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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Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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CAMBRIDGE
International Examinations

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:

	handle		**blade**	
–	appropriate hardwood	–	high carbon steel	
–	aluminium	–	silver steel	
–	mild steel	–	mild steel (case hardened)	
–	nylon/abs			1

Reasons:

	handle		**blade**	
–	can produce high quality finish	–	can be forged to shape	
–	comfortable to hold/grip	–	strong in torsion	
–	easy to turn/machine	–	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]

(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]

Part B – Practical Design

4 **(a)** **(i)** anticlockwise [1]

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

(b) $2400 \times 100 + 4400 \times 150 = 9000 \times B$ 2

$B = \frac{900000}{9000} = 100\,N$ 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]

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]

Part C – Graphic Products

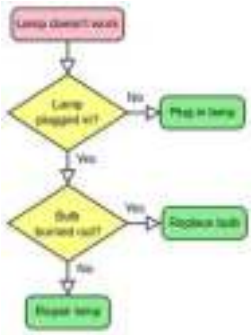
7 **(a)** initial construction accuracy 3
loci construction 5
loci accuracy 2
quality of overall communication 2 [12]

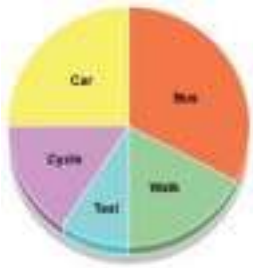
(b) description to include:
– details of materials used
– details of construction
– effective movement check

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

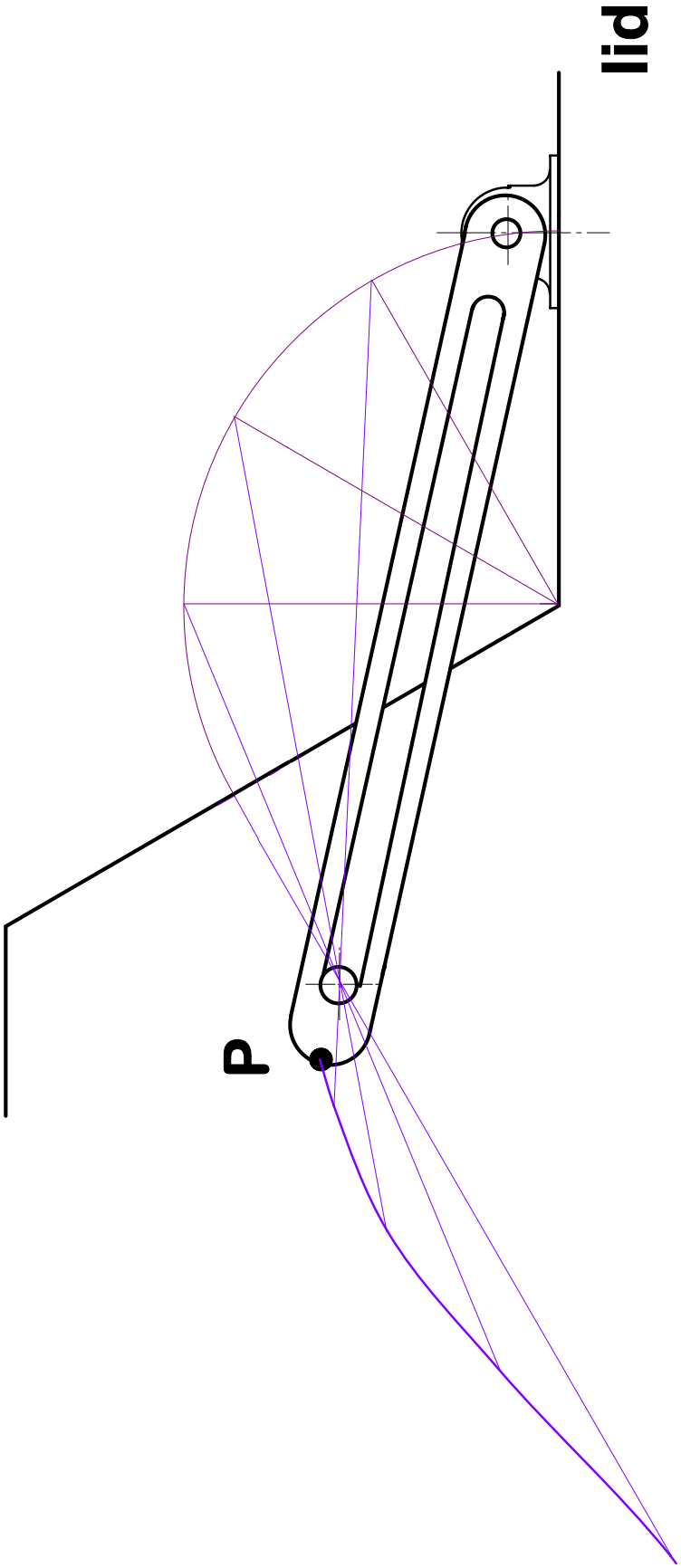
Ideograms – graphic symbol that reflects idea or concept, (also Chinese characters)

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

[Total: 20]

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

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]