

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Advanced Level

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MARK SCHEME for the October/November 2014 series

9705 DESIGN AND TECHNOLOGY

9705/33

Paper 3, maximum raw mark 120

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Section A

Part A – Product Design

- 1 (a) description of process
- fully detailed 3–5
 - some detail, 0–2
 - quality of sketches up to 2
- 7 × 2 [14]

- (b) calendaring
- large sheets produced/cut to size
 - even thickness, easily set
 - effective use of material, no wastage

- Profile moulding
- one step production, very quick
 - consistent section
 - high quality finish

- Milling
- high quality finish, accurate angle
 - one piece production
 - difficult material removal otherwise/separate assembly needed 3 × 2
- [6]

[Total: 20]

- 2 (a) suitable material:
- | | |
|---|---|
| <p>handle</p> <ul style="list-style-type: none"> – appropriate hardwood – aluminium – mild steel – nylon/abs | <p>blade</p> <ul style="list-style-type: none"> – high carbon steel – silver steel – mild steel (case hardened) |
|---|---|
- 1

- Reasons:
- | | |
|--|--|
| <p>handle</p> <ul style="list-style-type: none"> – can produce high quality finish – comfortable to hold/grip – easy to turn/machine | <p>blade</p> <ul style="list-style-type: none"> – can be forged to shape – strong in torsion – stiff |
|--|--|
- 2 × 1 [3]

- (b) description to include:
- quality of description:
- fully detailed 3–7
 - some detail, 0–2
 - quality of sketches up to 2
- [9]

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- (c) explanation could include:
- change in process;
 - change in materials;
 - use of jigs, formers, moulds;
 - simplification of design.

Quality of explanation:

- | | | |
|-----------------------|---------|-----|
| - logical, structured | 4–6 | |
| - limited detail, | 0–3 | |
| quality of sketches | up to 2 | [8] |

[Total: 20]

- 3 Discussion could include:
- material/production cost
 - volume of production
 - marketing/advertising
 - type of product
 - target market
 - energy/profit mark-up and other costs

Examination of issues

- | | |
|---------------------------------|-----|
| - wide range of relevant issues | 5–9 |
| - limited range | 0–4 |

Quality of explanation

- | | |
|-----------------------|-----|
| - logical, structured | 4–7 |
| - limited detail, | 0–3 |

Supporting examples/evidence

- | | |
|--|---|
| - specific products | |
| - specific materials/manufacturing methods | |
| - specific details of market | 4 |

[Total: 20]

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Part B – Practical Design

4 (a) (i) anticlockwise

(ii) $\frac{2 \times 3}{1 \times 2}$ [1] $= \frac{6}{2}$ [1] = 3:1 [1] [3]

(b) $2400 \times 100 + 4400 \times 150 = 9000 \times B$ 2
 $B = \frac{900000}{9000} = 100 \text{ N}$ 2 [4]

- (c) ways could be:
 – gussets, braces, ribs, lamination, triangulation
- Quality of explanation:
 – logical, structured 6–10
 – limited detail, 0–5
 quality of sketches 2 [12]

[Total: 20]

- 5 (a) – bevel gears 1
 – sprocket and chain 1
 – worm and worm wheel 1
 – pulley 1 [4]

(b) for each: product/application 1
 quality of explanation up to 2 [4 × 3]

- (c) explanation could include:
 – weight
 – friction
 – noise
 – wear
- Quality of explanation:
 – logical, structured 3–4
 – limited detail, 0–2 [4]

[Total: 20]

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- 6 wedge shaped tool – chisel, lathe tool, drill
 - Heat – welding/cutting torch, laser cutter
 - Shearing action – guillotine, tin snips
 - (a) quality of description
 - clear, fully detailed 3–5
 - some detail 0–3
 - quality of sketching up to 2 [2 × 7]
 - (b) quality of explanation:
 - logical, structured 3–4
 - limited detail 0–2 [2 × 3]
- [Total: 20]**

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Part C – Graphic Products

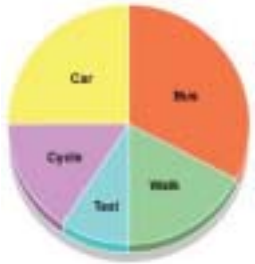
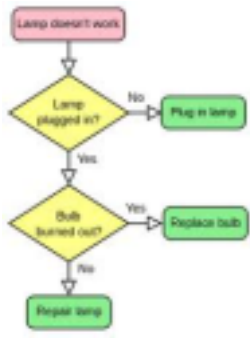
- 7 (a) initial construction accuracy 3
 loci construction 5
 loci accuracy 2
 quality of overall communication 2 [12]

- (b) description to include:
 – details of materials used
 – details of construction
 – effective movement check

- Quality of description
 – clear, fully detailed 4–6
 – some detail 0–3
 quality of sketching up to 2 [8]

[Total: 20]

