**ANSWERS: Cracking**

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| **2019** | **Evidence** | **Achievement** | **Merit** | **Excellence** |
| (i)  (ii)  (iii) | Cracking. It is necessary to provide alkenes that can be used to make polymers  C7H16 --> C5H12 + C2H4  (accept condensed or expanded)  C15H32 --> C8H18 + 2C2H4 + C3H6 | • Cracking or produce alkenes. | • Links cracking to producing an alkene.  • One Correct equation. | • Both correct balanced  equations. |

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| **2018** | **Evidence** | **Achievement** | **Merit** | **Excellence** |
|  | C6H14 --> C4H10  + C2H4 |  |  |  |

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| **2017** | **Evidence** | **Achievement** | **Merit** | **Excellence** |
| (i)  (ii) | Decane → Pentane + Propene + Ethene  C10H22 → C5H12 + C3H6 + C2H4  Cracking is a chemical reaction in which carbon to carbon bonds within the molecule are broken to form smaller hydrocarbons. This requires either high temperatures and pressures, or the use of a catalyst to break the carbon to carbon bonds. New products are formed, so this is a chemical process.  Fractional distillation is a physical process where hydrocarbons are separated based on their physical properties (boiling points). No new substances are formed – the mixture is separated into different fractions based on mass / boiling point, therefore the process is physical.  The two processes are different as cracking produces new products while fractional distillation is used to separate a mixture. | • One product correct.  • States that cracking is a chemical process and fractional distillation is a physical process.  • Describes what cracking /fractional distillation is. | • All products correct.  • Explains why one process is a  chemical or physical process. | • Contrasts both processes; including reference to the  physical / chemical properties of the hydrocarbons involved. |

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| **2016** | **Evidence** | **Achievement** | **Merit** | **Excellence** |
|  | ass90932aQ3c1_1  Reaction 1 is cracking. The conditions required are heat, pressure, catalyst. | * THREE out of four names / structures correct. |  |  |

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| **2015** | **Evidence** | **Achievement** | **Merit** | **Excellence** |
| (i)  (ii) | Catalyst, heat, pressure.  C12H26 → 2C2H4 + C8H18 | * States one condition required.   • Gives correct formulae of products. |  |  |

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