

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

**GCE Advanced Level**

**MARK SCHEME for the October/November 2013 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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## 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) wood turning
- perfect cylinder produced
  - high quality finish
  - quicker than carving
- Injection moulding
- complex shape
  - large numbers required
  - identical products
- casting
- minimal wastage
  - one piece production
  - difficult shaping/material removal required otherwise 3 × 2 [6]
- [Total: 20]**
- 2 (a) suitable material including:
- appropriate hardwood/softwood
  - plywood/mdf
  - aluminium
  - acrylic/ABS
  - card 1
- Reasons including:
- quality of finish – colour/attractive grain/texture
  - easy to bend/join
  - rigid 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
  - limited detail,
- quality of sketches

4–6  
0–3  
up to 2 [8]

[Total: 20]

- 3** Discussion could include:
- vandalism
  - material selection
  - safety / security
  - anthropometric considerations
  - finish/Protection

- examination of issues
- wide range of relevant issues
  - limited range

5–9  
0–4

- quality of explanation
- logical, structured
  - limited detail,

4–7  
0–3

- supporting examples / evidence
- products: eg. garden furniture
  - specific materials
  - specific finishes

4

[Total: 20]

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### Part B – Practical Design

#### 4 (a) specific product:

Concrete	e.g. building components, flooring
Chipboard	e.g. furniture (veneered), building cladding
Plywood	e.g. construction, storage boxes
Lead	e.g. as alloy – solder, weights, buildings
Polythene	e.g. food packaging, toys (HDPE)
ABS	e.g. vacuum cleaner casing, car dashboards
Melamine	e.g. surfaces, plates, bowls
Polypropylene	e.g. hinges, chemical storage, pipes
Aluminium	e.g. building cladding, aircraft parts, kitchenware
Rubber	e.g. tyres, gloves
Mild steel	e.g. tools, general engineering components
Brass	e.g. hinges, door handles, light fittings

Accept any other appropriate application

1 × 5 [5]

#### (b) appropriate properties related to product

Concrete	e.g. rigid, durable, variety of shapes
Chipboard	e.g. large sheets, relatively inexpensive, can be veneered/faced
Plywood	e.g. strong in both directions, large sheets, can be bent
Lead	e.g. heavy, easily cast
Polythene	e.g. see through, easily formed, range of colours
ABS	e.g. very tough, chemical resistant, range of colours
Melamine	e.g. thermosetting, heat resistant, compression moulded
Polypropylene	e.g. does not fracture, easily thermoformed, tough
Aluminium	e.g. does not corrode, lightweight
Rubber	e.g. flexible, hard wearing
Mild steel	e.g. tough, easily machined/joined widely available
Brass	e.g. attractive, does not corrode

Accept any other appropriate property

Explanation of suitability

up to 3 3 × 5 [15]

[Total: 20]

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5 (a) (i) clockwise 1

(ii) gears A and B ratio 3:1  
gears C and D ratio 4:1

$$\frac{3}{1} \times \frac{4}{1} = \frac{12}{1} \quad 12:1$$

Workings 2 correct ratio 1

[3]

(b) lubricating methods could be:

Oil sump  
Oil ring  
Grease nipple

Appropriate method

1

Quality of description/communication

up to 3

4 × 2

[8]

(c) explanation could include:

advantages:

Grip on surfaces, shoes, tyres, handles  
Nails cannot work without friction

disadvantages:

Heat generated  
Reduction in efficiency (more fuel in vehicles)  
Noise

quality of explanation:

- logical, structured
- limited detail,

5–8

0–4

[8]

[Total: 20]

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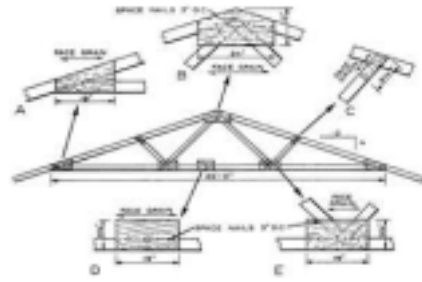
6 Structure could be:  
**lamination**  
 roof supports  
 Laminated flooring



**Braces**  
 Stage supports, oil rigs, folding tables

**Ribs.**  
 Castings, drill table, plastic trays

**Gussets**  
 Roll cage support,  
 roof frame



**Triangulation**  
 Pylons, bridges, crane joists

Appropriate structure

1 × 4 [4]

quality of explanation and communication including appropriate example up to 5

4 × 4 [16]

**[Total: 20]**

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**Part C – Graphic Products**

<b>7</b>	Discussion could include:		
	– technical/functional factors		
	– importance of visual impact to attract interest/sales		
	– specific product use		
	– chosen material/finish/texture		
	– colour and fashion trends		
	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 e.g. space for essential working components		
	– Packaging features		
	– specific finishes	4	
			<b>[Total: 20]</b>
<b>8</b>	<b>(a)</b> linkage construction	4	
	correct loci	5	
	accuracy	3	[12]
	<b>(b)</b> profile construction	3	
	correct profile	3	
	accuracy	2	[8]
			<b>[Total: 20]</b>
<b>9</b>	correct 1 point perspective	3	
	window	2	
	worktops	3	
	cabinets	3	
	table	4	
	stool	2	
	overall accuracy	3	
			<b>[Total: 20]</b>

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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
- annotation related to specification
- marketability, innovation
- evaluation of ideas, selection leading to development
- communication

[5]

[5]

[5]

[5]

[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
- reasoning
- materials
- constructional detail
- communication

[5]

[5]

[3]

[7]

[5]

### Proposed solution

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

- proposed solution
- details/dimensions

[10]

[5]

### Evaluation

Written evaluation of the final design solution.

[5]

**[Total 80]**