| Question | Answer | Extra information | Marks | AO / Spec. ref. |
| --- | --- | --- | --- | --- |
| **01** | A – salt waterB – steamC – distilled waterD – iced water |  | 1111 | AO3C10.1.2 |
| **02.1** | 2400 (%)  | accept 2350–3200 | 1 | AO3C10.1.2MS1c |
| **02.2** | 30 | accept 20–40 | 1 | AO3C10.1.2MS4a |
| **02.3** | Idea ofincreased demand. | Accept more cars/transport/uses for chemicals/polymers. | 1 | AO2C10.1.2 |
| **02.4** | Idea ofeasily accessible oil already discovered/used up. | Accept most oil discovered/used up. | 1 | AO2C10.1.2 |
| **02.5** | Any **two** from uncertainties about:* future demand for oil products
* amount of oil remaining
* success of replacement by renewable energy.
 |  | 2 | AO2C10.1.1 |
| **03.1** | 13 (%) |  | 1 | AO1C10.2.1MS1c |
| **03.2** | Description:* useful materials recycled
* unrecyclable parts to landfill

Explanation:Any **two** from ideas that recycling:* conserves raw materials
* reduces energy use
* reduces landfill
* reduces pollution.
 | Allow copper/iron/glass/ plastic recycled;allow some parts cannot be/are difficult to recycle. | 112 | AO1×1AO2×3C10.2.2 |
| **04.1** | Idea ofmanufacturing and packaging;idea ofuse/maintenance/and operation during lifetime. | Allow distribution;either order. | 11 | AO1C10.1.1 |

| Question | Answer | Extra information | Marks | AO / Spec. ref. |
| --- | --- | --- | --- | --- |
| **04.2** | **Level 3 (5–6 marks):** Reasonably detailed comparison of extraction/processing **and** disposal. | 6 | AO1×4AO2×2C10.2.1 |
| **Level 2 (3–4 marks):** Basic comparison of extraction/processing **and** disposal. |
| **Level 1 (1–2 marks):** Basic comparison of extraction/processing **or** disposal. |
| **Level 0 (0 marks):** No relevant content. |
| **Indicative content:**Extraction/processing poly(ethene):* (crude oil) is finite
* drilling/processing (oil)/distribution requires a lot of energy
* processing (oil)/and sometimes distribution in oil tankers causes pollution.

Extraction/processing paper:* (wood) is renewable
* (wood) is more sustainable
* risk of pollution in rivers at paper mills
* land usage to grow trees is high/can’t be used for growing food crops.

Disposal of poly(ethene):* non-biodegradable
* visual pollution/pollutes sea/harming wildlife
* could be recycled
* could be burned
* releases energy if burned
* not carbon neutral
* uses landfill space.

Disposal of paper:* biodegradable
* is recycled
* (ignoring processing) carbon neutral.

This indicative content is not exhaustive, other creditworthy responses should be awarded marks as appropriate. |
| **05.1** | Because large amounts of energy would be needed to extract the copper. | Accept because it is labour-intensive to extract copper from this land;accept because copper would have to be extracted from a large area of land (or words to that effect). | 1 | AO2C10.2.2 |
| **05.2** | Any **one** from:* produces large amounts of solid waste
* atmospheric pollution from carbon dioxide/sulfur dioxide
* more lorries/traffic.
 |  | 1 | AO1C10.2.2 |
| **05.3** | Iron is cheap/scrap iron has reached the end of its useful life. | Accept iron is much more abundant than copper. | 1 | AO2C10.2.2 |
| **05.4** | Iron displaces copper from solutions of its salts. | Accept iron is more reactive than copper. | 1 | AO1C10.2.2 |
| **05.5** | Any **two** from:* less expensive (or less energy) to extract the small amounts of copper
* plants will remove carbon dioxide from the atmosphere as they grow
* less air pollution/sulfur dioxide released.
 | Acceptcan release energy when plants are burned that could be used usefully/does not scar the landscape like a tradition open cast mine. | 2 | AO2C10.2.2 |
| **05.6** | Not continuous as it takes a long time for plants to grow/burning plants releases carbon dioxide/ contributes to climate change. | Accept supply not continuous as plants only harvested once / twice a year. | 1 | AO2C10.1.4 |