## Cambridge International Examinations

Cambridge International General Certificate of Secondary Education

MARK SCHEME
Maximum Mark: 120


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Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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| Question | Answer | Marks |
| :---: | :---: | :---: |
| 1(a)(i) | nitrogen ; oxygen ; | 2 |
| 1(a)(ii) | little change/no overall change; <br> (but) some fluctuations; increases from 1800 ; by 65 ppm ; | max 3 |
| 1(b)(i) | respiration/decomposition/excretion ; | 1 |
| 1 (b)(ii) | photosynthesis ; | 1 |
| 1(c)(i) | increase, because less photosynthesis ; | 1 |
| 1(c)(ii) | increase, because $\mathrm{CO}_{2}$ released by combustion ; | 1 |
| 1(d) | flooding ; <br> melting ice-caps ; <br> extinction/migration of species ; hurricanes/unpredictable weather patterns ; increased agricultural pests ; | max 2 |
|  |  | 11 |


| Question | Answer | Marks |
| :---: | :--- | :---: |
| 2(a)(i) | C and hydrogen ; | $\mathbf{1}$ |
| 2(a)(ii) | B and carbon dioxide ; | $\mathbf{1}$ |
| 2(a)(iii) | D and silver chloride ; | $\mathbf{1}$ |
| 2(b)(i) | substance/material that speeds up/alters rate of a chemical change/reaction ; <br> is itself not permanently changed ; | $\mathbf{2}$ |


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| Question | Answer | Marks |  |
| :---: | :--- | :---: | :---: |
| 2(b)(ii) | $28 ;$ <br> $23 ;$ | $\mathbf{2}$ |  |
| 2(b)(iii) | transition (series/metals) ; | 1 |  |
| 2(c)(i) | $\mathrm{SO}_{3} ;$ | 1 |  |
| 2(c)(ii) | (Y) <br> Oxygen has been added to the molecules ; | Total: | 10 |
|  |  | 10 |  |


| Question | Answer | Marks |
| :---: | :--- | :---: |
| 3(a)(i) | water has expanded because it is hotter ; | $\mathbf{1}$ |
| 3(a)(ii) | some of the water has boiled away/evaporated ; | $\mathbf{1}$ |
| 3(a)(iii) | temperature at which all the liquid can turn into a gas ; | $\mathbf{1}$ |
| 3(a)(iv) | (water is) B most particles are touching and random arrangement ; <br> (water vapour is) C particles are spread out (and random arrangement) ; | $\mathbf{2}$ |
| 3(b) | Convection ; | $\mathbf{1}$ |
| 3(c) | $\mathrm{R}=\mathrm{V} / \mathrm{I}$ or $=250 / 8 ;$ <br> $=31.25 ;$ <br> $\Omega ;$ | $\mathbf{3}$ |
| 3(d) | fuses cut electricity to a device if there is a power surge/too much current flows/a fault ; <br> (too much current) causes fuse to melt ; | $\mathbf{2}$ |
|  |  | Total: |


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| Question | Answer | Marks |
| :---: | :--- | :---: |
| 4(a)(i) | production of genetically identical offspring ; <br> from one parent ; | $\mathbf{2}$ |
| 4(a)(ii) | Aa ; | $\mathbf{1}$ |
| 4(b)(i) | root hair (cells) ; <br> xylem; <br> transpiration ; | $\mathbf{3}$ |
| 4(b)(ii) | retains water in the air around the leaves/increases humidity ; | max $\mathbf{2}$ |
| 4(b)(iii) | photosynthesis ; <br> transport ; <br> support ; <br> AVP ; | $\mathbf{1}$ |
| 4(c)(i) | for protein synthesis ; | $\mathbf{1}$ |
| 4(c)(ii) | for chlorophyll synthesis ; | Total: |
|  |  | $\mathbf{1 1}$ |


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| Question | Answer | Marks |
| :---: | :--- | :---: |
| $6(a)($ i $)$ | acceleration line gradient correct ; <br> constant speed line correct at $45 \mathrm{~m} / \mathrm{s}$ for 150 s anywhere ; | $\mathbf{2}$ |
| $6(\mathrm{a})($ ii) | distance $=$ speed $\times$ time ; <br> $=45 \times 150=6750(\mathrm{~m}) ;$ | $\mathbf{2}$ |
| $6(\mathrm{~b})$ | mass $=$ density $\times$ volume or $8 \times 512000 ;$ <br> $=4096000(\mathrm{~g}) ;$ | $\mathbf{2}$ |
| $6(\mathrm{c})$ | D is greater than $\mathrm{F} ;$ <br> D is equal (and opposite $)$ to $\mathrm{F} ;$ | $\mathbf{2}$ |


