

NAME:

CLASS:

INTRODUCTION

This worksheet looks at two organic reaction pathways, and allows you to apply your knowledge of organic reactions to solve for 'unknown' compounds in these pathways.

| No. | Question | Answer |
|-----|--|--------|
| 1 | <p>The reaction pathway shown below leads to the production of organic compound G, propyl ethanoate. Complete the diagram by drawing structural formulas for compounds A to G, and writing the systematic name for each compound in the boxes provided.</p> <pre> graph TD A[A] -- "H2O, H+(aq)" --> B[B] B -- "strong oxidant" --> C[C] D[D] -- "Cl2, UV" --> E[E] E -- "OH-(aq)" --> F[F] C -- "H+(aq)" --> G[G] F -- "H+(aq)" --> G style G fill:#fff,stroke:#333,stroke-width:1px </pre> | |
| 2 | Describe a chemical test that could be used to distinguish between compounds A and D. | |
| 3 | Describe a chemical test that could be used to distinguish between compounds C and G. | |

Organic reaction pathways

| No. | Question | Answer |
|-----|--|--------|
| 4 | Which compound, B or F, would be expected to have the higher boiling point? Explain your choice. | |

Organic compounds H and I have the same molecular formula, C_4H_8 . Compound H is reacted with $HCl(g)$ and a suitable catalyst. Two organic products, compounds J and K, are isolated. Compound J undergoes reaction with $OH^-(aq)$ to produce compound L. Compound L is oxidised to produce compound M. Compound M undergoes reaction with $Na_2CO_3(aq)$ to produce $CO_2(g)$. Compound I also reacts with $HCl(g)$ and a suitable catalyst to produce a single organic product, compound K. In another reaction, compound I undergoes addition polymerisation to form organic compound N.

| No. | Question | Answer |
|-----|--|--------|
| 5 | What is the general name given to compounds H and I? | |
| 6 | What does the reaction of compound M with $Na_2CO_3(aq)$ suggest about compound L? | |
| 7 | Complete the diagram below by drawing structural formulas for compounds H to N, and writing the systematic name for each compound in the boxes provided. | |

```

graph TD
    H[H] -- "HCl/catalyst" --> J[J]
    H -- "HCl/catalyst" --> K[K]
    I[I] -- "HCl/catalyst" --> K
    I -- "high temperature and pressure" --> N[N]
    J -- "OH⁻(aq)" --> L[L]
    L -- "oxidant" --> M[M]
  
```

The diagram shows a reaction network. At the top are boxes for H and I. From H, an arrow labeled 'HCl/catalyst' points down to a junction that splits into two arrows pointing to boxes J and K. From I, an arrow labeled 'HCl/catalyst' points down to box K, and another arrow labeled 'high temperature and pressure' points down to box N. From box J, an arrow labeled 'OH⁻(aq)' points down to box L. From box L, an arrow labeled 'oxidant' points right to box M.