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**Cambridge International Examinations**  
Cambridge International General Certificate of Secondary Education

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**PHYSICS**

**0625/32**

Paper 3 Core Theory

**May/June 2017**

**MARK SCHEME**

Maximum Mark: 80

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| <b>Published</b> |
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**CAMBRIDGE**  
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| Question  | Answer                                    | Marks |
|-----------|-------------------------------------------|-------|
| 1(a)      | flexible rule/tape measure/measuring tape | B1    |
| 1(b)(i)   | 58.75 (s)                                 | B1    |
| 1(b)(ii)  | speed = distance ÷ time in any form       | C1    |
|           | 0.85 (m/s)                                | A1    |
| 1(b)(iii) | 7.12 (s)                                  | B1    |
|           | Total:                                    | 5     |

| Question | Answer                                             | Marks |
|----------|----------------------------------------------------|-------|
| 2(a)(i)  | 6500 (g)                                           | B1    |
| 2(a)(ii) | density = mass ÷ volume in any form                | B1    |
|          | 1.3                                                | A1    |
|          | g/cm <sup>3</sup>                                  | B1    |
| 2(b)     | density (of brush) is less (than) density of paint | B1    |
|          | Total:                                             | 5     |

| Question | Answer                                                                   | Marks |
|----------|--------------------------------------------------------------------------|-------|
| 3(a)     | weight = mass · gravitational field strength in any form                 | C1    |
|          | 20.0 · 10.0                                                              | C1    |
|          | 200 (N)                                                                  | A1    |
| 3(b)(i)  | moment = force · (perpendicular) distance (from pivot) in any form       | C1    |
|          | 180.0 · 2.5                                                              | C1    |
|          | 450 (Nm)                                                                 | A1    |
| 3(b)(ii) | 2nd box down ticked decrease the length of the arm holding the sun-shade | B1    |
|          | Total:                                                                   | 7     |

| Question | Answer                                                                                                                                                                                                                                                                                                                                     | Marks     |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 4(a)     | radiation                                                                                                                                                                                                                                                                                                                                  | <b>B1</b> |
| 4(a)(ii) | thermometer near door or B is at higher temperature                                                                                                                                                                                                                                                                                        | <b>B1</b> |
|          | any 2 from:<br><br>darker colours are better absorbers (of thermal energy)<br>darker colours are better emitters (of thermal energy)<br>white/lighter colours are better reflectors (of thermal energy)<br>white/lighter colours are poorer absorbers (of thermal energy)<br>white/lighter colours are poorer emitters (of thermal energy) | <b>B2</b> |
| 4(b)     | any 3 from:<br><br>cold air is denser (than warm air)<br>cold air will fall<br>the cold air is warmed and expands<br>less dense/warm air rises or replaces the cold air<br>(forming a) convection (current)                                                                                                                                | <b>B3</b> |
|          | <b>Total:</b>                                                                                                                                                                                                                                                                                                                              | <b>7</b>  |

| Question | Answer                                                                                        | Marks |
|----------|-----------------------------------------------------------------------------------------------|-------|
| 5(a)     | any two from:<br>more collide with walls<br>more often<br>so pressure is greater (inside bag) | B2    |
| 5(b)     | density (of sea water)<br>depth (of sea water)<br>(in either order)                           | B2    |
| 5(c)(i)  | barometer                                                                                     | B1    |
| 5(c)(ii) | 3.4 or 1.3 seen                                                                               | C1    |
|          | 2.1                                                                                           | C1    |
|          | 1035.7                                                                                        | A1    |
|          | Total:                                                                                        | 8     |

| Question  | Answer                                                                                                                                                                         | Marks |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 6(a)(i)   | normal line drawn at $90^\circ$ to mirror by eye                                                                                                                               | B1    |
| 6(a)(ii)  | reflected ray drawn with $i = r$ by eye                                                                                                                                        | B1    |
| 6(a)(iii) | angle of incidence = angle of reflection                                                                                                                                       | B1    |
| 6(a)(iv)  | Mark is for the explanation linked to candidate's diagram.<br>e.g. if answer is YES they should state that the reflected ray hits/reaches the (other)driver/car or can be seen | B1    |
| 6(b)(i)   | ray refracted toward the normal                                                                                                                                                | B1    |
| 6(b)(ii)  | angle of incidence labelled                                                                                                                                                    | B1    |
|           | angle of refraction labelled                                                                                                                                                   | B1    |
|           | Total:                                                                                                                                                                         | 7     |

