# MARK SCHEME for the October/November 2008 question paper

## 0652 PHYSICAL SCIENCE

**0652/06**    Paper 6 (Alternative to Practical), maximum raw mark 60

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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

- CIE will not enter into discussions or correspondence in connection with these mark schemes.

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**1 (a) (i)** **squeeze** (the teat) and **release** with the **tube in liquid**: **all points essential** [1]

**(ii)** fill the pipette **several times** and place in the measuring cylinder (1)
read and divide by the number pipettes-full (1)
(one mark only for placing one pipette-full into the cylinder) [2]

**(iii)** count drops delivered and divide into pipette volume (1.8 cm$^3$) [1]

**(b) (i)** red – blue (must be in correct order) [1]

**(ii)** 16 × 0.08 = 1.28 (accept 1.3) (cm$^3$) [1]

**(iii)** sodium hydroxide is more concentrated (1)
as a smaller volume of it is needed OWTTE (1) [2]

**(iv)** to wash out/rinse the pipette [1]

**(v)** sodium chloride/NaC$l$ [1]

**[Total: 10]**

**2 (a) (i)** 15.0, 17.0 (no tolerance)
(if 1$^{st}$ decimal place is missing, maximum 1 mark) [2]

**(ii)** 15/20 = 0.75, 17/20 = 0.85, (one or both correct) ecf
(answer must show 2 d.p.) [1]

**(iii)** 0.75$^2$ = 0.56, 0.85$^2$ = 0.72 (one or both correct) ecf
(at least one answer must show 2 d.p.) [1]

**(b)** 3 or 4 points correctly shown; vertical tolerance 0.01 (half small square) (ecf) (1)
horizontal; no tolerance
straight line drawn, not passing through 0,0. (1) [2]

**(c)** **any** x- and y- distances marked or triangle drawn on graph
from which gradient may be calculated (1)
gradient calculated as y/x, (ecf)
example:
$\dfrac{0.90 - 0.42}{(500 - 200)} = \dfrac{0.47}{300}$ (working must be shown) = 1.56 × 10$^{-3}$ (accept 1 d.p.) (1) [2]

**(d)** $\dfrac{75 \times 0.0002}{1.56 \times 10^{-3}} = 9.57$ (accept 1 d.p., working need not be shown) (ecf) [1]

**(e)** the spring and weight hanger have a mass/
the spring will oscillate even if no weights are added OWTTE [1]

**[Total: 10]**

**3** **(a)** **(i)** aqueous (dissolved in water) [1]

    **(ii)** solid [1]

  **(b)** less than 50 cm$^3$ [1]

  **(c)** two folds at rt-angles OWTTE (1)
      open out (to form a cone) OWTTE (1)
      accept answers given as diagrams (no mark if filter paper is cut) [2]

  **(d)** pour (distilled) water through the precipitate (to wash it) OWTTE [1]

  **(e)** add (a few drops of) potassium carbonate to see if there is a precipitate (1)
      EITHER if there is, not enough has been added (1)
      OR if there is no precipitate, enough has been added (or 1) [2]

  **(f)** (partly) evaporate the solution (by heating) (1)
      leave to crystallise (without heating) OWTTE (1)
      (one mark only for "evaporate to dryness") [2]

                                                                   **[Total: 10]**

**4** **(a)** 2.8 A, (1)
      11.5 V (+/– 0.1) (1) [2]

  **(b)** 34.5, (1)
      41.5, (1)
      48.5 (+/– 0.1) (1) [3]

  **(c)** 2.8 × 11.5 × 5 × 60 (ecf) (1)
      = 9660 J (working need not be shown) (1) [2]

  **(d)** **(i)** $\dfrac{9660}{50 \times (55.8 - 20)}$ (1)

         = 5.4 J g$^{-1}$ °C$^{-1}$ (ecf) (1) [2]

    **(ii)** heat or energy loss (from the water) / mass of water incorrectly measured/
        timing was incorrect (any 1) [1]

                                                                   **[Total: 10]**

**5 (a) (i)** 12 mm, (1)
67 mm, (1)
64 mm (+/– 1 mm) (1)
(if recorded as centimetres, e.g. 1.2, 6.7, 6.4 deduct 1 mark) [3]

**(ii)** so that they all have the same temperature (rise) OWTTE
REJECT: to make it a fair test/so that conditions are equal [1]

**(iii)** so that all the water is at the same temperature/
all tubes are equally heated OWTTE [1]

**(b)** the result will be too large (1)
because the air expands more than the liquid (1) [2]

**(c) (i)** less than (1)
explanation: because the glass particles have stronger forces between them/
otherwise level of liquid would drop/reference to results (1) [2]

**(ii)** attraction within water is greater than in ethanol
OR attraction in ethanol is less than in water OWTTE [1]

**[Total: 10]**

**6 (a) (i)** observation: white (1)
conclusion: sulphate / $SO_4^{2-}$ (1) [2]

**(ii)** observation: magnesium dissolves/bubbling/effervescence/
fizzing/colourless solution formed (any 1) (1)
(reject "gas is given off")
observation: hydrogen burns, "pop" OWTTE (1) [2]

**(iii)** observation: 1: flame extinguished/goes out/dies (1)
observation: 2: turns cloudy/milky/chalky/white precipitate (1) [2]

**(b) (i)** observation: brown (precipitate) [1]

**(ii)** test: silver nitrate/$AgNO_3$ (1)
observation: white (precipitate) (1) [2]

**(c)** observation: green/greeny-blue [1]

**[Total: 10]**