

CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

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MARK SCHEME for the October/November 2012 series

5054 PHYSICS

5054/41

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

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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 $\frac{1}{2}$ grid
e.g. x-axis: 2 cm \equiv 1 N y-axis: 2 cm \equiv 0.1 s B1

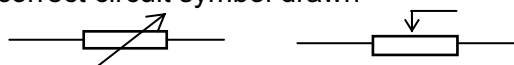
points plotted accurately within $\frac{1}{2}$ small square
neat crosses or small points (in circle) B1

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]

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- (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) $22^\circ \pm 1^\circ$ 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
 (may be shown on diagram) B1 [1]
- (d) (better grip) larger angle / ramp lifted higher or reverse argument B1 [1]

[Total: 5]