

01. 0620_w17_ms_43 Q: 4

(a)	fractional distillation	1
(b)(i)	oxidation	1
(b)(ii)	acid(ic)	1
(c)	$2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$	1
(d)(i)	no carbon dioxide produced / more efficient	1
(d)(ii)	storage of hydrogen is difficult / takes more space to store (hydrogen) / high likelihood of (hydrogen) leaks / lack of availability of hydrogen	1
(e)(i)	$\text{C}_2\text{H}_5\text{OH} + 3\text{O}_2 \rightarrow 2\text{CO}_2 + 3\text{H}_2\text{O}$ M1 species correct M2 balanced	2
(e)(ii)	climate change / greenhouse effect / consequence of climate change	1

(e)(iii)	fermentation	1
(f)	electrolysis	1

02. 0620_w16_ms_42 Q: 2

(a)	(total) number of protons and neutrons in a nucleus (of an atom)	2
(b)	Na 2 : 8 : 1 P ³⁻ 2 : 8 : 8	2
(c)	radiotherapy OR treatment of cancer	1
(d)	average mass of (naturally occurring) atom(s) (of an element) (compared to an atom of ¹² C)	2
(e)	chlorine must have more than one isotope the masses of these isotopes / (any given) mass numbers are averaged	2
(f)	lattice of labelled A ³⁺ ions electrons seen on the diagram between the ions attraction between (positive) ions and (sea of / delocalised) electrons	3

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03. 0620_w14_ms_33 Q: 4

(a) carbon dioxide/CO₂ [1](b) $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$ [1](c) (i) anode/negative electrode **and** electrons lost(by hydrogen/H/H₂)/electrons move from this electrode [1](ii) $\text{H}_2 \rightarrow 2\text{H}^+ + 2\text{e}^-$ / $\text{H}_2 - 2\text{e}^- \rightarrow 2\text{H}^+$ / $\text{H}_2 + 2\text{OH}^- \rightarrow 2\text{H}_2\text{O} + 2\text{e}^-$ / $\text{H}_2 + 2\text{OH}^- - 2\text{e}^- \rightarrow 2\text{H}_2\text{O}$ [2]
Species (1) Balancing (1)(d) Any **two** from:**CELL:**lightweight
quieter
fewer working parts/less maintenance
more efficient **or** less energy wasted **or** more energy produced**SUSTAINABILITY:**conserves a limited resource/petroleum/fossil fuels
unlimited supplies of renewable resource(of hydrogen from water)**POLLUTION:**No or less greenhouse effect
No or less acid rain
No or less toxic gases**POLLUTANTS:**No or less smog
No or less C/soot
No or less CO₂
No or less CO
No or less SO₂
No or less oxides of nitrogen/NO/NO₂/N₂O₄/NO_x
No or less (unburnt) hydrocarbons
No or less low level ozone
H₂O is the **only** product [2]

AcelGCSE [Total: 7]

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