Organic: Reactions

1. Chlorine gas, Cl2(g), is reacted with several hydrocarbons. When reacted with \_\_\_\_\_\_\_\_\_, one of the products of the reaction will be hydrogen chloride, HCl(g)
2. C3H6 b) C5H8

c) C­5H10 d) C6H6

1. A few drops of bromine, Br2(l), is added to each of the following hydrocarbons. The color of the bromine would disappear the most quickly in \_\_\_\_\_\_\_\_\_\_\_.
2. C4H10 b) C6H6

c) C7H14 d) C8H18

1. Chemical properties of an unknown organic compound were tested with bromine and potassium permanganate solution. It was found that the **unknown compound** decolorized potassium permanganate solution and gave a non- acidic product with bromine. The unknown organic compound was most likely \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. 2-methyl butane
3. 3,3-diethyl octane
4. hex- 2- ene
5. benzene
6. Given 1.0 mol of each substances below, the compound that would require the most Br2(l) for an addition reaction is \_\_\_
7. C4H10 b) C5H12

c) C6H10 d) C7H14

1. The esterification of propanol with butanoic acid forms \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| a | Butylpropanoate | water |
| b | Propylbutanoate | water |
| c | Butylpropanone | Hydrogen |
| d | Propylbutenoate | hydrogen |

1. A student has been asked to prepare octylethanoate, an artificial orange flavour. The student could prepare the octylethanoate by reacting \_\_\_\_\_\_\_\_\_\_\_ with \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

|  |  |  |
| --- | --- | --- |
| a | Heptanol | Ethanoic acid |
| b | Octanol | Ethanoic acid |
| c | Ethanol | Octanoic acid |
| d | Octanol | Methanoic acid |

1. Ethanol is a byproduct of the process of \_\_\_\_\_\_\_\_\_\_, where \_\_\_\_\_\_\_\_\_\_ reacts with \_\_\_\_\_\_\_\_\_\_\_.

|  |  |  |  |
| --- | --- | --- | --- |
| a | Hydrogenation | Ethane | Hydrogen |
| b | Hydration | Ethene | Water |
| c | Hydrogenation | Ethene | Hydrogen |
| d | Hydration | ethane | water |

1. Consider the following addition reaction. CH3CHCHCH2CH3 + Cl2 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The expected product(s) is/are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. 2-chloropentane and hydrogen chloride

b) 3,4-dichloropentane

c) 2,3-dichloropentane

d) 2-chloropent-3-ene and hydrogen chloride

9. The most likely species to undergo a **substitution** reaction would be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

a) 2-methyl-prop-1-ene

b) o-dimethylbenzene

c) acetylene

d) but-2-yne

10. The most likely species to undergo an **addition** reaction would be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

a) benzoic acid

b) 2-methylpropane

c) propyne

d) propan-1,2-diol

11. Name the most likely product(s) for the following reaction.

CH3CH2 CH3 + Cl2 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. 1,2-dichloropropane and hydrogen

b) 1-chloropropane and hydrogen

c) 2-chloropropane and hydrogen chloride

d) 3-chloroprop-1-ene and hydrogen chloride

12. The most likely species to undergo a substitution reaction would be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

a) 3-methylpent-1ene

b) 2,3 - dimethylbutane

c) 1,1-dichlorobut-2-yne

d) octa-1,3-diene

13. The most likely species to undergo an addition reaction would be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

a) p-chlorofluorobenzne

b) 2-phenylpropane

c) propyne

d) propan-1,2-diol

14. Compounds that will undergo addition reactions are:

a) alcohols and alkanes

b) alkenes and alkynes

a) aromatics and alkanes

a) esters and aromatics

15. If an alkene undergoes **hydration** it will form \_\_\_\_\_\_\_whereas when it undergoes **hydrogenation** it will form a(n) \_\_\_\_\_\_\_.

1. alkane, alcohol
2. alkyne, acid
3. aromatic, alcohol
4. alcohol, alkane
5. The organic compound that will undergo an addition reaction with F2(g) is

a) C4H8

b) C6H6

c) CCl4

d) CH3COOH

17. The ester ethylmethanoate is formed by the reaction between the alcohol \_\_\_\_\_\_ and the carboxyllic acid \_\_\_\_\_\_\_\_\_

a) C2H5OH, HCOOH

b) CH3OH, CH3OOH

c) C2H5OH, CH3COOH

d) CH3OH, HCOOH

18. Consider the incomplete reaction as follows: C2H4(g) + Br2(l) 🡪 **product**

This is a(n) \_\_\_\_\_\_\_\_\_ reaction and the product(s) will be \_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |
| --- | --- | --- |
| a | Addition | Bromoethane and hydrogen bromide |
| b | Addition | 1,2-dibromoethane |
| c | Substitution | Bromoethane and hydrogen bromide |
| d | substitution | 1,2-dibromoethane |

19. A sample of propene undergoes a reaction with chlorine.

The reaction will be called a(n) \_\_\_\_\_\_\_\_\_ reaction, and the product(s) will be \_\_\_\_\_\_\_\_\_\_\_\_\_

1. substitution, 1-chloropropane and hydrochloric acid
2. addition, 1,1-dichloropropane
3. substitution, 1,2-dichloropropane
4. addition, 1,2-dichloropropane

20. Consider the diagram below. It is formed by the addition of \_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_

**CH3COOCH2CH2CH2CH3**

a) hexanoic acid, water

b) butanol, ethanoic acid

c) ethanol, butanoic acid

d) propanol, water

21. The chemical below that is most likely to undergo an addition reaction with Br2(l) is

a) benzene

b) fluoroethane

c) acetylene

d) ethanol

22. Consider the reactions in the table below.

|  |
| --- |
| prop-1-ene + chlorine 🡪 1,2-dichloropropane |
| ethanol 🡪 ethene + water |
| ethane + fluorine 🡪 fluorethane + hydrogen fluoride |
| benzene + bromine 🡪bromobenzene + hydrogen bromide |
| Methanol + Ethanoic acid 🡪 methylethanoate + water |
|  |

There is / are \_\_\_\_\_\_\_\_\_ **addition reaction(**s) given in the table above.

1. 1 b) 2

c) 3 d) 4

23**. Numerical response question**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |

Left justify your answer in the boxes provided.

|  |  |
| --- | --- |
| Jake just bought a propane-fuelled mini-bus. The combustion of propane can be written as:  **a C3H8(g) + b­ O2(g) 🡪 c CO2(g) + d H2O(g)**  Balance the equation with the lowest possible whole numbers and record the values of ‘a,b,c,d’ in that order | |
|  | |
|  | |

**24. Numerical response question**

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| --- | --- | --- | --- |
|  |  |  |  |

Left justify your answer in the boxes provided.

|  |
| --- |
| Colin mixed a sample of Ethanoic acid and methanol in the presence of a catalyst.  Identify the product(s) for this esterification reaction. Record the answers in ascending order   1. Ethyl methanoate 2. Methyl ethanoate 3. Water 4. Ethyl ethanoate 5. Methyl methanoate   Solutions:   * + - 1. D       2. C       3. C       4. C       5. B       6. B       7. B       8. C       9. B       10. C       11. C       12. B       13. C       14. B       15. D       16. A       17. A       18. B       19. D       20. b       21. C       22. A       23. 1534       24. 23 |
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