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Cambridge International General Certificate of Secondary Education

PHYSICS **0625/31**

Paper 3 Core Theory **October/November 2019**

MARK SCHEME

Maximum Mark: 80

Published

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Question	Answer	Marks
1(a)	density = mass ÷ volume in any form OR (mass =) density × volume	**C1**
	mass = 1000 × 0.05	**C1**
	50 (kg)	**A1**
1(b)	Floats OR does not sink	**M0**
	density of full barrel OR its density OR density of plastic OR density of barrel OR density of (pure) water is less than sea water	**C1**
	density of plastic OR barrel AND (pure) water is less than sea water	**A1**

Question	Answer	Marks
2(a)	(student) S	**B1**
2(b)	83.37 (s) seen	**C1**
	83.37 ÷ 50	**C1**
	1.67 (s) cao	**A1**
2(c)	165 (mm)	**B1**

Question	Answer	Marks
3(a)	measure without any load / weights AND measure with load / weights	**B1**
	measure length OR ruler stated or seen	**B1**
	(extension =) difference in two values	**B1**
3(b)(i)	30 (cm)	**B1**
3(b)(ii)	2.5 (N)	**B1**
3(c)	W = m × g OR W = m × 10 OR (m =) W ÷ g in any form	**C1**
	6.0 ÷ 10	**C1**
	0.6(0) (kg)	**A1**

Question	Answer	Marks
4(a)(i)	stop the tractor tipping up/keep tractor level owtte	**B1**
4(a)(ii)	moment = force × (perp.) distance from pivot in any form	**C1**
	6000 × 2.1	**C1**
	12 600	**A1**
	Nm	**B1**
4(b)	Any **three** from: (wide tyres have) greater area (in contact with ground) pressure = force ÷ area in any form the bigger the area the smaller the pressure so tractor less likely to sink/become stuck (in soft ground)	**B3**

Question	Answer	Marks
5	Box 1 ✓	**B3**
	Box 2 ✓	
	Box 3	
	Box 4	
	Box 5 ✓	

Question	Answer	Marks
6(a)(i)	straight line to mirror **AND** normal correctly positioned	**B1**
6(a)(ii)	two correct reflections drawn	**B1**
6(a)(iii)	angle of incidence = angle of reflection	**B1**
6(b)	refracted away from normal	**B1**
	refracted along straight edge	**B1**
	totally internally reflected	**B1**

Question	Answer	Marks
7(a)(i)	ray from X through centre of lens	**B1**
7(a)(ii)	image drawn from axis to point where rays cross and labelled I	**B1**
7(a)(iii)	point labelled F where ray crosses principal axis	**B1**
7(a)(iv)	2.7 (cm) ± 0.2 cm	**B1**
7(b)	diminished 2nd box ticked	**B1**
	inverted 4th box ticked	**B1**

Question	Answer	Marks
8(a)(i)	(it is) vibrating	**B1**
8(a)(ii)	longitudinal	**B1**
8(a)(iii)	frequency (of sound) OR 25 kHz	**B1**
	is above (upper limit of) human hearing range OR is an ultrasound	**B1**
8(b)(i)	horizontal line with arrows at either end	**B1**
8(b)(ii)	(14.4 ÷ 4 =) 3.6 (cm)	**B1**
8(c)	Any **four** from: use of shallow water use of flat lamina or shape below surface / different depths (of water) used waves hit {shallower water / shape} at an angle (other than 90°) waves change direction (due to) change in speed	**B4**

Question	Answer	Marks
9(a)	correct field pattern for bar magnet	**B1**
	no lines crossing and good detail of curvature	**B1**
	correct direction of arrow, i.e. out from N pole	**B1**
9(b)	electrons	**M1**
	move from the rod/to the cloth	**A1**
9(c)	1. force of repulsion circled	**B1**
	2. no force circled	**B1**

Question	Answer	Marks
10(a)(i)	correct symbol for ammeter	**B1**
	correct symbol for voltmeter	**B1**
	ammeter in series and voltmeter in parallel with lamp	**B1**
10(a)(ii)	(R =) V ÷ I OR $V = I \times R$ in any form	**C1**
	(R =) 4.5 ÷ 0.25	**C1**
	18 (Ω)	**A1**
10(b)(i)	variable resistor	**B1**
10(b)(ii)	(sliding contact moved to) change resistance (in circuit)	**B1**
	(and so) change current (in lamp) or p.d. (across lamp)	**B1**

Question	Answer	Marks
11(a)	relative movement (between conductor and magnetic field) And any **two** from: connect conductor/coil to (sensitive) meter use of magnet/magnetic field	**B1**
	deflection on meter (indicates emf) OR voltage generated OR current in conductor	**B2**
11(b)(i)	(soft-) iron	**B1**
11(b)(ii)	more turns on output coil (than input coil) ora	**B1**
11(b)(iii)	Vs / Vp = Ns / Np in any form	**C1**
	Vs / 12 = 300 / 20 OR Vs = (300 / 20) × 12 OR Vs = 15 × 12 OR 12 / 20 = ? / 300	**C1**
	180 (V)	**A1**

Question	Answer	Marks
12(a)	2.5 (minutes)	**B1**
12(b)	any answer above 1246 (counts/s), e.g. 1247	**B1**
12(c)	1. helium nucleus OR 2 protons **AND** 2 neutrons	**B1**
	2. strongly (ionising)	**B1**
	3. weakly (penetrating)	**B1**