

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Advanced Level

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		[1]
(ii)	$\frac{2 \times 3}{1 \ 2}$ [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 quality of explanation	1 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

The image shows four graphic products: a flowchart for a lamp, a pie chart for transport modes, a pictogram for a man and woman, and an ideogram for a dog.

```

    graph TD
      Start([Lamp doesn't work]) --> Q1{Lamp plugged in?}
      Q1 -- No --> A1[Plug in lamp]
      Q1 -- Yes --> Q2{Bulb burned out?}
      Q2 -- Yes --> A2[Replace bulb]
      Q2 -- No --> A3[Repair lamp]
  
```

The pie chart is divided into five segments: Car (yellow), Bus (orange), Cycle (purple), Taxi (cyan), and Walk (green).

The pictogram shows a man and a woman silhouette.

The ideogram shows a dog silhouette with a red prohibition sign over it.

- 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)

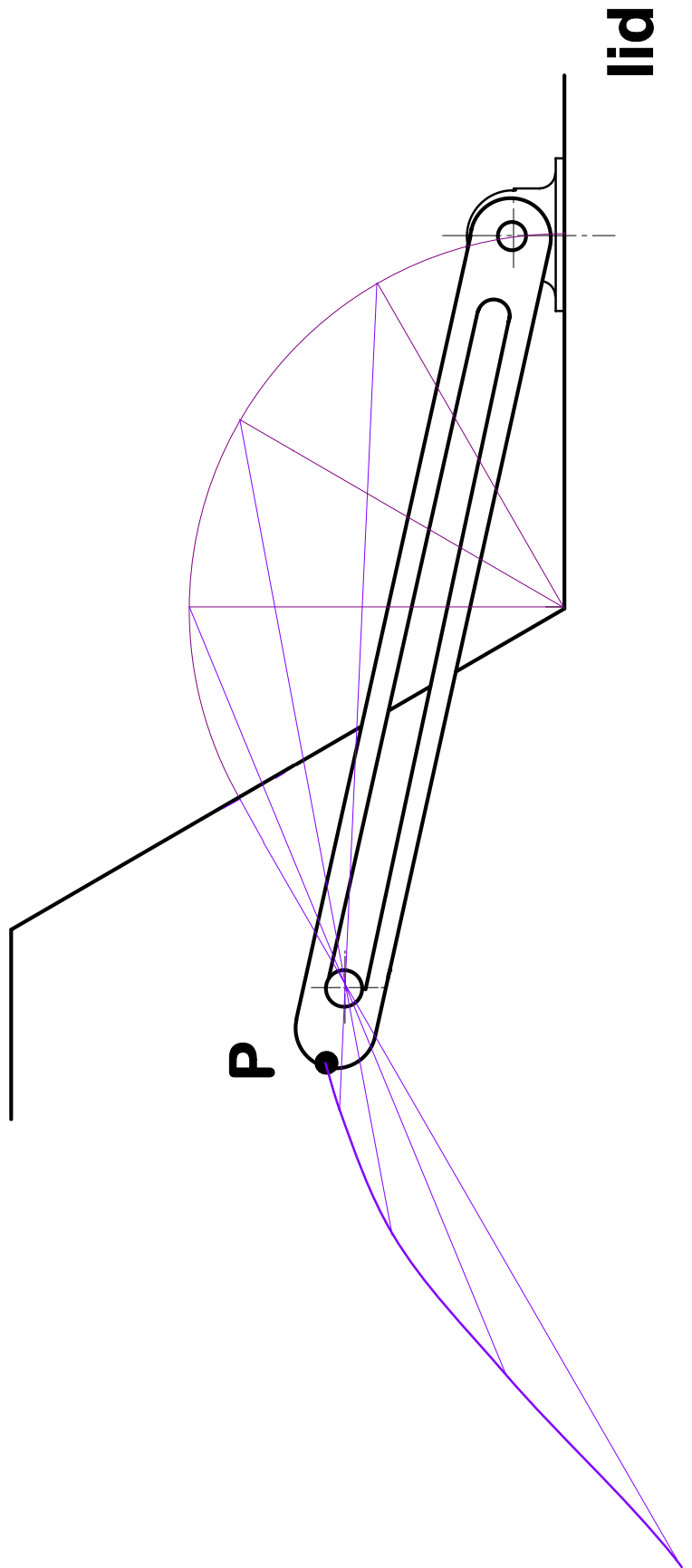
- Quality of explanation:
 – logical, structured 4–5
 – limited detail 0–3 [4 × 5]

[Total: 20]

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9	Correct isometric	[2]
	scale	[1]
	detail	
	– circles	[3]
	– central rib	[2]
	– base tangents	[2]
	– square	[2]
	– hexagon	[3]
	– thick and thin line	[2]
	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]