UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS GCE Ordinary Level

MARK SCHEME for the October/November 2009 question paper for the guidance of teachers

5054 PHYSICS

5054/02

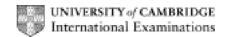
Paper 2 (Theory), maximum raw mark 75

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 must be read in conjunction with the question papers and the report on the examination.

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Page 2		2	Mark Scheme: Teachers' version Syllabus		Paper	•	
				GCE O LEVEL – October/November 2009	5054	02	
	(a)	(i)	weig	ht of water (causes extra pressure)(not mass)		B1	
		(ii)		sity of liquid/(sea-)water or gravitational field strength/gravity)	acceleration of freefa	all B1	
	(b)	(i)	3.6/3	3.60 × 10⁵ Pa		B1	
		(ii)		$_1 = P_2 V_2$ or $1.05 \times 10^5 \times 6000 = 3.60 \times 10^5 \times V_2$ or 1750 or 1800 cm ³		C1 A1	[5
	(a)		VD =)Fx or 1680 × 50 4 000 J				
	(b)			rag/resistance of water/air ne against friction/resistance/drag or energy lost due t	to friction/resistance/	В1	
				energy lost as heat/internal/thermal		B1	[4
	(a)	(i)	` '	loses –ve charge trons lost (to surface) (positive electrons	ons 0/2)	C1 A1	
		(ii)	(bec	omes) negative/gains electrons		B1	
	(b)	b) (i) (he) discharges/(re)gains electrons/–ve charge (not current flow)		ent flow)	B1		
		(ii))It or 1.6 × 0.15 or 0.0016 × 0.00015		C1 C1	
				¹⁰⁻⁷ C		A1	[7
	(a)	(i)		ray from M correctly reflected – checked by eye	and tropped book to	C1	

4 (a) (i) one ray from M correctly reflected – checked by eye
two rays from M correctly reflected – checked by eye – and traced back to
image

C1
A1

(ii) image point **clearly** marked at intersection/correct place checked by eye B1

(b) 0.34 m **cao** B1 [4]

 5 (a) (i) C in correct position i.e. gap 4, 18 or 32 { allow arrows/ R in correct position i.e. gap 11 or 25 { brackets < λ/2 OR two correct positions but R and C reversed 1/2

(ii) $6.2 \to 6.6 \text{ cm}$

(iii) $(v =)f\lambda$ or 5.1/5100 × 6.4/0.064 (using candidate's **5 (a) (ii)**) C1 $3.16 - 3.37 \times 10^{n}$ C1 316 - 337 m/s

	_		GCE O LEVEL – October/November 2009 5054	02	
	, ,	wave	itudinal wave:) vibration/oscillation direction parallel to/in same direction as e/energy travel direction (not L & R) everse wave: directions perpendicular or can be polarized (not up & down)	B1	[8]
6	(a)	• •	(I =)P/V or P = VI or 650/230 2.8 or 2.83 A	C1 A1	
	(ii) 3	3, 4, 5, 6 or 7 A only	B1	
	(b)		casing becomes live/at high voltage current through user/user electrocuted/user shocked	B1 B1	
	(,	use blows/melts/breaks use in live wire/(microwave) disconnected/circuit broken/no current	B1 B1	[7]
7	(a)	1.(0)	m	B1	
	(b)	\	(for an object in) equilibrium/balance $W_1x = W_2y$ (clear) or anticlockwise moment/torque/turning force = clockwise moment/torque/turning force	B1 B1	
	(,	18 000 × 1. 0 = T × 0.5 36 000 N	C1 A1	[5]
8	(a)	(i) (3 cao	B1	
	(ii) 2	208 cao	B1	
	(i	ii) ´	11 cao	B1	
	(b)	(i) ´	17 cao	B1	
	(ii) 2	20 cao	B1	[5]
					: 45]

Mark Scheme: Teachers' version

Syllabus

Paper

Page 3

Page 4	Mark Scheme: Teachers' version	Syllabus	Paper	
	GCE O LEVEL – October/November 2009	5054	02	
Section B				

