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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

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

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

(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
= 2.5 Ω 1 [2]

(b) 5.0 Ω (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]

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4 **(a)** **(i)** greater amplitude

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

(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 (62.5 N) 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

(ii) ray correctly drawn

(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]

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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]

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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]