8



- Flow charts** – chart showing logical order of process
Pie charts – circular chart showing proportion
Pictograms – resemble what they signify
Ideograms – graphic symbol that reflects idea or concept, (also Chinese characters)

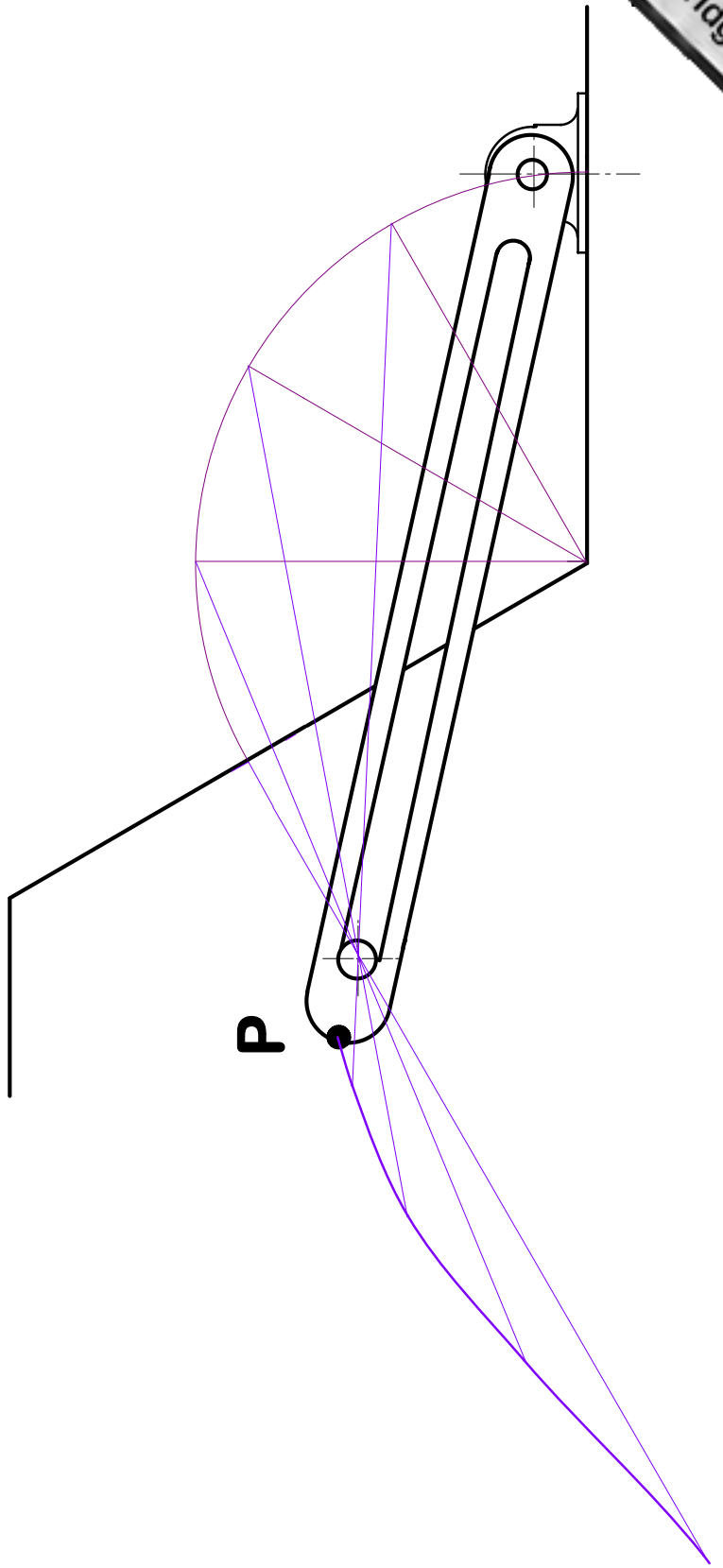
- Quality of explanation:
 – logical, structured 4–5
 – limited detail 0–3 [4 × 5]

[Total: 20]

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- 9 Correct isometric scale detail
 - circles [2]
 - central rib [2]
 - base tangents [2]
 - square [3]
 - hexagon [2]
 - thick and thin line [3]
- Quality of line/construction [3]

[Total: 20]



Q7

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Section B

Analysis

Analysis of the given situation/problem. [5]

Specification

Detailed written specification of the design requirements.
At least five specification points other than those given in the question. [5]

Exploration

Bold sketches and brief notes to show exploration of ideas for a design solution, with reasons for selection.

- range of ideas [5]
- annotation related to specification [5]
- marketability, innovation [5]
- evaluation of ideas, selection leading to development [5]
- communication [5]

Development

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.

- developments [5]
- reasoning [5]
- materials [3]
- constructional detail [7]
- communication [5]

Proposed solution

Produce drawing/s of an appropriate kind to show the complete solution.

- proposed solution [10]
- details/dimensions [5]

Evaluation

Written evaluation of the final design solution. [5]

[Total: 80]