

CAMBRIDGE
INTERNATIONAL EXAMINATIONS

NOVEMBER 2002

GCE Advanced Level

MARK SCHEME
MAXIMUM MARK : 120
SYLLABUS/COMPONENT : 9705 /3 DESIGN AND TECHNOLOGY (WRITTEN 2)



Section A

Part A – Product Design

- 1 (a) appropriate material including:
- aluminium
 - mild steel
 - appropriate wood laminate
- 1
- Reasons including:
- strength
 - comfort
- 2 [3]
- (b) description to include:
- appropriate method;
 - shaping;
 - forming;
 - drilling.
- quality of description:
- fully detailed 3 - 6
 - some detail, 0 - 2
- quality of sketches up to 2 [8]
- (c) explanation could include:
- change in process;
 - change in materials;
 - use of templates, jigs, formers;
 - simplification of design.
- quality of explanation:
- logical, structured 4 - 7
 - limited detail, 0 - 3
- quality of sketches up to 2 [9]

[Total: 20]

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2 (a) examples could include:

- seat height;
- leg room
- steering wheel position;
- head rest

for four examples 3 x 4 [12]

(b) explanations could include:

- physiological – seat angle
- force required to turn wheel;
- psychological – shape:
- colour;
- room;
- interior quality.

For two explanations 4 x 2 [8]

[Total: 20]

3 (a) requirements could include:

- durability;
- vandal proof;
- strength;
- finish;
- appearance;
- comfort.

For five requirements (qualified statements) 1 x 5 [5]

(b) appropriate design 3
 construction 1
 quality of sketch up to 2 [6]

(c) appropriate material including:

- aluminium
- mild steel
- appropriate wood 1

Reasons including:

- strength;
- comfort;
- appearance. 2 [3]

(d) understanding of aesthetics 3
 quality of explanation 3 [6]

[Total: 20]

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Part B – Practical Design

4	(a) description of process			
	- fully detailed	3 - 5		
	- some detail,	0 - 2		
	quality of sketches	up to 2	7 x 2	[14]
	(b) die casting:			
	- complex shape;			
	- quality finish;			
	- can be repeated;			
	extrusion:			
	- little wastage;			
	- once set up, vast production runs;			
	- reliable dimensions;			
	blow moulding:			
	- once set up, vast production runs;			
	- complex shape;			
	- speed of production.	3 x 2		[6]
				[Total: 20]
5	(a) explanation: monocoque – shell structure frame – components			2
	examples: egg; pylon			2 [4]
	(b) graphic method (create parallelogram)		1 x 2	
	Correct answer 10.8 N, 10.4 N (+or- .3)		1 x 2	[4]
	(c) understanding may include:			
	- capital letters for spaces between forces;			
	- lower case on vector diagrams			2
	reference to forces / framework diagram			2
	sketch/s			2 [6]
	(d) tray: ribs, fold over top			
	bookshelf: brace			
	bolted structure: gusset plate			2 x 3 [6]
				[Total: 20]

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- 6 (a) $R = \frac{R1 \times R2}{R1 + r2}$ 1
- $\frac{220}{32}$ 1
- 6.875KΩ 1
(or calculation leading to correct answer 3 marks) [3]

- (b) diode: suppress noise and back emf.s;
steer electronic signals;
convert ac to dc in a rectifier circuit.

Strain gauge: wires stretch – resistance changes
Sensor in structures

Explanations 2 x 2
Applications 1 x 2 [6]

- (c) (i) digital devices – inputs and outputs either logic 0 or logic 1 2

(ii) NAND	0	0	1
	0	1	1
	1	0	1
	1	1	0
OR	0	0	0
	0	1	1
	1	0	1
	1	1	1
NOR	0	0	1
	0	1	0
	1	0	0
	1	1	0

for each; 1 mark for symbol
2 marks for truth table [9]

[Total: 20]

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Part C – Graphic Products

7	correct exploded view	2	
	correct isometric sketch	2	
	approx twice full size	1	
	quality of linework	3	
	overall shape / proportion (each component 1, 2 for main arm)	9	
	thick / thin line technique	3	
			[Total; 20]
8	(a) pyramid;		
	- accuracy (inc true length)	2	
	- correct net	4	
	- tabs	1	
	cone:		
	- accuracy	2	
	- correct net	5	
	- tabs	1	[15]
	(b) description could include:		
	- templates;		
	- cutters/creasers;		
	- assembling.		
	Quality of description up to 5 marks		[5]
			[Total: 20]
9	(a) considerations could include;		
	- language;		
	- shock value?		
	- Print volume;		
	- Audience.		
	For four considerations (qualified statements)	1 x 4	[4]
	(b) appropriate symbol	4	
	quality	3	
	monochrome	1	[8]
	(c) appropriate unit	3	
	dimension	1	
	folding/disassembly	2	
	communication	2	[8]
			[Total: 20]

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Section B

Questions 10, 11, 12

(A)	Analysis		5	[5]
(S)	Specification		5	[5]
(I)	Ideas	range	5	
		annotation related to specification	5	
		marketability	5	
		selection / rejection of ideas	5	
		communication	5	[25]
(D)	Development	clear development of selected idea/s	5	
		reasoning	5	
		materials	3	
		construction	7	
		communication	5	[25]
(P)	Proposed Solution		10	
	details / dimensions		5	[15]
(E)	Evaluation		5	[5]
(T)	Total			[80]