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

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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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

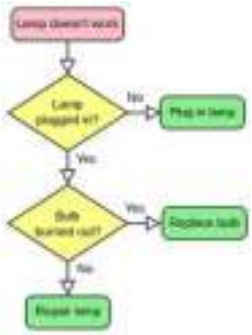
7 **(a)** initial construction accuracy 3
loci construction 5
loci accuracy 2
quality of overall communication 2 [12]

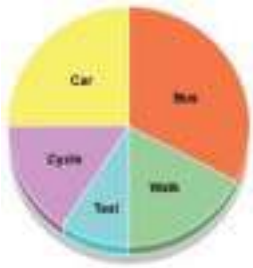
(b) description to include:
– details of materials used
– details of construction
– effective movement check

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

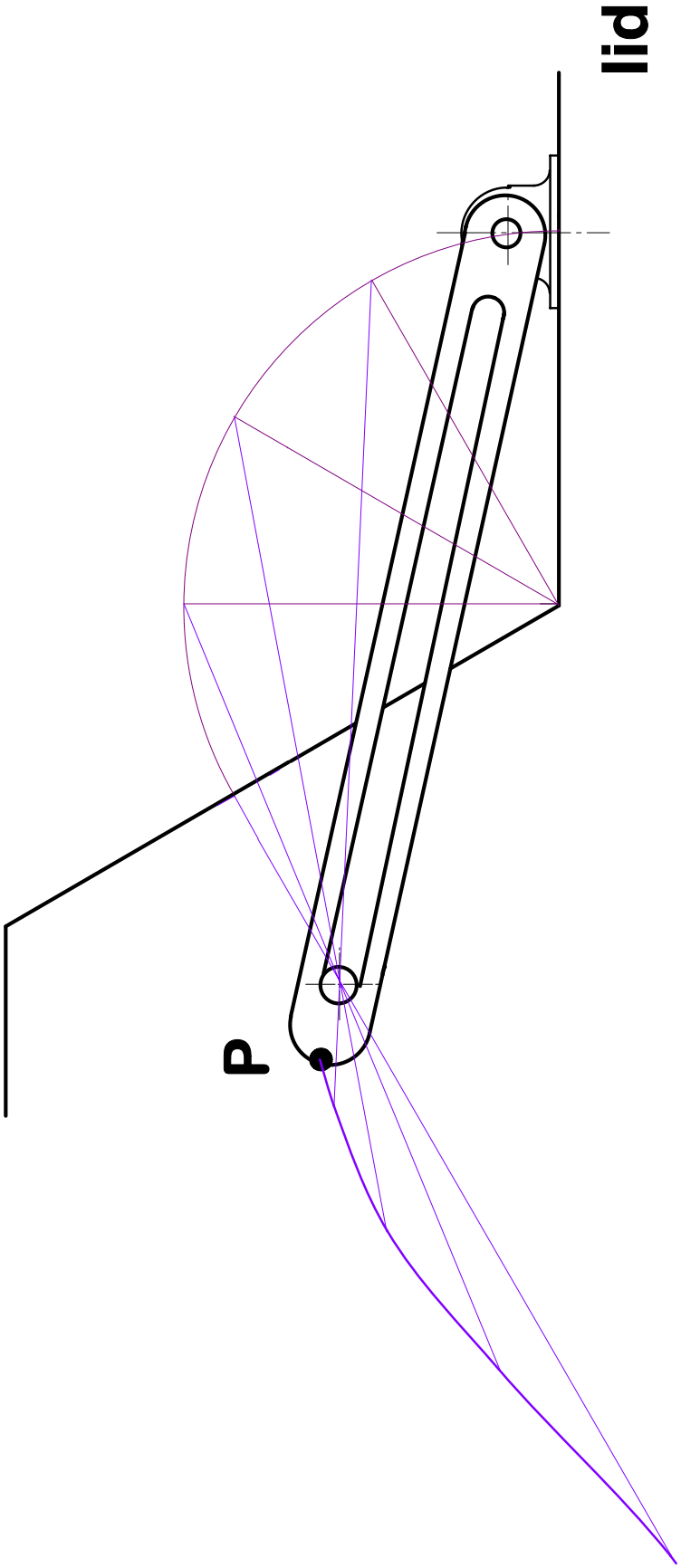
Ideograms – graphic symbol that reflects idea or concept, (also Chinese characters)

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]