MARK SCHEME for the May/June 2008 question paper

5054 PHYSICS

5054/04   Paper 4 (Alternative to Practical), maximum raw mark 30

1 (a) bottom/lowest part [1]

(b) (i) ball drawn at 0.66 m on ruler by eye
OR ecf **(a)** allow radius/diameter as centre of ball (1)

    (ii) eye marked level with ball looking toward ball and ruler ecf **(b)(i)** (1) [2]
NOT eye between ruler and ball

(c) (i) cannot view drop position and bounce height at same time/
reference to speed changing or short time ball at highest point/
parallax error <u>due to distance between ball and ruler</u> [1]

    (ii) one drops ball, other measures height (from correct level) [1]
ignore repeat and average
allow throw for dropping
NOT both read height then find average
NOT measuring time/use a stopwatch

(d) (i) 0.83 cao [1]

    (ii) 0.68 to 0.70 (without checking working) ignore sf and rounding errors allow 0.7
ecf **(d)(i)** (check working) [1]

(e) axes: quantity and unit labelled and both correct way round (1)

scales: more than ½ page, sensible, from (0,0) (1)
allow 2 cm = 0.2 m or 0.25 m and 2 cm = 1 bounce

points plotted accurately within ½ square (1)

best fit curve drawn, neatly (1) [4]

(f) N increases h decreases/inverse relationship [1]
allow inversely proportional/negative correlation

(g) whole number in range 7 to 15 [1]
allow e.g. 7.0

[Total: 13]

2 (a) diagram of cell and voltmeter (and bulb) with voltmeter across cell or bulb (1)
allow: incomplete circuit, line through voltmeter symbol
allow other components if voltmeter across cell only
ignore: switches, open or closed
NOT cell short-circuited

reading on voltmeter much less than 1.5 V (allow value if less than 1 V) (1)   [2]
allow: voltmeter reads zero/no deflection on voltmeter
ignore: voltmeter would not work/check whether deflection or not/*V* across cell should be 1.5 V

(b) any three comments from:
mark each answer space separately, list rule applies

- bulb broken/blown
  allow: bulb fused/lamp out of order

- bulb not connected/not screwed in

- faulty switch
  allow: switch might not be closed
  ignore switch is open

- faulty connecting lead
  ignore wire missing

- detail of bad connection

- bulb rating incorrect (higher than 1.5 V)   [3]
  ignore lamp needs more volts to work/voltage of cell not enough to light bulb

[Total: 5]

3 (a) (i) tape measure/metre rule   [1]
ignore additional measuring instruments
NOT inches tape

(ii) length, width and height of room/dimensions of room   [1]
check diagram for annotation
ignore additional quantities, e.g. mass, density

(iii) ($V =$) $l \times w \times h$ equation or words/($V =$) area × height   [1]

(b) two sensible comments, **e.g.**
list rule applies
- parallax error (unqualified/in any measuring instrument)
- zero error explained
- cupboards/walls not flat/ceiling not flat
  allow any comments to cupboards/room contents
- room not square
- tape measure too short
- ceiling too high to reach/hazard identified   [2]

[Total: 5]

4 **(a)** 23 °C   unit required
allow 23.0 °C
not C°   [1]

(b) **(i)** B (1)

reads to 100 °C/110 °C/boiling point of water (1)
ignore wide range of temperature

comparison with A; e.g. more sensitive/more divisions   ignore just longer than A
OR scale reads to 1 °C/each division 1 °C (1)   [3]

(ii) any two good points, e.g.
1/3 length immersed
thermometer not touching container/in centre of water
ignore thermometer hung from string
water stirred (with stirrer, NOT thermometer unless A chosen in **(b)(i)**
reading taken with eye level with meniscus/avoid parallax error   [2]
ignore incorrect parallax explanations

NOT wait for meniscus/reading to become steady unless clearly initial rise
repeat readings

(c) not breakable/not placed in mouth/more hygienic/safer   [1]
allow children moving about/fidgeting
ignore easier to use/more accurate/no parallax error

[Total: 7]