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| Question | Answer | Marks |  |
| :---: | :--- | :---: | :---: |
| 6(d)(i) | fuel is burned ; <br> chemical energy to thermal energy ; <br> water is turned into steam ; <br> thermal to kinetic energy ; <br> steam drives turbine/generator ; <br> kinetic to electrical ; | max 4 |  |
| 6(d)(ii) | example of non-renewable <br> and example of renewable ; | Total: | $\mathbf{1 3}$ |
|  |  | 1 |  |


| Question | Answer |  | Marks |
| :---: | :---: | :---: | :---: |
| 7(a) | environment ; shiver ; arterioles ; vasoconstriction ; capillaries ; |  | 5 |
| 7(b)(i) | 16.30 ; |  | 1 |
| 7(b)(ii) | exercise/activity ; sweating/vasodilation ; |  | 2 |
| 7(b)(iii) | is a good insulator ; reduces heat loss to the environment ; |  | 2 |
|  |  | Total: | 10 |


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| Question | Answer |  | Marks |
| :---: | :---: | :---: | :---: |
| 8(a)(i) | sodium + chlorine $\longrightarrow$ sodium chloride ;; <br> LHS and RHS |  | 2 |
| 8(a)(ii) |  |  | 1 |
| 8(a)(iii) | atom gains (an) electron/completes its outer shell ; |  | 1 |
| 8(b)(i) | make copper chloride into a(n aqueous) solution ; add solution to the beaker so electrodes are immersed ; close the switch; |  | 3 |
| 8(b)(ii) | changes from black to brown/pink/ copper coloured; copper is deposited (on the cathode); |  | 2 |
| 8(c)(i) | alloy ; |  | 1 |
| 8(c)(ii) | malleable refers to ability to be shaped (without breaking)/ does not break/change shape when subjected to a force/other correct ; |  | 1 |
| 8(c)(iii) | less likely to be dented when rung/owtte ; |  | 1 |
|  |  | Total: | 12 |


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| Question | Answer |  | Marks |
| :---: | :---: | :---: | :---: |
| 9(a)(i) | (nucleus) splits ; |  | 1 |
| 9(a)(ii) | $\alpha \beta \gamma$; |  | 1 |
| 9(a)(iii) | alpha (is ionising but) has low penetration ; |  | 1 |
| 9(b)(i) | resistance reduced |  | 1 |
| 9(b)(ii) | length/material/temperature ; |  | 1 |
|  |  | Total: | 5 |


| Question | Answer |  | Marks |
| :---: | :---: | :---: | :---: |
| 10(a)(i) | $\begin{aligned} & X=\text { ovary; } \\ & Y=\text { cervix; } \\ & Z=\text { vagina; } \end{aligned}$ |  | 3 |
| 10(a)(ii) | release of female gametes ; |  | 1 |
| 10(b)(i) | oviduct ; |  | 1 |
| 10(b)(ii) | divides ; <br> forms a ball of cells ; <br> implants ; <br> in lining/wall of uterus ; |  | max 3 |
|  |  | Total: | 8 |


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| Question | Answer |  | Marks |
| :---: | :---: | :---: | :---: |
| 11(a)(i) | cobalt chloride paper goes pink; <br> showing water (vapour in the combustion products) ; <br> limewater turns milky ; <br> showing carbon dioxide (in the combustion products) ; |  | 4 |
| 11(a)(ii) | decreases ; |  | 1 |
| 11(b)(i) | hydrocarbon <br> contains hydrogen and carbon only ; <br> saturated <br> it contains only single bonds/ <br> it fits the general formula $\mathrm{C}_{n} \mathrm{H}_{2 n+2}$; |  | 2 |
| 11(b)(ii) | I is ethanol ; $\mathbf{K}$ is ethene ; |  | 2 |
| 11(b)(iii) | $\mathrm{H}_{2} \mathrm{O}$; |  | 1 |
|  |  | Total: | 10 |


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| Question | Answer | Marks |
| :---: | :--- | :---: |
| $12(f)($ i) | sound requires a medium/sound cannot travel through vacuum ; | $\mathbf{1}$ |
| $12(f)($ ii $)$ | light waves are electromagnetic/sound waves are not ; <br> light waves are transverse/sound waves are longitudinal ; | max 1 |
|  |  | Total: |

