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

**PHYSICS** **0625/32**

Paper 3 Core Theory **March 2018**

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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## 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:<br><br>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:<br><br>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) | 5.0 ÷ 500 or 0.01 (cm) | **B1** |
| 1(b) | 30 × 20 × 5 or length × width × height or cross-sectional area × length | **B1** |
| 1(c) | balance | **B1** |
| 1(d) | D = M / V in any acceptable form | **C1** |
| | 2400 ÷ 3000 | **C1** |
| | 0.80 (g / $cm^3$) or 0.8 (g / $cm^3$) | **A1** |

| Question | Answer | Marks |
|---|---|---|
| 2(a)(i) | 2nd box ticked section B | **B1** |
| 2(a)(ii) | distance = area under graph or line or 0.5 × base × height | **C1** |
| | 20 × 5 × 0.5 | **C1** |
| | 50 (m) | **A1** |
| 2(b)(i) | (average speed =) (total) dist ÷ (total ) time | **C1** |
| | (250 × 4) | **C1** |
| | 1000 ÷ 80 | **C1** |
| | 12.5 (m / s) | **A1** |
| 2(b)(ii) | 43.88 – 20.16 or 23.72 | **B1** |

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| Question | Answer | Marks |
|---|---|---|
| 3(a) | 12.5 (mm) | **B1** |
| 3(b) | (spring) B | **M1** |
| | same load gives greater extension (than spring A) owtte | **A1** |
| 3(c)(i) | 43.9 – 19.7 or 24.2 (cm) | **B1** |
| 3(c)(ii) | Any **two** from:<br>measure the extension for different (number of 1.0 N) loads<br>repeat each reading (as each (1.0 N) load is removed) AND calculate average (extension for each load)<br>(take reading from ruler with) eye level with pin | **B2** |

| Question | Answer | Marks |
|---|---|---|
| 4(a) | any **three** from:<br>water flows down (from reservoir)<br>idea of gravitational / potential energy (transferred to kinetic (energy))<br>water turns turbine<br>turbine turns generator | **B3** |
| 4(b) | Any **three** from:<br>• does not contribute to atmospheric pollution / acid rain<br>• does not contribute to greenhouse gases / global warming<br><br>• renewable energy source (so will not run out)<br>• short start-up time / can meet surges in demand owtte<br>• conserve non-renewable reserves / fossil fuels<br>• reduces dependence on fossil fuels (from other countries) | **B3** |
| 4(c)(i) | kinetic | **B1** |
| 4(c)(ii) | efficient | **B1** |

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| Question | Answer | Marks |
|---|---|---|
| 5(a)(i) | (pressure) increases | **B1** |
| 5(a)(ii) | any **four** from:<br>(air) molecules / particles have more (kinetic) energy / move faster<br><br>more frequent collisions<br>harder collisions (with walls)<br>collisions with walls<br>idea of collisions causing force | **B4** |
| 5(b) | P = F / A in any form words or numbers | **C1** |
| | 0.59 | **A1** |
| | N / $cm^2$ | **B1** |
| 5(c)(i) | (Area = $\pi \times r^2$ =) 50.2654 ( $cm^2$) | **B1** |
| 5(c)(ii) | smaller <u>area</u> (in contact with the table) | **B1** |

| Question | Answer | Marks |
|---|---|---|
| 6(a) | expansion / voltage / potential difference / emf<br>length / colour / pressure / volume / resistance / density | **B1** |
| 6(b)(i) | 8:30 pm | **B1** |
| 6(b)(ii) | 9:00 pm | **B1** |
| | (explanation) Slope / gradient of graph is less<br>or temperature drops / falls (more) slowly / slower | **B1** |
| 6(c) | insulator<br>conduction<br>convection | **B3** |

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| Question | Answer | Marks |
|---|---|---|
| 7(a)(i) | (angle) Z | **B1** |
| 7(a)(ii) | any other part of em spectrum or (seismic) S-waves | **B1** |
| 7(b)(i) | 3 curved waves after gap | **M1** |
| | waves evenly spaced and centred on gap (by eye) | **A1** |
| 7(b)(ii) | diffraction | **B1** |

| Question | Answer | Marks |
|---|---|---|
| 8(a)(i) | ammeter in series with power supply | **B1** |
| 8(a)(ii) | variable resistor symbol in series with lamp B | **B1** |
| 8(a)(iii) | voltmeter symbol seen | **B1** |
| | voltmeter symbol in parallel with lamp B | **B1** |
| 8(b) | V = I R in any form | **C1** |
| | 6.0 ÷ 0.2 accept 6 ÷ 0.2 | **C1** |
| | 30 (Ω) | **A1** |

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| Question | Answer | Marks |
|---|---|---|
| 9(a)(i) | X-rays / X-radiation | **B1** |
| 9(a)(ii) | Radio waves | **B1** |
| 9(b) | ultrasound | **B1** |
| 9(c) | For full marks the method described must work.<br>any **four** from:<br>Means of producing sharp sound<br>use of suitable reflecting surface<br>measure distance travelled by sound<br>Method for measurement of time for sound to travel measured distance.<br>use of speed = distance / time | **B4** |

| Question | Answer | Marks |
|---|---|---|
| 10(a) | any **four** from:<br>needle moves (one way) as N pole / magnet moves downward / into coil<br>as coil cuts across magnetic field (of magnet)<br>needle moves in opposite direction as N pole / magnet moves upward / out of coil<br>field is cut in opposite direction<br>needle at zero when spring at max extension<br>magnet is stationary so no cutting of field lines | **B4** |
| 10(b) | (device) X is a step-up transformer | **B1** |
| | (device) Y is a step-down transformer | **B1** |

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| Question | Answer | Marks |
|---|---|---|
| 11(a) | friction (between cloth and rod) | **B1** |
| | (causes) electrons to move | **B1** |
| | from cloth / to rod | **B1** |
| 11(b) | rod {moves or rotates} away | **B1** |
| | like charges repel | **B1** |

| Question | Answer | Marks |
|---|---|---|
| 12 | For full marks the method described must work.<br>any **four** from:<br>take background reading / reading without source<br>use piece of paper between source and detector<br>beta particles can pass through paper or alpha particles stopped / absorbed by paper?)<br>reading on detector similar / unchanged<br>so no alpha particles emitted<br>use few mm of aluminium between source and detector<br>reading on detector now similar to background reading<br>(because) beta particles stopped by a few mm of aluminium | **B4** |

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