| Question | Answer                                                                                                                                                                                                                                                                                             | Marks |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| 7(a)(i)  | visible light                                                                                                                                                                                                                                                                                      | B1    |
|          | gamma rays                                                                                                                                                                                                                                                                                         | B1    |
| 7(a)(ii) | wavelength                                                                                                                                                                                                                                                                                         | B1    |
|          | frequency                                                                                                                                                                                                                                                                                          | B1    |
| 7(b)     | (sound) is a longitudinal wave (radio waves are transverse)<br>(sound) needs a medium to be transmitted (but radio waves do not)                                                                                                                                                                   | B1    |
| 7(c)     | any four from: only award 4 marks if valid procedure<br><br>(use tape measure) to measure distance of at least 100 m<br>blocks banged together<br>stopwatch started when blocks are SEEN to hit<br>stopwatch stopped when sound heard<br>time taken recorded/calculated<br>speed = distance ÷ time | B4    |
|          | Total:                                                                                                                                                                                                                                                                                             | 9     |

| Question | Answer                                                                                                                       | Marks     |
|----------|------------------------------------------------------------------------------------------------------------------------------|-----------|
| 8(a)     | At least 2 curves drawn from one end of magnet to the other                                                                  | <b>B1</b> |
|          | pattern is symmetrical by eye above and below middle of magnet                                                               | <b>B1</b> |
|          | Arrow from N to S                                                                                                            | <b>B1</b> |
| 8(b)     | any 2 from:<br>magnet/block/metal placed in coil<br>coil connected to d.c. supply<br>(d.c.) current in coil (for short time) | <b>B2</b> |
| 8(c)     | tick in 4th box steel                                                                                                        | <b>B1</b> |
|          | <b>Total:</b>                                                                                                                | <b>6</b>  |

| Question | Answer                                                                                                       | Marks     |
|----------|--------------------------------------------------------------------------------------------------------------|-----------|
| 9(a)     | arrow drawn pointing from C to D                                                                             | <b>B1</b> |
|          | arrow on /near side CD pointing upwards                                                                      | <b>B1</b> |
| 9(b)     | any 2 from:<br>increase (size of) current<br>increase strength of magnet<br>increase number of turns in coil | <b>B2</b> |
| 9(c)(i)  | electrons                                                                                                    | <b>B1</b> |
| 9(c)(ii) | current is smaller                                                                                           | <b>B1</b> |
|          | (as) resistance of coil/wire is greater                                                                      | <b>B1</b> |
|          | <b>Total:</b>                                                                                                | <b>7</b>  |

| Question  | Answer                                                                                                                                      | Marks     |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| 10(a)     | in any order:<br>cells/battery (connected) incorrectly<br>voltmeter used instead of ammeter<br>thermistor symbol used instead of LDR symbol | <b>B3</b> |
| 10(b)(i)  | resistance decreases as brightness increases                                                                                                | <b>B1</b> |
| 10(b)(ii) | (resistance at 60% full brightness) = 2000 (ohms)                                                                                           | <b>B1</b> |
|           | resistance = voltage ÷ current in any form e.g. $I = \frac{V}{R}$                                                                           | <b>C1</b> |
|           | $8.0 \div 2000$                                                                                                                             | <b>C1</b> |
|           | $4 \cdot 10^{-3}$ (A)                                                                                                                       | <b>A1</b> |
|           | <b>Total:</b>                                                                                                                               | <b>8</b>  |

| Question  | Answer                                                                   | Marks     |
|-----------|--------------------------------------------------------------------------|-----------|
| 11(a)     | protects circuit<br>if current too large                                 | <b>B2</b> |
| 11(b)(i)  | copper                                                                   | <b>B1</b> |
| 11(b)(ii) | $\frac{N_s}{N_p} = \frac{V_s}{V_p}$ in any form                          | <b>C1</b> |
|           | $\frac{16}{224} = \frac{N_s}{308}$ or $\frac{224}{16} = \frac{308}{N_s}$ | <b>C1</b> |
|           | 22 (turns)                                                               | <b>A1</b> |
|           | <b>Total:</b>                                                            | <b>6</b>  |

| Question  | Answer                              | Marks     |
|-----------|-------------------------------------|-----------|
| 12(a)     | proton                              | <b>B1</b> |
|           | positive or +1                      | <b>B1</b> |
| 12(a)(ii) | tick in third box                   | <b>B1</b> |
| 12(b)     | idea of mass being halved, e.g. 0.5 | <b>C1</b> |
|           | 0.25 (mg)                           | <b>A1</b> |
|           | <b>Total:</b>                       | <b>5</b>  |