0654 CO-ORDINATED SCIENCES
0654/61 Paper 6 (Alternative to Practical), maximum raw mark 60

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1 (a) batch A mass 8.8 g; 
batch B mass 8.3 g; [2]

(b) average mass for batch A time 0 = 0.88
1 = 1.74
4 = 2.57
7 = 3.26
average mass for batch B time 0 = 0.83
1 = 1.68
4 = 3.22
7 = 4.20
(allow ecf) (all correct 2 marks, 1 error 1 mark) [2]

(c) scale correct; 
plotting of points for both batches correct; 
reasonable curve(s) drawn; 
(if a non-linear scale only curves can score) [3]

(d) (i) (seed/seedlings) took up/absorbed water; [1]
(ii) seedlings will die; 
cannot photosynthesise/have used up stored energy; 
(ignoring references to water) [2]

[Total: 10]

2 (a) (i) 1.55; 1.6(0) (no tolerance); (allow 1 mark if reversed) [2]

(ii) 1.55 × 0.25 = 0.39 (ecf);
1.6 × 0.12 = 0.19(2) (ecf); [2]

(iii) Watt(s)/W; [1]

(b) (i) diagram shows 2 lamps in parallel; [1]

(ii) 0.48 (+/- 0.01); [1]

(iii) 0.48 × 1.5 = 0.72 (allow 0.705 to 0.74) (ecf); [1]

(c) both statements are true/statement 1 is true and statement 2 is true but not as accurate; 
(allow statement(s) is/are false if justified) [1]

(d) clock/watch/timer; [1]

[Total: 10]
3  (a) blue ;
   ammonia ;
   ammonium (accept NH₄) ;  [3]

(b) (i) iron(II) ;
   iron(III) ; (allow 1 mark if oxidation state missing or reversed)
   oxidation ;  [3]

   (ii) barium chloride (nitrate) ;
        white precipitate / ppt. / solid / residue ;  [2]

   (iii) nitric ; (must score before award of next mark)
        silver nitrate / lead nitrate ;  [2]

[Total: 10]

4  (a) 23.2 °C ;
    44.8 °C ; (no tolerance)  [2]

(b) 95.8 g ;
    97.9 g ; (no tolerance)  [2]

(c) 97.9 – 95.8 = 2.1 g (ecf) ;  [1]

(d) 44.8 – 23.2 = 21.6 °C (ecf) ;  [1]

(e) (i) condensation / condensing ;  [1]

   (ii) molecules (particles) / gas lose energy / move more slowly / forms bonds ;
        on changing from gas to liquid / owtte ;
        (not molecules / particles come closer together)
        (e.g. gas molecules lose energy when they become liquid = 2 marks)  [2]

(f) some (2.1 g) water / steam cools (from 100 °C to 44.8 °C);  [1]

[Total: 10]
5 (a) C and E purple;
    A, B and D blue; [2]

(b) B blue/black;
    C and D brown/yellow; (ignore colours in other boxes) [2]

(c) tube D;
    (Benedict's solution) changes (from blue) to red/shows a positive test; [2]

(d) put starch/solution B into two test-tubes;
    add protein solution to each/use C and E;
    allow to react/leave for some time;
    at a temperature of 35 °C (allow 30 °C to 40 °C)/warming;
    test-tubes with Benedict's solution;
    positive result with amylase; [max 4]

[Total: 10]

6 (a) (i) (dark) red or red-brown (do not accept 'brown' on its own); [1]
    (ii) black; [1]

(b) litmus (turns red and then) is bleached/loses colour; [1]

(c) (i) blue-black colour (accept 'blue' or 'black'); [1]
    (ii) \( C_{6} + 2KI \rightarrow 2KCl + I_{2} \)
        all formulae correct;
        balanced; [2]

(d) (i) ethene; [1]
    (ii) unsaturated/(molecules) contain a double bond/C=C; [1]

(e) (i) purple; [1]
    (ii) sublimation/subliming; (ignore reverse) [1]

[Total: 10]