

Cambridge Assessment International Education

Cambridge International Advanced Level

DESIGN AND TECHNOLOGY

9705/32

Paper 3

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MARK SCHEME
Maximum Mark: 120

Published

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.

Cambridge International will not enter into discussions about these mark schemes.

Cambridge International is publishing the mark schemes for the October/November 2018 series for most Cambridge IGCSE™, Cambridge International A and AS Level components and some Cambridge O Level components.

Cambridge International A Level – Mark Scheme

Generic Marking Principles

These general marking principles must be applied by all examiners when marking candidate answers. They should be applied alongside the specific content of the mark scheme or generic level descriptors for a question. Each question paper and mark scheme will also comply with these marking principles.

GENERIC MARKING PRINCIPLE 1:

Marks must be awarded in line with:

- the specific content of the mark scheme or the generic level descriptors for the question
- the specific skills defined in the mark scheme or in the generic level descriptors for the question
- the standard of response required by a candidate as exemplified by the standardisation scripts.

GENERIC MARKING PRINCIPLE 2:

Marks awarded are always whole marks (not half marks, or other fractions).

GENERIC MARKING PRINCIPLE 3:

Marks must be awarded **positively**:

- marks are awarded for correct/valid answers, as defined in the mark scheme. However, credit is given for valid answers which go beyond the scope of the syllabus and mark scheme. referring to your Team Leader as appropriate
- marks are awarded when candidates clearly demonstrate what they know and can do
- marks are not deducted for errors
- marks are not deducted for omissions
- answers should only be judged on the quality of spelling, punctuation and grammar when these features are specifically assessed by the question as indicated by the mark scheme. The meaning, however, should be unambiguous.

GENERIC MARKING PRINCIPLE 4:

Rules must be applied consistently e.g. in situations where candidates have not followed instructions or in the application of generic level descriptors.

GENERIC MARKING PRINCIPLE 5:

Marks should be awarded using the full range of marks defined in the mark scheme for the question (however; the use of the full mark range may be limited according to the quality of the candidate responses seen).

GENERIC MARKING PRINCIPLE 6:

Marks awarded are based solely on the requirements as defined in the mark scheme. Marks should not be awarded with grade thresholds or grade descriptors in mind.

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Section A

Part A - Product Design

Question	Answer	Marks
1(a)	$\begin{array}{ccc} \text{Description of process} & & & & & \\ & - & \text{fully detailed} & & & 3-5 \\ - & \text{some detail} & & 0-2 \\ & & & & & 0-2 \\ & & & & & & 1 \end{array}$ Quality of sketches $\begin{array}{cccc} \text{up to 2} & & & & \\ & & & & & 7\times 2 \\ & & & & & & 1 \end{array}$	14
1(b)	Dowel joint - quick process - strong joint - standard components available Riveting - strong permanent join - can provide feature/same material rivet - hand or machine quick process Vacuum forming - complex shapes formed - very quick once original former produced - repeated production 3×2	6

Question	Answer		Marks
2(a)	Suitable material: - abs/polypropylene/HDPE - appropriate hardwood for laminating/bending - aluminium alloy, brass. copper - mild steel (with finish) - stainless steel Reasons: - rigid, will hold shape - can be bent to required shape - high quality finish, look attractive in desired environment	1 2×1	3
2(b)	Quality of description: - fully detailed - some detail Quality of sketches	3–7 0–2 up to 2	9

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Question	Answer	Marks
2(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	8
	Quality of sketches up to 2	

Question	Answer	Marks
3	Discussion could include: - target market - anthropometrics - ergonomic factors - fashion/trends	20
	Examples/evidence could be - teenage/adult market - specific placement - promotions – celebrities, BOGOF	
	Examination of issues - wide range of relevant issues 4–8 - limited range 0–3	
	Quality of explanation - logical, structured 4–8 - limited detail 0–3	
	Supporting examples/evidence 4	

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Part B - Practical Technology

