



**Cambridge Assessment International Education**  
Cambridge International Advanced Level

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**DESIGN AND TECHNOLOGY**

**9705/33**

Paper 3

**October/November 2017**

MARK SCHEME

Maximum Mark: 120

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**Published**

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This document consists of **8** printed pages.



## Section A

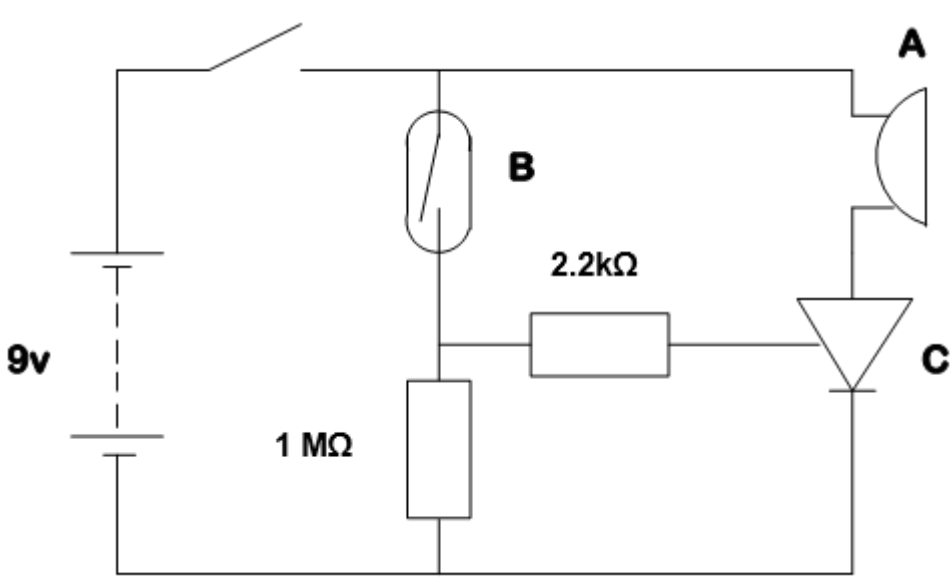
## Part A – Product Design

| Question | Answer  | Marks  |
|----------|---|--|
| 1        | <p>appropriate example</p> <p>2D modelling ;<br/>3D modelling ;<br/>Mock up ;<br/>Scale prototype ;</p> <p>computer modelling, exploring shape, card<br/>exploring form, proportion<br/>scaled model of part/whole of concept, possibility<br/>usually final design model, can be tested</p> <p>for each;<br/>quality of explanation:</p> <ul style="list-style-type: none"> <li>– logical, structured</li> <li>– limited detail</li> </ul> | <p>1 × 4</p> <p>20</p> <p>3–4<br/>0–2</p> <p>4 × 4</p> |

| Question | Answer  | Marks  |
|----------|---|--|
| 2(a)     | <p>suitable material:</p> <p>abs/polypropylene/HDPE<br/>appropriate hardwood e.g. beech</p> <p>Reason :</p> <ul style="list-style-type: none"> <li>– robust/take harsh treatment</li> <li>– can be assembled/formed to required shape</li> <li>– not split easy</li> <li>– take a good finish</li> </ul>  | <p>1</p> <p>1 × 2</p> <p>3</p>                   |
| 2(b)     | <p>description to include:</p> <p>quality of description:</p> <ul style="list-style-type: none"> <li>– fully detailed</li> <li>– most stages</li> <li>– some detail,</li> </ul> <p>quality of sketches</p>  | <p>6–8<br/>3–5<br/>0–2<br/>up to 2</p> <p>10</p> |
| 2(c)     | <p>explanation could include:</p> <ul style="list-style-type: none"> <li>– change in process;</li> <li>– change in materials;</li> <li>– use of jigs, formers, moulds;</li> <li>– simplification of design.</li> </ul> <p>quality of explanation:</p> <ul style="list-style-type: none"> <li>– logical, structured</li> <li>– limited detail,</li> </ul> <p>quality of sketches</p> | <p>3–5<br/>0–2<br/>up to 2</p> <p>7</p>          |



