(CH_3)_2$

b) $CH_3CH_2CH = CHCH_2CH_3$

c) $(CH_3)_2CH\underset{\underset{CH_3}{|}}{C} = CH_2$

d) $(CH_3)_3CCH = CH_2$

15. The correct IUPAC name of the given structure $H_3C - \underset{\underset{CH_3}{|}}{C}H - C \equiv CH$ is **[1]**

a) 2-methylbut-3-yne

b) 2-methylbut-1-yne

c) 3-methylbut-1-yne

d) 1-methylbut-3-yne

16. $CH_3 - C \equiv CH + Br - Br \longrightarrow A$. **[1]**

Here, A refers to

a) $BrCH_2 - CH = CHBr$

b) $Br - CH_2 - CBr = CH_2$

c) $CH_3 - CBr = CHBr$

d) $CH_3 - CH = CBr_2$

17. The common name and IUPAC name of $CH_3CH_2 - C \equiv CH$, respectively are **[1]**

a) ethylacetylene and but-1-yne

b) methylacetylene and but-2-yne

c) acetylene and but-2-yne

d) dimethylacetylene and but-2-yne

18. When $CH_3 - C \equiv CH$ reacts with one mole of HBr then product obtained is **[1]**

a) 2-bromopropene

b) 1-bromopropane

c) bromoethene

d) dibromopropane

19. Which among the two trans-but-2-ene or trans-pent-2-ene is non-polar? **[1]**

20. Write an equation of the reaction of propyne with water in the presence of H_2SO_4 and $HgSO_4$. Show the intermediate. **[1]**

21. How will you distinguish propane and propene by giving chemical tests? **[1]**

22. The intermediate carbocation formed in the reactions of HI, HBr and HCI with propene is the same and the bond energy of HCI, HBr and HI is 430.5 kJ mol^{-1}, 363.7 kJ mol^{-1} and 296.8 kJ mol^{-1} respectively. What will be the order of reactivity of these halogen acids? **[2]**

23. Write IUPAC names of the following compounds. **[3]**

i. $CH_3CH = C(CH_3)_2$

ii. $CH_2 = CH - C \equiv C - CH_3$

iii. 

iv. $CH_3CH = CH - CH_2 - CH = CH - \underset{\underset{C_2H_5}{|}}{CH} - CH_2 - CH = CH_2$

24. Give the structures of A and B. **[3]**

$$\underset{\text{(Isomers of formula } C_3H_6O)}{C} + D \xleftarrow{\text{Hot } KMnO_4} A \xrightarrow[\text{(ii) } Zn,\ H_2O]{\text{(i) } O_3} \underset{\text{(Isomers of formula } C_3H_6O)}{B + C}$$

25. Write IUPAC name of the products obtained by the ozonolysis of the following compounds: **[5]**

i. Pent-2-ene

ii. 3,4-dimethylhept-3-ene

iii. 2-ethylbut-1-ene

iv. 1-phenylbut-1-ene

26. Match the compounds given in Column I with suitable properties/reagent given in Column II and choose the correct option using codes given below: **[1]**

Column I	**Column II**
A. Cis-but-2-ene, trans-but-2-ene	(i) Alkaline $KMnO_4$
B. n-butane, propane	(ii) Dipole moment
C. Ethene, ethane	(iii) Melting point
D. But-1-ene,but-2-ene	(iv) Ozonolysis

a) A - (i), B - (iv), C - (ii), D - (iii)

b) A - (ii), B - (iii), C - (i), D - (iv)

c) A - (iii), B - (ii), C - (i), D - (iv)

d) A - (i), B - (ii), C - (iii), D - (iv)

27. Match the Column I with Column II and choose the correct option from the codes given below. **[1]**

Column I	**Column II**
(A) $RC \equiv CR \xrightarrow[CH_3COOH]{BH_3.\ THF}$	(i) $CH_3 - C \equiv C - Na$
(B) $RC \equiv CR \xrightarrow[H_2]{Pd/Ni}$	(ii) $R - CH_2 - \overset{\overset{O}{\|}}{C} - R$
(C) $\underset{\underset{Br}{\|}}{CH_2}CH_2Br \xrightarrow[NaNH_2]{\text{Alc. KOH}}$	(iii) $CH_3 - C \equiv C - OH$
(D) $CH_3C \equiv CH \xrightarrow{NaNH_2}$	(iv) $R - CH_2 - CH_2 - R$
	(v) $CH \equiv CH$

a) (A) - (ii), (B) - (iv), (C) - (iii), (D) - (v)

b) (A) - (ii), (B) - (v), (C) - (iv), (D) - (i)

c) (A) - (ii), (B) - (iv), (C) - (v), (D) - (i)

d) (A) - (ii), (B) - (iv), (C) - (v), (D) - (iii)

28. **Fill in the blanks:** **[8]**

(a) Fill in the blanks by choosing the appropriate word(s) from those given in the brackets: **[4]**

(C_7H_{16}, alkanes, water, sodium metal)

i. When unsaturated compound i.e alkenes are treated with dihydrogen in the presence of finely divided catalyst _____ are obtained.

ii. When alkyl halides are treated with _____ in the presence of dry ether (free from moisture) it results in the formation of an alkane having double number of carbons as that present in parent-halide.

iii. Alkanes are ligher than _____.

iv. Complete the following reaction.

$C_{12}H_{26} \xrightarrow[973\ K]{Pt/pd/Ni} ..... + C_5H_{10}$ + other products.

(b) Fill in the Blanks: **[4]**

(alkene, C_nH_{2n}, Lindlar's catalyst, $(C_6H_5CO)_2O_2$)

i. The general formula of alkene is _____.

ii. Alcohols when treated with concentrated sulphuric acid at 170^oC _____ is obtained.

iii. Complete the following reaction:

$$CH_3 - CH = CH_2 + HBr \xrightarrow{.....} CH_3 - \underset{\underset{CH_2Br}{|}}{CH_2}$$

iv. Alkynes on hydrogenation with _____ or with Na or Li in liquid ammonia gives alkenes.