Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

PHYSICS **0625/33**

Paper 3 Core Theory **May/June 2017**

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 will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2017 series for most Cambridge IGCSE®, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

Question	Answer	Marks
1(a)	any two from: use a ruler with mm (scale) ruler close(r) to book/no space between book and ruler have zero on ruler at one end of book take reading with eye in line with end of book owtte	**B2**
1(b)	use large number of pages i.e. more than 50	**B1**
	measure (total) thickness (with ruler)	**B1**
	divide (total) thickness by number of pages	**B1**
1(c)	convert g to kg or 400 ÷ 1000	**B1**
	Weight = mass × gravitational field strength in any form	**C1**
	(weight =) 4.0	**A1**
	(unit) N or newtons	**B1**
	Total:	**9**

Question	Answer	Marks
2(a)	chemical	**B1**
2(b)(i)	Moment = force × (perpendicular) distance (from pivot) in any form	**C1**
	3.0 × 25.0	**C1**
	75 (N cm)	**A1**
2(b)(ii)	any two from: idea that work done = energy gained total energy does not change the student loses chemical energy laptop gains (gravitational) PE (of lid) energy dissipated as thermal energy in the environment	**B2**
2(c)	any two from: laptop can be charged anywhere owtte cost of charging is zero (Sun is a) renewable energy (source)/not using fossil fuels	**B2**
2(d)	(Takes 5 times) longer to (re-)charge (battery)	**B1**
	Total:	**9**

Question	Answer	Marks
3(a)(i)	1.75 (hours) 1 hour 45 minutes	**B1**
3(a)(ii)	0.5 (hours) 30 minutes	**B1**
3(a)(iii)	100 (km)	**B1**
3(a)(iv)	Speed = distance ÷ time in any form	**C1**
	50 ÷ 0.75	**C1**
	66.67 (km / h)	**A1**
3(a)(v)	(average) speed after stopping is faster	**B1**
	line on graph is steeper	**B1**
	Total:	**8**

Question	Answer	Marks
4(a)	convert kN / m^2 to N / m^2 or 240 × 1000	**B1**
	pressure = force ÷ area	**C1**
	transformation force = pressure × area	**C1**
	3600 (N)	**A1**
4(b)	any 3 from: molecules move about (randomly) collisions impacts with walls/surfaces (of tyre) idea of force produced (by bombarding molecules) idea of pressure as force on an area	**B3**
	Total:	**7**

Question	Answer	Marks
5(a)	B between E and C	**B1**
	G between C and D	**B1**
	A followed by F in last two boxes	**B1**
5(b)	any 2 from: risk of radioactive material escaping into environment products of nuclear fission are radioactive many isotopes produced have long half-lives reactors can be used to produce material for nuclear weapons	**B2**
5(c)	useful energy output compared to total energy input	**B2**
	Total:	**7**

Question	Answer	Marks
6(a)	top diagram labelled *diffraction*	**B1**
	middle diagram labelled *reflection*	**B1**
	bottom diagram labelled *refraction*	**B1**
6(b)(i)	amplitude correctly indicated by eye	**B1**
6(b)(ii)	wavelength correctly indicated by eye	**B1**
6(c)	straight line (by eye) drawn through centre of lens to Y	**B1**
	sloping ray that emerges horizontally from lens to Y	**B1**
	Total:	**7**

Question	Answer	Marks
7(a)	horizontal arrows by eye	**B1**
	arrows pointing in opposite directions	**B1**
7(b)	3rd box ticked *vacuum*	**B1**
7(c)(i)	value less than 20 000	**B1**
	Hz	**B1**
7(c)(ii)	sound with frequency above upper (frequency) limit of human hearing	**B1**
	Total:	**6**

Question	Answer	Marks
8(a)	circuit completed with 3 lamps in parallel	**B1**
	switch in each branch	**B1**
	variable resistor in each branch	**B1**
8(b)	switch all lights on/off	**B1**
8(c)	name: Fuse	**B1**
	if the current (in the fuse/circuit is) too large	**B1**
	(the wire in the fuse) melts	**B1**
	Total:	**7**

Question	Answer	Marks
9(a)	repel no effect attract attract	**B2**
9(b)	any two from: (soft) iron is easily magnetised (but) loses its magnetism (very) quickly Steel is harder to magnetise and retains its magnetism (for a long time)	**B2**
	Total:	**4**

Question	Answer	Marks
10(a)	(coil X) primary (coil Y) secondary	**B1**
10(b)	$N_s / N_p = V_s / V_p$ in any form	**C1**
	$240 / V_s = 6400 / 400$ OR $V_s / 240 = 400 / 6400$	**C1**
	15 (V)	**A1**
	Total:	**4**

Question	Answer	Marks
11(a)	Any two from: two curves/loops drawn from one end of coil to the other above line AB two curves/loops drawn from one end of coil to the other below line AB field pattern symmetrical by eye above and below line XY straight lines by eye within coil (accept some lines leaving side of coil near ends)	**B2**
	arrow from B to A	**B1**
11(b)(i)	electromagnet	**B1**
11(b)(ii)	Scrap yards/relay/motor/generator/(security) doors/(electric) bells	**B1**
	Total:	**5**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>12(a)</td><td>Any 4 from:

type of detector named e.g. Geiger counter

place absorber between sample and detector and measure count rate

uses paper to absorb/stop alpha particles

if count rate or radiation decreases/is stopped/is absorbed returns to background sample is emitting alpha particles
OR
if count rate remains unchanged sample is emitting beta particles

uses aluminium to absorb/stop alpha particles

if count rate or radiation decreases/is stopped/is absorbed returns to background sample is emitting beta particles</td><td>B4</td></tr>
<tr><td>12(b)</td><td><table><tr><td>particle</td><td>charge</td><td>location</td></tr><tr><td>electron</td><td>negative</td><td>outside/orbiting nucleus</td></tr><tr><td>neutron</td><td>neutral/zero</td><td>in the nucleus</td></tr><tr><td>proton</td><td>positive</td><td>in the nucleus</td></tr></table></td><td>B3</td></tr>
<tr><td></td><td>Total:</td><td>7</td></tr>
</table>