## Part B – Practical Technology

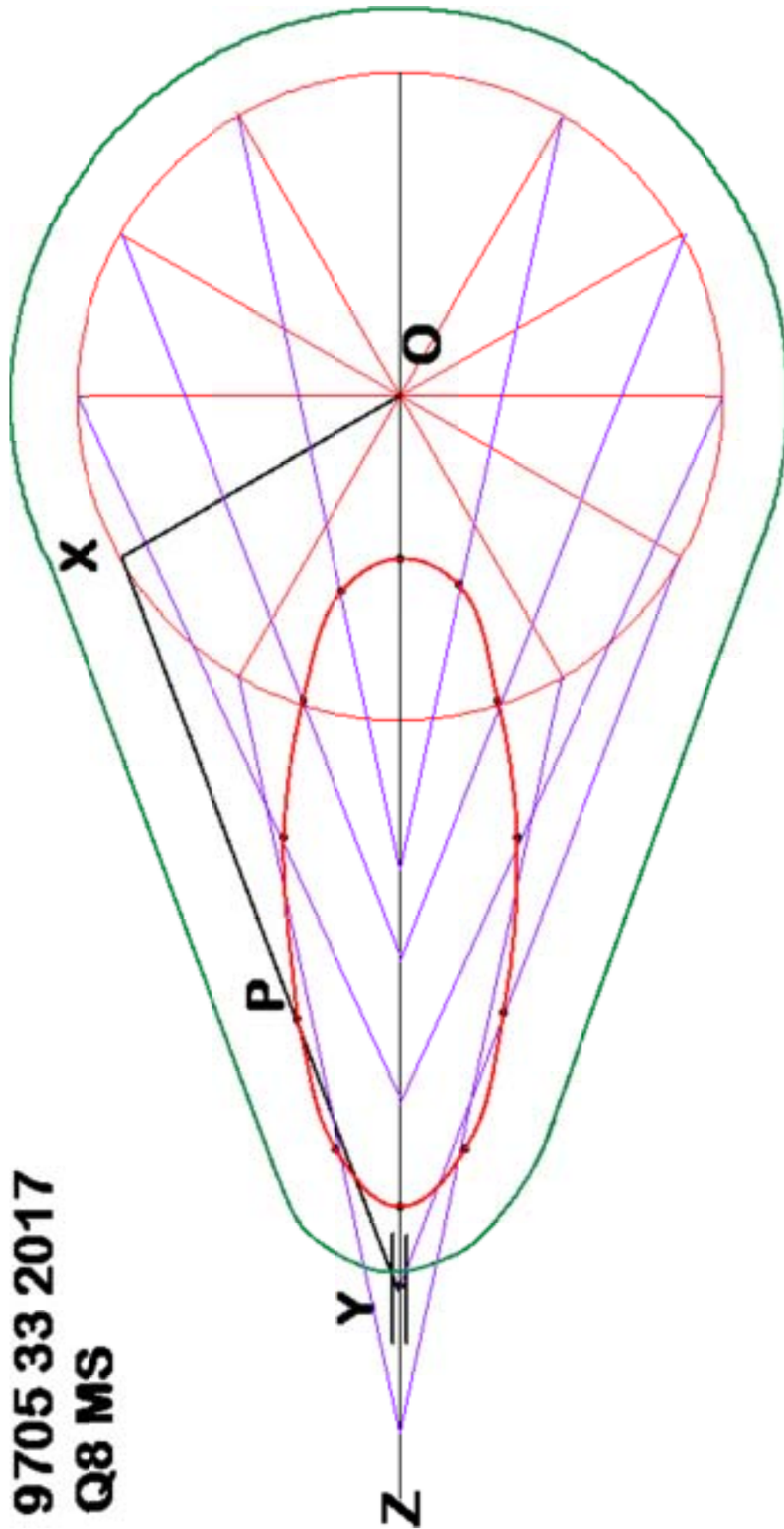
| Question | Answer   | Marks   |
|----------|--|---|
| 4(a)(i)  | $P = VI$ $12 \times 2.4$ (1)<br>28.8 (1) Watts (1)   | 3   |
| 4(a)(ii) | Battery<br>Mains supply<br>Dynamo<br>Photovoltaic<br>Why used e.g. location, safety  | 4<br><br><br><br>$1 \times 2$<br>$1 \times 2$ |
| 4(b)(i)  | <b>A</b> buzzer<br><b>B</b> reed switch<br><b>C</b> thyristor  | 3<br><br><br>$1 \times 3$                     |
| 4(b)(ii) |  <p>switch sets alarm (1)<br/>           Alarm activated when reed switch closes (1) – magnet on door frame – (1)<br/>           Current flows to gate leg of thyristor (1) causing it to switch on (1)<br/>           Circuit complete (1) Buzzer sounds (1)<br/>           Thyristor latching device – will stay on (1) until switched off by top switch.</p> <p>Clarity of communication (up to 2)</p> | 10  |



