MARK SCHEME for the October/November 2015 series

5054 PHYSICS

5054/41   Paper 4 (Alternative to Practical), 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) N pole   **B1**

(b) (i) simple means of suspension   **B1**
good practical detail, e.g. string stirrup / at the centre stated   **B1**

(ii) means of floating magnet, e.g. place on block of
wood / polystyrene / foam / object that floats / on a float   **B1**

(c) statement + explanation, e.g. water due to (more) friction / resistance   **B1**

[Total: 5]

2 (a) (i) remove excess water / water that has not been absorbed owtte / shake off the
drops / no drips (on bench) / avoid spillage / remove surface water / to do the
same each time   **B1**

(ii) whole towel would absorb all the water   **B1**
to obtain different values for different volumes / to get a large range of
values / to get more results owtte

(iii) Any one: **B1**
takes too long to cut squares / do experiment
only small amount of water removed each time / do not absorb enough water

(b) (i) axes correct way round, labelled quantity and unit   **B1**
scales linear, sensible   **B1**
points plotted accurately within ½ small square   **B1**
neat crosses or small points (in circle)
best fit straight line drawn   **B1**

(ii) 0.49 ± 0.02 at least 2 sf ignore unit   **B1**

(iii) furthest point from line / anomalous point /
does not fit on line / does not fit the pattern   **B1**

(iv) $32 \pm 0.5 \, cm^3$ unit required   **B1**

(c) white towels + explanation, e.g.   **B1**
more squares needed for yellow towels ORA / steeper gradient means more
towels needed per unit volume

(d) statement + explanation   **B1**
B to make a fair comparison / experiment / result of the material / to keep the same
conditions / number does not matter – it is the absorbency that does matter

[Total: 12]

3 (a) (i) ray from A to screen through pinhole   B1
             ray from B to screen through pinhole   B1
             $17 \pm 2°$ B1

       (ii) use of longer lines, e.g. use of rays on left hand side of pinhole / extend rays
            on right / measure the angle from both rays / measure angle at both sides of
            the inter section   B1

       (iii) ray from A forms bottom of image ora with B / image is real / rays of light
            cross or intersect / rays of light meet at the pinhole (before the screen)   B1

    (b) light from A spread out / diverge on screen / form more than one image / rays from
       A do not meet (at a point on screen)   B1

                                               [Total: 6]

4 (a) (i) two values accurately marked and labelled   C1
             all three accurately marked and labelled   A1

       (ii) 46 mm cao
            48 mm cao
            2 mm cao
            two correct with at least one unit   C1
            all three correct with units   A1

       (iii) Answers in range 17 100 to 17 250 min 2 sf   C1
            $17\,000 \text{ mm}^3 / 17 \text{ cm}^3$ A1

    (b) vernier / micrometer / calipers / depth gauge
       ruler (with no dead space) **both needed**   B1

                                               [Total: 7]