Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

PHYSICS **0625/62**

Paper 6 Alternative to Practical **March 2024**

MARK SCHEME

IMPORTANT NOTICE

Pre-STM Mark Scheme

Not to be used for marking candidates' live scripts

MAXIMUM MARK: 40

Question			Answer	Marks	Additional Guidance / Notes
1	**(a)**		*d* = 28(.0)(cm)	1	CAO
	(b)	**(i)**	balance point between where just tips one way then the other	1	
		(ii)	a = 22(.0) and b = 19.6	1	ACCEPT ecf from (a)
			both to nearest mm	1	
	(c)	**(i)**	graph: • axes labelled with quantity and unit	1	
			• appropriate scales (plots occupying at least ½ grid)	1	
			• plots all correct to ½ small square <u>and</u> precise plots	1	plots≤1/2square NOT plots shown on line if they should be between lines
			• well-judged line <u>and</u> thin line	1	EXPECT straight line line thickness≤1/3square,
		(ii)	*G* present and use of triangle method seen <u>on graph</u>	1	ACCEPT any size of triangle or clear indication of method (2 marks on scale not enough)
	(d)		*M* in range 150 to 350 <u>with</u> unit of g	1	CORRECT RANGE only - QUALITY mark ACCEPT mass in kg if matching correct values
	(e)		No, as increases mass of metre ruler	1	ACCEPT any well-argued suggestion (e.g. Yes as modelling clay only a small % of mass of metre rule)
				TOTAL 11	

Question			Answer	Marks	Additional Guidance / Notes
2	**(a)**		correct voltmeter symbol in parallel with **PQ**	1	
	(b)		V = 3.1 I = 0.12	1 1	
	(c)	**(i)**	R values correct (25.8/ecf, 13.2, 3.02) R values to consistent 2 or consistent 3 significant figures	1 1	IGNORE sig figs but PENALISE incorrect rounding
		(ii)	units (V, A, Ω)	1	
	(d)	**(i)**	correct calculation of R_A, R_B and R_C (8.60, 8.80, 9.06)	1	CAO – Quality mark Same sig fig query as above.
		(ii)	statement matching values of R_A, R_B and R_C justification referencing values <u>and</u> 'limits of experimental accuracy'	1 1	Expect 'Yes' but ALLOW 'No' if matching results If 'No' must justify by 'outside limits' ACCEPT words to that effect NEED justification and at least smallest and largest values stated
	(e)	**(i)**	correct circuit symbol for variable resistor	1	
		(ii)	suitable advantage e.g. easy to obtain (large) range of current values/ can set current to chosen values	1	ACCEPT can set current to exact values
				TOTAL 11	

Question			Answer	Marks	Additional Guidance / Notes
3	**(a)**		**one** precaution from: lamp, object and lens at same height/ lens and screen perpendicular/ fix metre rule to bench	1	
	(b)	**(i)**	move screen slowly/ back and forth	1	
		(ii)	v_1 = 8(.0)(cm)	1	If expressed as mm, MUST SEE unit
			V_1 = 80(cm)	1	ACCEPT 80.0cm If expressed as mm, MUST SEE unit
	(c)		h_O = 1.2(cm) and h_I = 4.8(cm)	1	If expressed as mm, MUST SEE unit
			correct calculation of M (4.0/ecf) and no unit	1	ACCEPT 4
	(d)		f_1 = 16(.0 cm)	1	CAO - accuracy mark
	(e)		any one valid difficulty (e.g. hand or ruler gets in way of light)	1	NOT from poor practice
			one matching improvement (e.g. translucent screen and measure from back / fix grid to screen)	1	
	(f)		f_2 = 15.4 and cm seen at least once in **(d)** or **(f)** and not contradicted	1	
	(g)		valid suggestion with reason e.g: f_2 as f_1 has smaller measurements (i.e. h_o and h_i) (and so uncertainties larger)	1	ACCEPT any well-reasoned argument (could be opposite as $v_2 < v_1$)
				TOTAL 11	

Question			Answer	Marks	Additional Guidance / Notes
4		MP1	**apparatus:** thermometer and stopwatch and ruler if thickness is to be measured	1	 ACCEPT equivalents NOT NEEDED if number of layers used instead
		MP2	**method:** measure independent variable measure initial and final temperatures measure time	1	NEED all 3 mentioned for mark ACCEPT thickness of insulation/number of layers ACCEPT values for cooling curve
		MP3	repeat for new value of independent variable	1	NEED a specific reference to repeating
		MP4	**control variable:** **one** from: volume of water, initial temperature	1	ACCEPT material thickness if no. of layers is i.v. ACCEPT room temperature/humidity ACCEPT duration of experiment if expressed as a variable
		MP5	**table:** columns, with units, for independent variable and dependent variable any other variable mentioned must have correct units	1	ACCEPT initial and final temperatures or values for a cooling curve NOT any variable which isn't measured or mentioned in method
		MP6	**analysis:** compare readings in the table to see if change in insulation thickness produces change in (rate of) temperature change (owtte), plot line graph (with axes specified)	1	IGNORE a conclusion or prediction from theory ACCEPT a minimum of 2 cooling curves GRAPH is sufficient for this mark NOT a bar chart (except if number of layers used)
		MP7	**additional point** (one from)**:** at least 5 sets of data taken, repeat for each value of independent variable and take average, correct description of calculating rate of cooling from results	1	NOT just 'repeat experiment'
				TOTAL 7	