| Question | Answer  | Marks                                |    |
|----------|---|--------------------------------------|----|
| 7(a)     | (i) cashaft diameter 24<br>(ii) in line flat follower<br>(iii) minimum distance of 24 from the flat follower to camshaft centre<br>(iv) clockwise direction<br>(v) 0°–180° rise 30 simple harmonic motion<br>(vi) 180°–210 dwell<br>(vii) 210–360° fall with simple harmonic motion<br>Accuracy | 1<br>1<br>1<br>1<br>4<br>2<br>3<br>2 | 15 |
| 7(b)     | ratchet described, pawl identified<br>Example   | 4<br>1                               | 5  |

| Question | Answer  | Marks            |   |
|----------|---|------------------|---|
| 8(a)(i)  | size/scale<br>Circle divided (angular or trammel)<br>Loci plotted<br>Accuracy | 2<br>1<br>3<br>2 | 8 |
| 8(a)(ii) | accurate guard profile  | up to 4          | 4 |
| 8(b)     | isometric<br>Exploded parts in line<br>Accuracy rendering                     | 2<br>3<br>3      | 8 |

| Question | Answer   | Marks   |    |
|----------|--|---|----|
| 9        | Discussion could include:<br><br>– materials (e.g. smart)<br>– printing technologies<br>– virtual reality<br><br>examination of issues<br><br>– wide range of relevant issues<br>– limited range<br><br>quality of explanation<br><br>– logical, structured<br>– limited detail,<br><br>supporting examples / evidence<br><br>– specific CAD/Internet/simulation VR etc. programmes/usage<br>– specific printing/manufacturing technologies<br>– specific consumer/manufacturer examples | 5–9<br>0–4<br><br><br>4–7<br>0–3<br><br><br><br>16<br><br><br>4 | 20 |



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Q8 MS

## Section B

| Question | Answer  | Marks     |
|----------|---|-----------|
|          | <p><b>Analysis</b></p> <p>Analysis of the given situation/problem. 0–5</p> <p><b>Specification</b></p> <p>Detailed written specification of the design requirements.<br/>At least five specification points other than those given in the question 0–5</p> <p><b>Exploration</b></p> <p>Bold sketches and brief notes to show exploration of ideas for a design solution, with reasons for selection.</p> <ul style="list-style-type: none"> <li>– range of ideas 0–5</li> <li>– annotation related to specification 0–5</li> <li>– marketability, innovation 0–5</li> <li>– evaluation of ideas, selection leading to development 0–5</li> <li>– communication 0–5</li> </ul> <p><b>Development</b></p> <p>Bold sketches and notes showing the development, reasoning and composition of ideas into a single design proposal. Details of materials, constructional and other relevant technical details.</p> <ul style="list-style-type: none"> <li>– developments 0–5</li> <li>– reasoning 0–5</li> <li>– materials 0–3</li> <li>– constructional detail 0–7</li> <li>– communication 0–5</li> </ul> <p><b>Proposed solution</b></p> <p>Produce drawing/s of an appropriate kind to show the complete solution.</p> <ul style="list-style-type: none"> <li>– proposed solution 0–10</li> <li>– details/dimensions 0–5</li> </ul> <p><b>Evaluation</b></p> <p>Written evaluation of the final design solution. 0–5</p> | <b>80</b> |