9 (a) (i) 100 - 22 or 78C1 $(Q =)mc\Delta T \text{ or } 35 \times 4200 \times 78$ C₁ $1.1/1.1466/1.15 \times 10^7 \text{ J}$ **A1** (ii) (t =)E/P or P = E/t or $1.15 \times 10^7/2600$ C1 $4.4/4.41/4.42 \times 10^3$ s **A1** (iii) heat escapes/lost (to kitchen) **or** heat to heat the boiler/heater **or** not all heat ends up in water **or** heat to cause evaporation or used as latent heat (**not** heat wasted) **B1** [6] (b) (i) hot/warm water expands (**not** molecules expand) **B**1 density (of hot/warm water) decreases **B1 B1** hot/warm water rises convection current/circulation or cold water sinks B1 B1 mixes water (max 4) (ii) metal/steel is (good) conductor/poor insulator or plastic is poor conductor/ **B1** insulator more heat transferred through steel/less through plastic or heat transferred more quickly through steel/less quickly through plastic B1 [6] (c) (i) evaporation OR **B1** condensation (ii) any two points only occurs at surface boiling needs heat/ **B1** occurs at any temperature condensation releases heat produces cooling boiling: liquid to gas/ no bubbles B2 condensation: gas to liquid **B**1 [3] [Total: 15] **10** (a) (i) (W =)mg or 0.5×3.7 C1 1.8/1.85/1.9 N A1 (ii) $3.7 \text{ m/s}^2 \text{ not N/kg}$ **B1** (iii) (KE =) $\frac{1}{2}$ mv² C1 $\frac{1}{2}$ × 0.50 × 3.2² C1 2.6 or 2.56 J Α1 [6] (b) (i) A compares/measures (unknown and known) masses/amount of matter **B1** B measures/is dependent on weight/force of gravity (and hence mass obtained) B1 Mars weights/forces of gravity are less than/different from (Earth) **B**1

B1

[4]

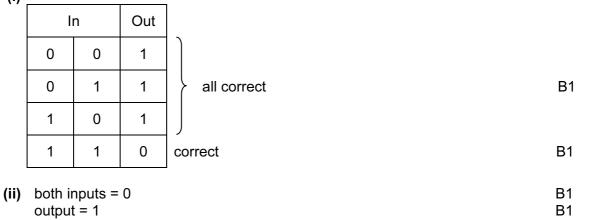
(ii) A or lever arm balance or balance with discs

Page 5		5	Mark Scheme: Teachers'	version	Syllabus	Paper	•
			GCE O LEVEL – October/November 2009 5054		5054	02	
(c)	(i)	volu	me			В1	
	(ii)	cylin inse reco subt or m	ord value of water in measuring order (not beaker) rt rock ord new value oract (to obtain volume) neasure rise) olume or <i>m</i> /subtraction	full to overflowing immerse rock	ubtraction	an B4 [Total :	[5] : 15]
11 (a)	(i)	$(I =)V/R \text{ or } V = IR \text{ (in (i)/(ii)) or } 9.0/20 \text{ (in (i)) or } 0.45 \times 16 \text{ (in (ii))} 0.45 A$				C1 A1	
	(ii)	7.2 \ C1 r	V (ma may be awarded for either A mark	ax 3 for (i) and (ii)	together)	A1	[3]
(b)	(i)		T and line of positive slope through ght line, positive intercept on R-axis		elvin scale	B1 B1	
	(ii)	curre	meter reading falls ent (supplied by battery) falls or X ta s smaller proportion of p.d.	kes greater propoi	tion of p.d. or 16 Ω	B1 B1	
	(iii)		nd to/→/- 10/whole number not greater than 20	V (usual unit p	enalty)	B1 B1	[6]
EITHEF (c)	R: (i)	(with	small, metal conductor as probe/sen n known T) voltmeter reading is used to find T	sor or calibrate V	reading	B1 B1	
	(ii)	•	two from: high temperatures /remotentemputer/low heat capacity	e reading/robust/q	uick acting/direct inp	ut B2	
	(iii)	grap	al changes in one/T do not produce a th with axes labelled not straight or i a straight line or not same change o i	not proportional to		B2	[6]

Page 6	Mark Scheme: Teachers' version	Syllabus	Paper
	GCE O LEVEL – October/November 2009	5054	02

OR:





(iii) A and B inputs = 1 В1 output = 0В1 [6]

[Total: 15]