MARK SCHEME for the October/November 2009 question paper

for the guidance of teachers
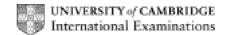
0652 PHYSICAL SCIENCE

0652/02   Paper 2 (Core Theory), maximum raw mark 80

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1 (a) covalent [1]

(b) correct arrangement with shared electron pair, correct outer shells [1]

(c) any **two** from:
high melting point
electrolyte when molten or aqueous
crystalline
soluble in water
etc. 1 + 1 [2]

[Total: 4]

2 (a) R = V / I or 6.0 / 2.4 1
= 2.5Ω 1 [2]

(b) 5.0Ω (e.c.f.) [1]

(c) I = V / R or = 6 / 5 (e.c.f.) 1
= 1.2 A 1 [2]

[Total: 5]

3 (a) substance which (is burned to) release heat / energy [1]

(b) (i) any **two** from:
non-polluting / makes only water when burned
easy to transport through pipes
lights easily
high heat output
etc. 1 + 1 [2]

(ii) has to be manufactured / etc. [1]

(c) (i) fermentation [1]

(ii) add to limewater 1
turns cloudy / milky / white precipitate 1 [2]

(iii) fractional distillation [1]

[Total: 8]

4 (a) (i) greater amplitude [1]

(ii) more waves on screen / waves close together
(accept higher frequency / shorter wavelength) [1]

(b) (i) 20 000 Hz (20 kHz) (accept 10 – 30 kHz) [1]

(ii) v = distance / time or distance = vt or 320 × 0.075   1
= 24 m   1
bat ½ this distance = 12 m from wall   1   [3]

[Total: 6]

5 (a) (i) moment = 250 × 0.6   1
= 150 (Nm)   1   [2]

(ii) 150 = F × 2.4   1
F = 63 (62.5) N   1
(if final force (62.5N) is correctly found and inserted into
(i) score 3 out of 4 marks, ignore remainder in **(ii)**).   [2]

(b) (i) horizontal line at 2.5 m   1
diagonal line to time axis covering 8 s.   1   [2]

(ii) attempt to find area under graph   1
(2.5 × 12) + (½ × 2.5 × 8)   1
= 40 m   1   [3]

[Total: 9]

6 (a) mixture of metals [1]

(b) e.g. brass   1
ornaments / electrical terminals / etc.   1   [2]

(c) (i) painting / chrome plating / etc. [1]

(ii) too dense / too expensive / not strong enough / etc. [1]

[Total: 5]

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7 **(a)** **(i)** radiation [1]

    (ii) ray correctly drawn [1]

    (iii) both angle of incidence and angle of reflection correctly drawn [1]

    (iv) angle of incidence = angle of reflection [1]

  (b) **(i)** conduction [1]

    (ii) hot water less dense than cold   1
        therefore floats / rises to the top   1   [2]
        (mention of convection – C1)

  (c) **(i)** distillation [1]

    (ii) idea of waste energy from turbine used [1]

                                                                     [Total: 9]

8 **(a)** **A** turns red   no gas   1 + 1
      B fizzes / dissolves   hydrogen   1 + 1
      C fizzes / dissolves   carbon dioxide   1 + 1   [6]

  (b) no change   1
      relevant explanation about acids
      e.g. all contain hydrogen ions, etc.   1   [2]

                                                                    [Total: 8]

9 **(a)** splitting of <u>nucleus</u> (into two more or less equal halves)   1
      with release of energy   1   [2]

  (b) advantage: no greenhouse gases released / chemical pollutants   1
      disadvantage: danger of radioactive substances leaking / difficulty of dealing
                         with long half-life waste (do not accept explosions, etc.)   1   [2]

                                                                       [Total: 4]

10 (a)
	2
hydrogen	8
sulfur	1
oxygen	4

(3 correct names = 1 mark)

(4 correct numbers = 3 marks; 3 correct = 2 marks; 2 correct = 1 mark)   [4]

(b) 28 g

(allow one mark for '2 atoms nitrogen' with incorrect final answer)

(calculation of mass of one mole of ammonium hydroxide = (80) C1)   [2]

[Total: 6]

11 (a) source (much) nearer to detector   1

because alphas short range or different type of detector   1   [2]

(b) (i) mention of background count   1

subtracted from original count   1   [2]

(ii) smooth curve going within 1 square of all points   [1]

(iii) clear working or 12.5 ± 1.0 s   1

12.5 ± 0.5 s   1   [2]

[Total: 7]

12 (a) faster   [1]

(b) (i) unreactive / can withstand high temperature / etc.   [1]

(ii) only small amount needed / increases surface / etc.   [1]

(c) not used up by reactions   [1]

(d) $2CO + 2NO \rightarrow 2CO_2 + N_2$

(correct formulae – 1 mark   correct balancing – 1 mark)   [1]

[Total: 5]

13 (a)

particle	relative mass	relative charge
electron	0 / very small / 1/2000 etc.	–1
neutron	1	0
proton	1	+ 1

[3]

(b) number of protons in an atom / nucleus [1]

[Total: 4]