This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners’ meeting before marking began, which would have considered the acceptability of alternative answers.

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

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2015 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.
1 (a) fibre traps layer of air;  
  air is a good insulator; 
  prevents convection;  

(b) friction;  
  transfer of electrons/charged particles;  

(c) (i) cause (skin) cancer 
  (ii) radiation and correct use; (both required for mark)  

[Total: 6]

2 (a) (i) exothermic;  
  (ii) temperature has stopped increasing/no more thermal energy is being released;  
  (iii) 3 (minutes);  
  (iv) time would be decreased; 
  because reaction speed higher/ greater concentration of acid particles /greater collision frequency;  
  (v) the higher the temperature the higher the rate;  

(b) hydrogen;  
  pops when ignited;  

(c) no temperature change;  
  because there is no reaction/because copper is unreactive/less reactive;  

[Total: 10]
3 (a) (i) \(A =\) larynx;  
\(B =\) trachea;  
\(C =\) bronchus;  
\(D =\) bronchiole;  
\(E =\) alveolus/alveoli;  

(ii) alveoli/ capillaries/ part E;  

(b) (i) arrows on \(Q\) and \(R\) both pointing to right;  

(ii) less \(\text{CO}_2\);  
more oxygen;  

(iii) \(A\) – no change;  
\(B\) – goes cloudy/milky;  

(iv) more \(\text{CO}_2\) in expired air;  

[Total: 12]

4 (a) (i) cannot be simplified / only one type of atom / only one chemical symbol / can be found in Periodic Table;  

(ii) compound has a fixed chemical formula/mixture has no fixed chemical formula;  

compound has properties different to the elements/  
a mixture has properties similar to those of the two elements or  
compound has unique properties/mixture has properties of components;  

making compound is a chemical change/involves temp/energy change/no energy change when mixture is made;  

(b) (i) 21;  

(ii) the idea that it must not contain harmful substances / does not make people ill / so that it works as expected;  

(c) (i) nucleon number includes neutrons and protons;  

(ii) both (argon) atoms have 18 / same number of protons;  

\(\text{Ar} – 36\) has 18 neutrons (per atom) and \(\text{Ar} – 40\) has 22 neutrons (per atom)/ different number of neutrons / they have different numbers of neutrons (per atom);  

(iii) caesium would react with oxygen / components in air;  
argon is very unreactive / is an inert gas / caesium does not react with argon;  
reference to filled electron shells;  

[Total: 10]
5 (a) lines drawn from
    electric drill to kinetic energy;
    radio to sound energy;
    torch to light energy; [3]

(b) ray refracted at both surfaces;
    evidence of dispersion; [2]

(c) (angle of) reflection;
    60°; [2]

(d) (i) all symbols correct;
    all in series; [2]

    (ii) correct symbol;
    in parallel with lamp; [2]

    (iii) \[ V = I \times R; \]
    \[ = 0.9 \times 5 = 4.5 \text{ (V)}; \] [2]

[Total: 13]
6 (a) (nitrate) for protein synthesis / amino acids to form proteins; (magnesium) for chlorophyll; [2]

(b) (i) first 20 days: the same; [1]
next 100 days: do not grow as high in field B / grows higher/quicker in field A; [max 2]
approx straight line instead of curve;
final (mean) difference of 35cm;

(ii) 290; [1]

(iii) extra nitrate/magnesium/mineral ions increases growth; [1]

(c) water; [4]
from soil;
carbon dioxide; [Total: 11]
from air;
7. (a) (i) air; [1]

(ii) (A) [2]

C contains carbon dioxide; which would react with limewater;

(iii) carbon monoxide (CO); [1]

(iv) ethane; [3]

\[
\begin{array}{c}
\text{H} \\
\text{H} \\
\text{H} \\
\text{H} \\
\text{C} \\
\text{C} \\
\text{H} \\
\text{H}
\end{array}
\]

C – C bond; 6H all correctly bonded;

(b) (i) ethene; [2]

(+ water;

(ii) solvent/fuel/alcoholic drinks; [1]

[Total: 10]
8  (a) (i) oxygen; temperature; [2]
(ii) seeds in dish A germinate and seeds in dish B do not; because water needed/no water in dish B; [2]

(b) (i) ovary/ovule; [1]
(ii) so animals do not eat/chew them; because they contain the embryo/offspring / which could kill/damage embryo; unchewed seeds can pass through the intestines intact/not digested; [max2]

[Total: 7]

9  (a) (i) conduction
convection; [1]
(ii) iron magnetises quickly/steel magnetises slowly/
iron loses magnetism quickly/steel loses magnetism slowly; [1]
(iii) volume = mass/density;
convert 0.80 kg to 800 g;
800/7.9 = 101.3 (cm³); [3]

(b) (B) no mark [1]
because particles are close together/ most particles touching and randomly arranged;

(c) force; [2]
area;

[Total: 8]
10 (a) (i) (pupil) reflex;  
(ii) (change in) light;  
(b) (i) motor/effect (neurone);  
(ii) relay/connector (neurone);  
(c) damage to retina;  

[Total: 5]

11 (a) (i) P copper;  
Q chlorine;  
R hydrogen;  
S oxygen;  
(b) (i) fork and copper electrode connected to power supply;  
fork connected to negative and copper to positive;  
fork and copper both dipping into electrolyte;  
(ii) fork now has the extra mass of the copper plating;  
(c)  

<table>
<thead>
<tr>
<th>property</th>
<th>✓</th>
</tr>
</thead>
<tbody>
<tr>
<td>compounds usually have colours other than white</td>
<td></td>
</tr>
<tr>
<td>good conductors of electricity</td>
<td></td>
</tr>
<tr>
<td>good conductors of heat</td>
<td></td>
</tr>
<tr>
<td>often used as catalysts</td>
<td>✓</td>
</tr>
<tr>
<td>malleable</td>
<td></td>
</tr>
<tr>
<td>very reactive</td>
<td></td>
</tr>
</tbody>
</table>

the only 2 correct = 2 marks only 1 correct = 1 mark  
minus 1 for any incorrect;  

[Total: 10]
12 (a) coal;
   petroleum;
   natural gas;
   peat;

   (b) cannot be replaced once used;   [1]

   (c) (named) alternative energy sources;
       insulation;
       low-energy appliances/equipment;
       more public transport/less use of cars;
       less use of/recycling of, plastics;
       AVP;

   [Total: 5]

13 (a) (i) B and D and A and C; (either order)
   B and D;   [2]

   (ii) equal;
        opposite;   [2]

   (b) (i) time = distance / speed;

        = 240/1500 = 0.16(s);

   (ii) 20 Hz (allow 10) to 20000 Hz (allow 25000);   [1]

   (iii) ultrasound waves have a frequency above 20000Hz;   [1]

   (c) (i) K;   [1]

   (ii) N;   [1]

   (d) (i) wave motion makes turbine move;
       turbine turns generator;

   (ii) solar/geothermal/wind/hydroelectricity/tidal/ biomass/biofuels; any two for one mark   [1]

   [Total: 13]