

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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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

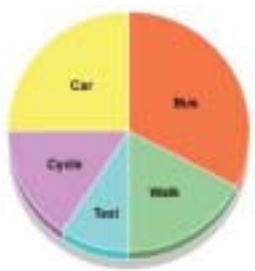
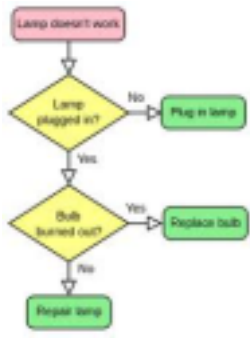
- 7 (a) initial construction accuracy 3
 loci construction 5
 loci accuracy 2
 quality of overall communication 2 [12]

- (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]

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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]