



PHYSICS

0625/33

Paper 3 Core Theory

October/November 2016

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.

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Page 2	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks
1(a)	100 (km/h)	B1
1(b)	boxes L – M AND R – S ticked	B1
1(c)	0.1 hours identified 6 (minutes)	C1 A1
1(d)	area under graph $0.5 \times 0.2 \times 100$ 10 (km)	C1 C1 A1
	Total	7

Question	Answer	Mark
2(a)(i)	constant speed/velocity	B1
2(a)(ii)	75 N forwards	B1 B1
2(b)	<u>friction</u> two surfaces rubbing together owtte	B1 B1
	Total	5

Page 3	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks
3(a)(i)	maximum displacement owtte	B1
3(a)(ii)	moving with maximum speed OR mid-point of oscillation	B1
3(b)(i)	energy cannot be created or destroyed (but can be changed) owtte	B1
3(b)(ii)	any three from: stretched spring has elastic potential energy potential energy converted to kinetic energy each oscillation energy transferred to surroundings oscillations become smaller (in amplitude)	B3
	Total	6

Page 4	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks
4(a)	W = m × g in any form 10 000 (N)	C1 A1
4(b)(i)	pressure = force/area in any form (10 500 / 4) / 125 21 (N/cm ²)	C1 C1 A1
4(b)(ii)	(weight spread over) larger area owtte pressure reduced	B1 B1
4(c)(i)	moment = force × distance from pivot in any form 200 × 0.25 OR 50 <u>Nm</u>	C1 A1 B1
4(c)(ii)	force applied further away from wheel nut owtte	B1
	Total:	11

Page 5	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks
5(a)	air above water becomes less dense cool breeze occurs as a result of convection warm air rises	B1 B1 B1
5(b)	(jacket) traps air air is an insulator OR prevents convection	B1 B1
	Total:	5

Question	Answer	Marks
6(a)(i)	arrow on incident ray pointing towards mirror OR arrow on reflected ray pointing away from mirror	B1
6(a)(ii)	<i>i</i> AND <i>r</i> both correctly labelled	B1
6(a)(iii)	same distance from mirror as candle same size as the candle	B1 B1
6(b)	angle of incidence = angle of reflection	B1
	Total:	5

Page 6	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks
7	Person A : lightning seen and thunder heard at (almost) same time	B1
	Person B : lightning seen first OR thunder heard later/after flash of lightning	B1
	Explanation:	
	light travels faster than sound OR reverse argument	B1
	sound has further to travel to B so time delay is greater or similar argument OR distances for A are so short that no observable difference in time.	B1
	Total:	4

Question	Answer	Marks
8(a)	any named insulator, e.g. cotton, string etc.	B1
8(b)	1 = attract	B1
	2 = repel	B1
	3 = repel	B1
8(c)	(sphere) is rubbed with a cloth	B1
	<u>electrons</u> move off (sphere) owtte	B1
	Total:	6

Page 7	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks
9(a)	a.c. current changes direction OR d.c. one direction only	B1
9(b)(i)	<u>variable resistor</u>	B1
9(b)(ii)	changes the amount of current	B1
	changes speed of motor fan	B1
9(c)(i)	V = IR in any form	C1
	24/8.5	C1
	2.82	A1
	A OR amps	B1
9(c)(ii)	5 (A)	B1
9(d)	protect user from electric shock	B1
		Total: 10

Page 8	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks
10(a)	<u>electrons</u> <u>protons AND neutrons</u>	B1 B1
10(b)	same number of protons OR proton number AND different number of nucleons OR neutrons/nucleon number	B1
10(c)	alpha – most ionising beta – carries a negative charge gamma – most penetrating	B1 B1 B1
	Total:	6

Page 9	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks
11(a)	X = step up AND Y = step down	B1
11(b)	$V_p/V_s = N_p/N_s$ OR $V_s = 132\,000 / (24\,000/2000)$ OR turns ratio, 12 calculated 11 000 (V)	C1 A1
11(c)	any two from: less heating OR less energy OR power wasted OR more efficient thinner wires OR cables fewer power stations lower current in cables transmit longer distances (without drop in power)	B2
	Total:	5

Page 10	Mark Scheme	Syllabus	Paper
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Question	Answer	Marks
12(a)(i)	correct symbols for battery AND switch connected in series with coil	B1 B1
12(a)(ii)	increasing turns on coil increasing the current increasing the strength of the magnetic field	B1 B1 B1
12(b)(i)	coil in series with galvanometer magnet moved relative to coil deflection on galvanometer	B1 B1 B1
12(b)(ii)	more OR less coils OR number of coils faster OR slower movement OR speed of magnet OR coil	B1 B1
	Total:	10