

Mark scheme 5054/3 – Practical Test November 2001

1(a) and (b)	Volume found by displacement method using measuring cylinder [may be seen in diagram or from working in part (b)]	1
	Most plasticene used in the displacement method and initial and final volumes shown and sensible, giving volume greater than 20 cm ³ with unit seen somewhere	1
	Sensible mass recorded to nearest g or better with unit	1
	Correct calculation of density with unit and 2 or 3 s.f.	1
	Value 1.6 to 2.0 g cm ⁻³ from a volume of greater than 20 cm ³	1
2(a)-(c)	(setting up apparatus – no answer required)	
(d)	u and h_0 recorded to the nearest mm ($u = 100$ mm or 10.0 cm, $h_0 = 10$ mm or 1.0 cm)	1
	h_1 between 1.30 cm and 1.70cm with unit (do not penalise omission of unit if consistent with u and h_0)	2
(e) and (f)	Correct unit for f and no unit for m	1
	Value ± 1.0 cm of Supervisor's value	1
3(a)	(setting up apparatus – no answer required)	
(b)	Scale readings recorded and e found, with measurements to the nearest mm, unit and value normally in the range 10.0 to 15.0 cm	1
(c)	At least 10 oscillations timed	1
	Repeat measurement seen and used	1
(d)	Correct substitution into formula and calculation of g	1
	Value 9.8 ± 1.0 m s ⁻² (980 ± 100 cm s ⁻²) with unit	1
4		
	Diagram and initial readings	
4(a)	Evidence of d.c. power supply and correct series connection of power supply, rheostat, lamp and ammeter with correct circuit symbols for the latter three components	1
	Voltmeter correctly connected in parallel with lamp	1
(b)	Sensible I (30 mA) and V recorded with units for both	1
(a)	Correct calculation of R	1
Table		
(b)	Table of at least 6 readings with units for I and V (ignore trend in readings)	1

One I value < 10 mA (allow 0, if 0 plotted on graph or in table)	1
One I value > 40 mA	1
8 points plotted on a reasonable curve or straight line	1

Graph

(e)	Graph of R/Ω against I/mA with axes labelled and units	1
	Suitable scale, which may include the origin, with data occupying more than half the page in both directions and no scales based on 3,7 etc	1
	Two points plotted correctly	1
	Good fit, fine lines and fine points	1

Calculations and Conclusions

(f)	Correct resistance value at $I = 10$ mA	1
	Correct resistance at $I = 40$ mA (from table or graph)	1
(g)	Temperature of filament has increased (When checking plots or the reading of values from the graph, the values should be within half a square of the correct value)	1