

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Advanced Subsidiary Level

MARK SCHEME for the October/November 2014 series

8780 PHYSICAL SCIENCE

8780/02

Paper 2 (Short Response), maximum raw mark 30

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prefix	symbol	power of ten		
centi	C	10^{-2}		
micro	μ	10^{-6}	[1]	
mega	M	10^6	[1]	
giga	G	10^9	[1]	[3]

award 1 mark for each correct row

- 2 any **two** from: [2]
 iron is melted/molten and treated with magnesium to remove sulphur
 oxygen blown through to oxidise carbon and phosphorus
 limestone added to remove the acidic oxides [2]
- 3 idea that the filament is cool and takes time to warm up [1]
 resistance of metals increases with (increasing) temperature [1] [2]
- 4 $C_7H_{16} + 11O_2 \rightarrow 7CO_2 + 8H_2O$ (allow multiples/fractions) [1]
 C_7H_{16}
 balanced equation [1] [2]
- 5 (a) 1.3 (m) [1]
- (b) $T = 4.0$ ms [1]
 $(f = 1/4.0 \times 10^{-3}) = 250$ (Hz) [1]
 for ecf it must be a clearly expressed value of T
- (c) 325 (ms⁻¹) ecf from (a) and (b) [1] [4]
- 6 (a) chlorine quoted as **both** oxidising and reducing agents [1]
 reducing agent = chlorine, as oxidation state goes from 0 to +1 [1]
 oxidising agent = chlorine as oxidation state goes from 0 to -1 [1]
allow 1 mark for correctly deducing oxidation states or correctly deducing oxidising and reducing behaviour from incorrect oxidation states
- (b) $2NaClO + H_2O_2 \rightarrow 2NaOH + Cl_2 + O_2$
 allow multiples/fractions [1] [4]

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- 7 (a) (electric field strength =) (electric) force on a (stationary) unit positive charge [1]
- (b) (i) curved upwards within field [1]
 good curve and significantly less deflection than beta
 e.g. hits plate in last 1/3 of plate [1]
- (ii) no deflection [1] [4]
- 8 (a) (hot) KOH dissolved in alcohol [1]
- (b) 3,3-dimethylbut-1-ene [1]
- (c) structure for 3,3-dimethylbutan-1-ol [1] [3]
- 9 (a) arrow pointing towards the centre of the circle (Moon) [1]
- (b) force is (always) perpendicular to the (direction of) motion/displacement
 in one orbit = 0 [1] [2]
- 10 (a) diagram showing three single covalent bonds and one lone pair on N [1]
- (b) extracts correct bond energy data for N–H, O=O, O–H [1]
 $-900 = 7160 - (5520 + 4b.e.)$ [1]
 $(4b.e. = 2540) b.e. = 635$ [1] [4]

[Total: 30]