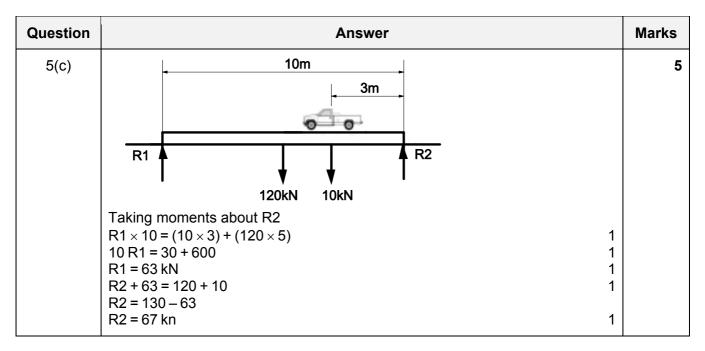
Question			Answer			Marks
4(a)(i)	6v _	250 Ω	Σ 50Ω Υ	1k n	1 mark	2
4(a)(ii)	$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{10}$ $R = 200 \Omega$	$\frac{1}{000} + \frac{1}{250} = \frac{5}{100}$	00		2 marks 1 mark	4
	RT = 200 + 50 = 2	250 Ω			1 mark	
4(a)(iii)	V = I × R				1 mark	4
	$I = \frac{V}{R} = \frac{6}{250}$				1 mark	
4/b)/i)	0.024 amps				2 marks	4
4(b)(i)	NAND					2
4(b)(ii)	Inpu	ıts	Output			2
	X	Y	Z			
	0	0	1			
	0	1	1			
	1	0	1			
	1	1	0			
4(b)(iii)	Flip-flop or latch - fundamental - 2 stable state - stores inform	es	of digital circuit		1 mark 1 mark 1 mark	3

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Question	Answer	
4(b)(iv)	set A outputs Filip flop NAND reset Outputs outputs flip flop NOR	4
	Fully detailed arrangement of gates cross coupled 4 marks	

Question	Answer	
5(a)	Monocoque – is often a one piece structure that supports loads through its external skin	6
	Example: ping pong ball, egg shell, car frame, aircraft fuselage	
	Frame – is a structure built up of parts (struts, ties) to withstand loads	
	Example: pylon, buildings, bridge, chair	
	Description 2 Example 1 3×2	
5(b)	Twisting torsional pressure 1 resulting in deformation or breaking 1 communication 1 Buckling small increase in load at a point 1 on structure can lead to collapse and deformation 1 communication 1 Fatigue weakening 1 caused by repeated load over time 1 communication 1 3 × 3	9

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Question	Answer	Marks
6(a)	Appropriate product 1 Appropriate process described up to 4 Quality of explanation - logical, structured 3–5 - limited detail 0–2	10
6(b)	Understanding of non – destructive testing Quality of explanation - logical, structured 4–8 - limited detail 0–3	10

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Part C - Graphic Products

Question	Answer	Marks
7(a)	Front elevation 2 Plan 2 End elevation 4 Scale/quality 2	10
7(b)	Accurate net 6 Tabs 2 Appropriate scale/quality 2	10
8	Discussion could include: - accuracy/speed/quality - ease/speed of communication/sharing - accurate /instant accounts - organisation/efficiency Examples/evidence could be - specific programme - specific company examples - JIT examples	20
	Examination of issues - wide range of relevant issues - limited range 4–8 0–3	
	Quality of explanation - logical, structured 4–8 - limited detail 0–3	
	Supporting examples/evidence 4	

Question	Answer	Marks
9	Construct linkage3Sub divide arcs41800 constraint2Loci constructed8Accuracy/quality3	20

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Section B

Question	Answer		Marks
	Analysis Analysis of the given situation/problem.	[0–5]	80
	Specification Detailed written specification of the design requirements.		
	At least five specification points other than those given in the question.	[0-5]	
	Exploration B Bold sketches and brief notes to show exploration of ideas for a desig solution, with reasons for selection.	n	
	range of ideas annotation related to specification marketability, innovation evaluation of ideas, selection leading to development communication	[0–5] [0–5] [0–5] [0–5] [0–5]	
	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	[0-5] [0-5] [0-3] [0-7] [0-5]	
	Proposed solution Produce drawing/s of an appropriate kind to show the complete solution		
	proposed solution details/dimensions	[0–10] [0–5]	
	Evaluation Written evaluation of the final design solution.	[0–5]	

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