CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2012 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) (i) horizontal level or point marked level with top of hook B1 [1]

(ii) eye / E labelled level with dotted line B1 [1]

(b) within extension of spring /
within elastic limit / not permanently stretched /
gives smooth oscillations /
load does not jumps off spring / spring does not become slack B1 [1]

(c) reduces human reaction error (in *T)* / more accurate *T* /
T too small /
gives average value (of *T*) B1 [1]

(d) 8.024 / 8.02 / 8.0 seen OR $\Sigma t \div 10$ C1
0.4012 / 0.401 / 0.40 (s) A1 [2]

(e) (i) 0.401 written in table ecf (**d**) (3 sf required) B1 [1]

(ii) axes: correct way round, labelled quantity and unit

scales: linear, not awkward, more than ½ grid B1
e.g. *x*-axis: 2 cm ≡ 1 N *y*-axis: 2 cm ≡ 0.1 s

points plotted accurately within ½ small square
neat crosses or small points (in circle) B1

smooth curve of best fit neatly drawn B1 [4]

(iii) yes + when $W = 0$ there will be (no extension so) no oscillations B1 [1]

(allow no + when $W = 0$ there will be some extension due to mass of spring)

(iv) non-linear with *T* increasing as *W* increases B1 [1]

[Total: 13]

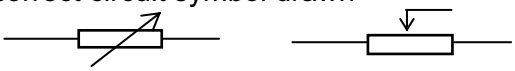
2 (a) (i) lamp lights (normal brightness) B1 [1]

(ii) any one from:
broken wire / connections not good
lamp blown / faulty
cell(s) run down B1 [1]

(b) (i) lamp becomes dimmer B1 [1]

(ii) **1.** rheostat / variable resistor / potentiometer B1 [1]

2. correct circuit symbol drawn B1 [1]



3. wire is coiled B1 [1]

[Total: 6]

3 **(a)** withstand (high) pressure / force (from air) (outside) B1 [1]

(b) seals bell-jar / prevents air entering B1 [1]

(c) (i) sound gradually becomes quieter B1
sound cannot travel through a vacuum / requires medium / air B1 [2]

(ii) light can travel through a vacuum / does not require medium / air B1 [1]

(d) sound / vibrations can travel through the metal plate B1 [1]

[Total: 6]

4 **(a)** to determine height accurately / to stop as soon as shoe moves B1 [1]

(b) 22° ± 1° B1 [1]

(c) (i) any one sensible suggestion, e.g.
protractor has edge
protractor is small
divisions close together
alignment of zero difficult
board sags
board may move B1 [1]

(ii) **measures** two sides of triangle and uses trig formula B1 [1]
(may be shown on diagram)

(d) (better grip) larger angle / ramp lifted higher or reverse argument B1 [1]

[Total: 5]