

MARK SCHEME for the October/November 2014 series

8780 PHYSICAL SCIENCE

8780/04

Paper 4 (Advanced Practical Skills), maximum raw mark 30

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.

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- 1 (a) current reading (no mark)
- (b) (i) table headings with correct units: R/Ω ; I/A ; $1/I/A^{-1}$ [1]
 accept brackets instead of /
 accept words instead of symbols
- (ii) record first values of R and I in table (no mark)
- (iii) 8 sets of readings recorded in table [1]
 all readings of I made to nearest 0.01 A and consistent [1]
 significant figures for $1/I$ to the same number as for I and consistent [1]
 accept one more significant figure for $1/I$ than given for I
 from graph: 6 points (not $R = 25\Omega$) within $1/I = 0.2$ of line [1]
- (iv) calculation of $1/I$ correct for each measurement of I [1] [6]
- (c) (i) graph: both axes labelled with sensible scales and at least $\frac{1}{2}$ grid used [1]
 do not accept awkward scales – 3, 7, etc.
 at least 7 points plotted to within $\pm \frac{1}{2}$ small square [1]
 best straight line drawn [1]
- (ii) correct substitution into gradient formula and triangle used over at least $\frac{1}{2}$ drawn line [1]
- (iii) correct read-off of intercept and reciprocal [1] [5]
- (d) use of $E = 1/\text{gradient}$ [1] [1]
 expect 5.4 V to 6.5 V
 unit required (accept $A\Omega$)
 accept a method using readings from the graph substituted in the equation
- (e)(i)(ii) correct identification of odd resistor network [1]
- (iii) correct value of odd resistor [1]
 explanation of how sections of network were tested to identify odd resistor [1] [3]
OR
 by calculation

[Total: 15]

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- 2 (a) silver nitrate and no/very faint precipitate
do not allow addition of aqueous ammonia before the silver nitrate
- barium nitrate/chloride and white precipitate [1]
accept a named soluble lead salt for the reagent
- (b) (i) green/greenish precipitate [1]
*turns brown (on heating/standing) [1]
correct test for ammonia with litmus or indicator paper [1]
- (ii) dark blue precipitate/colouration/solution [1]
- (iii) solution turns brown/brownish-yellow/yellow [1]
- (iv) brown/dark brown/brown-red precipitate [1]
- (v) turns blue/dark blue [1]
- (vi) solution turns yellow/yellow green [1]
- (vii) greenish/green precipitate [1]
*turns brown (on heating/standing) [1]
- (viii) blue precipitate/colouration/solution [1] [7]

*this mark can be awarded in EITHER (b)(i) or (b)(vii) but NOT both
- MAXIMUM 7 MARKS FOR PART (b)
- (c) (i) iron(II) with correct evidence [1]
ammonium with correct evidence [1]
sulfate with correct evidence [1]
- (ii) hydrogen peroxide is an oxidising agent with correct evidence [1]

zinc is a reducing agent with correct evidence [1]
allow one mark if BOTH oxidising and reducing agents identified with no or incomplete evidence
- (iii) (iron(II) changes to iron(III) by air oxidation [1] [6]

[Total: 15]