Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

PHYSICS **0625/33**

Paper 3 Core Theory **May/June 2019**

MARK SCHEME

Maximum Mark: 80

Published

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 should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge International will not enter into discussions about these mark schemes.

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Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always **whole marks** (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme, referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

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GENERIC MARKING PRINCIPLE 5: Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).
GENERIC MARKING PRINCIPLE 6: Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

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Question	Answer	Marks
1(a)	(A =) lead, (B=) iron, (C=) aluminium	**B1**
1(b)	density = mass ÷ volume in any form (V =) M/d	**C1**
	200 ÷ 8.4	**C1**
	24 (cm^3)	**A1**
1(c)	add water to measuring cylinder/note the volume of water added	**B1**
	lower/immerse metal object into water	**B1**
	note new volume of water owtte	**B1**
	subtract new volume from initial volume/determine difference in volumes	**B1**

Question	Answer	Marks
2(a)(i)	10 (km)	**B1**
2(a)(ii)	1.5 (hours)	**B1**
2(a)(iii)	speed = distance ÷ time in any form	**C1**
	10 ÷ 1.5	**C1**
	6.7 (km/h) accept 6.67 (km/h)	**A1**
2(b)(i)	4:30 (pm) **OR** 16:30	**B1**
2(b)(ii)	30 (minutes)	**B1**
2(b)(iii)	smaller gradient **OR** less steep slope owtte	**B1**

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Question	Answer	Marks
3(a)	0.35 (m)	**B1**
	0.025 (m)	**B1**
3(b)	(weight =) mass × gravity in any form	**C1**
	50 × 10 OR (20 × 10) + (30 × 10)	**C1**
	500 (N)	**A1**
3(c)	moment = force × distance from pivot	**C1**
	140 × 1.3	**C1**
	180	**A1**
	Nm	**B1**

Question	Answer	Marks
4(a)	centre of cone nearer base than apex	**B1**
	centre of sphere	**B1**
4(b)	any three from: centre of mass is higher surface (area in contact with table) is smaller (so a) small displacement causes toppling (because with a small displacement the) vertical line through centre of mass is outside the base owtte	**B3**

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Question	Answer	Marks
5(a)	A (at end of sentence)	**B1**
	B (at end of sentence)	**B1**
5(b)(i)	energy cannot be created or destroyed	**B1**
	but can be transformed/changed (from one form to another)	**B1**
5(b)(ii)	Energy losses as heat **or** sound (to surroundings)	**B1**

Question	Answer	Marks
6(a)(i)	conduction **OR** radiation	**B1**
6(a)(ii)	conduction	**B1**
6(a)(iii)	convection	**B1**
6(b)(i)	any THREE from: hot water in each can same volume of water in each can/same temperature thermometer/radiation detector placed near can or seen on labelled diagram thermometer/radiation detector at same distance from each can measure temperature (change) on each thermometer	**B3**
6(b)(ii)	bigger / faster temperature change from better emitter	**B1**

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Question	Answer	Marks
7(a)	Any one from: angle of incidence is greater than the critical angle light is travelling from a(n optically) more dense medium to(wards an optically) less dense medium (at a large angle)	**B1**
7(b)(i)	dispersion	**B1**
7(b)(ii)	From A to B: red, orange, yellow, green, blue, indigo, violet	**B1**
7(c)	correct name for any part of em spectrum other than visible light	**M1**
	correct use of named part of em spectrum	**A1**

Question	Answer	Marks
8(a)(i)	(principal) axis ignore X-axis	**B1**
8(a)(ii)	F marked near intersection of ray and principle axis	**B1**
8(b)(i)	Either: ray from top of object towards centre of lens	**B1**
	continues from centre and crosses initial ray	**B1**
	OR 1st ray through F on left of lens (needs to be added by candidate)	**(B1)**
	2nd ray parallel to principle axis and crosses initial ray	**(B1)**
8(b)(ii)	inverted arrow drawn from axis to point where rays cross	**B1**
8(b)(iii)	diminished circled	**B1**
	inverted circled	**B1**

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Question	Answer	Marks
9(a)(i)	variable resistor	**B1**
9(a)(ii)	connect material in gap/between X and Y	**B1**
	if reading on ammeter material is a(n electrical) conductor	**B1**
9(a)(iii)	**BOTH** copper **AND** gold ticked i.e. **2nd** and **4th** boxes	**B1**
9(b)(i)	voltmeter	**B1**
9(b)(ii)	$V = IR$ OR $(R =)\ V/I$	**C1**
	= 6.0 ÷ 0.	**C1**
	= 30 (Ω)	**A1**

Question	Answer	Marks
10(a)	any 3 from: earth wire is connected to metal case earth wire has low resistance large current in earth wire fuse in live wire fuse (heats up and) melts this disconnects case/computer/circuit from supply (and so protects user)	**B3**
10(b)	(Vp / Vs) = (Np / Ns) in any form	**C1**
	240 / 12 = 3000 / Ns OR Ns = 3000 × (12/240) OR Ns = 3000 / 20	**C1**
	150 (turns)	**A1**

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Question	Answer	Marks
11(a)	1 mark for each correct column	
	(type of radiation): **gamma** in top box **beta** in bottom box	**B1**
	charge: **–1** (in bottom box)	**B1**
	mass: **4** (in middle box)	**B1**
	nature: **electron** (in bottom box)	**B1**
11(b)	line on graph from 4500 to curve **OR** from 8000 and 4000	**C1**
	line on graph from curve to 23 minutes **OR** from curve to 4 minutes AND 27 minutes	**C1**
	23(minutes)	**A1**

Question	Answer	Marks
12(a)	pointer deflects to the left	**B1**
	(then pointer) returns to zero reading	**B1**
12(b)	any three from: (magnet has a) magnetic field conductor/coil cuts magnetic field (this) induces or produces emf/voltage/p.d. in the conductor/coil (so reading on meter) no cutting of field when far from coil (so no reading on meter)	**B3**

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