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Cambridge International General Certificate of Secondary Education

MARK SCHEME for the March 2016 series

0625 PHYSICS

0625/52 Paper 5 (Practical Test), maximum raw mark 40

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Brackets ( )	Brackets around words or units in the mark scheme are intended to indicate wording used to clarify the mark scheme, but the marks do not depend on seeing the words or units in brackets, e.g. 10 (J) means that the mark is scored for 10, regardless of the unit given.
Underlining	Underlining indicates that this must be seen in the answer offered, or something very similar.
OR / or	This indicates alternative answers or words, any one of which is satisfactory for scoring the marks.
AND	Both answers or words must be given for credit to be awarded.
e.e.o.o.	This means "each error or omission".
o.w.t.t.e.	This means “or words to that effect”.
c.a.o.	This means “correct answer only”.
NOT	This indicates that an incorrect answer is not to be disregarded, but cancels another otherwise correct alternative offered by the candidate, i.e. right plus wrong penalty applies.
e.c.f.	This means "error carried forward". If a candidate has made an earlier mistake and has carried an incorrect value forward to subsequent stages of working, marks indicated by e.c.f. may be awarded, provided the subsequent working is correct, bearing in mind the earlier mistake. This prevents a candidate from being penalised more than once for a particular mistake, but **only** applies to marks annotated e.c.f.

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1 (a) (i) l and d sensible values clearly in cm [1]

(ii) boiling tube between blocks, ruler spanning gap [1]

suitable precaution: [1]
e.g. measure in (at least) 2 places (and take average),
avoid lip,
ensure blocks smooth,
no dirt between tube and block

(iii) V_1 correctly calculated [1]

(b) (i) V_2 present and < V_1 [1]

(ii) line of sight perpendicular to reading [1]
OR read bottom of meniscus

(iii) V_3 calculation correct [1]

(c) m present and ρ in range 1 to 3 [1]

unit g / cm^3 [1]

(d) suitable source of inaccuracy [1]
e.g.
- any reference to <u>why</u> tube is not a cylinder,
- tube may contain some water when mass taken,
- difficult to fill to brim and then pour out

appropriate effect on value of ρ <u>explained</u> [1]

[Total: 11]

2 (a) 5 I values, all < 1.00 A and all increasing [1]

(b) graph:
- axes labelled with quantity and unit [1]
- appropriate scales (plots occupying at least ½ grid) [1]
- plots all correct [1]
- well-judged line and thin line, neat plots [1]

(c) (i) G present AND triangle method seen using at least ½ line [1]

(ii) R in range 4 Ω to 6 Ω [1]

to 2 / 3 significant figures and with correct unit [1]

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(d) statement matching graph with reference to straight line [1]

reference to passing through origin (within limits of experimental accuracy / owtte) [1]

(e) suitable change: [1]
e.g. reduce supply voltage / current,
use thinner / longer wire,
material with greater resistivity

[Total: 11]

3 **(a)** normal correct [1]

(b) incident line at $\theta = 20°$ [1]

(c) pin separations > 5.0 cm [1]

(d) **(i)** first set of lines all in correct place [1]

(ii) correct values for *a* and *b* from ray trace [1]

correct calculation of n_1 and in range 1.3 to 1.8 [1]

no unit for n_1 or n_2 [1]

(e) **(i)** all lines thin and second set of lines in correct place with $\theta = 40°$ [1]

(ii) *c* and *d* present and n_2 within 10% of n_1 [1]

(f) any two suitable precautions: [2]
e.g.
- view pins from base / ensure pins upright,
- large pin separations
- use of thin pencil lines / sharp pencil / thin pins
- repeat with different angles

[Total: 11]

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4 apparatus:
(set of) different sized beakers / containers, thermometer and stop clock / watch [1]

method:
pour hot water into container (and allow to cool) [1]
and measure temperature and time

repeat for a second container with a different surface area [1]

precautions:
any two from: [2]
same volume of hot water
same initial hot water temperature
same room temperature or other environmental condition

graph:
temperature change / rate of cooling against surface area, [1]
temperature against time,
time to cool between fixed temperatures against surface area

additional point:
any one from: [1]

- at least 5 different surface areas,
- sensible range of container sizes given,
- sensible amount of water stated,
- use of lagging / insulating material for container walls,
- same type of container
- how surface area may be calculated

[Total: 7]

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