

Cambridge Assessment International Education

Cambridge International Advanced Level

DESIGN AND TECHNOLOGY

9705/31

Paper 3

October/November 2017

MARK SCHEME
Maximum Mark: 120

Published

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Section A

Part A - Product Design

Question		Answer	Marks
1	appropriate example	1 × 4	20
	2D modelling; 3D modelling; Mock up; Scale prototype; for each; quality of explanation: - logical, structured - limited detail	computer modelling, exploring shape, card exploring form, proportion scaled model of part/whole of concept, possibility usually final design model, can be tested $\frac{3-4}{0-2} \qquad \qquad 4\times 4$	

Question	Answer			Marks
2(a)	suitable material:			3
	abs/polypropylene/HDPE appropriate hardwood e.g. beech	1		
	Reason:	·		
	 robust/take harsh treatment can be assembled/formed to required shape not split easy 			
	 take a good finish 		1 × 2	
2(b)	description to include:			10
	quality of description:			
	 fully detailed 	6–8		
	most stages	3–5		
	- some detail,	0–2		
	quality of sketches	up to 2		
2(c)	explanation could include:			7
	change in process;			
	change in materials;			
	use of jigs, formers, moulds;			
	simplification of design.			
	quality of explanation:			
	logical, structured	3–5		
	 limited detail, 	0–2		
	quality of sketches	up to 2		

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	20	17

Question	Answer			Marks
3(a)	description of process			14
	fully detailedsome detail,quality of sketches	3–5 0–2 up to 2	7 × 2	
3(b)	milling - V and slot cuts - quality finish - easy machine set up, change cutter laminating - solid, strong structure - some give/flexibility - low waste/environmentally friendlier			6
	 compression moulded range of colours suitable for thermosetting plastic limited finishing required 		3 × 2	

Part B – Practical Technology

Question	Answer	Marks
4(a)(i)	P = VI	3
4(a)(ii)	Battery Mains supply Dynamo Photovoltaic 1×2 Why used e.g. location, safety 1×2	4
4(b)(i)	A buzzer B reed switch C thyristor 1 × 3	3
4(b)(ii)	Switch sets alarm (1) Alarm activated when reed switch closes (1) – magnet on door frame – (1) Current flows to gate leg of thyristor (1) causing it to switch on (1) Circuit complete (1) Buzzer sounds (1) Thyristor latching device – will stay on (1) until switched off by top switch. Clarity of communication (up to 2)	10

Question	Answer			Marks
5	Discussion could include:			20
	 computer functions in designing accuracy, ability to change, share, forward comment on creative capacity/response to 			
	examination of issues			
	wide range of relevant issueslimited range	5–9 0–4		
	quality of explanation			
	logical, structuredlimited detail,	4–7 0–3	16	
	supporting examples/evidence			
	specific programmes/usagespecific use architecture/engineering		4	

Question	Answer	Marks
6(a)	resultant 11.1 N	4
	Direction and magnitude 3 Resultant 1	
6(b)	RL 4,2 N 1 RR 5.8 N 1	2
6(c)	correct notation 1 Load diagram 3 Transfer to main diagram 3 Strut/ties 4 Accuracy 3	14

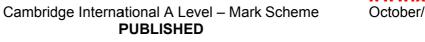
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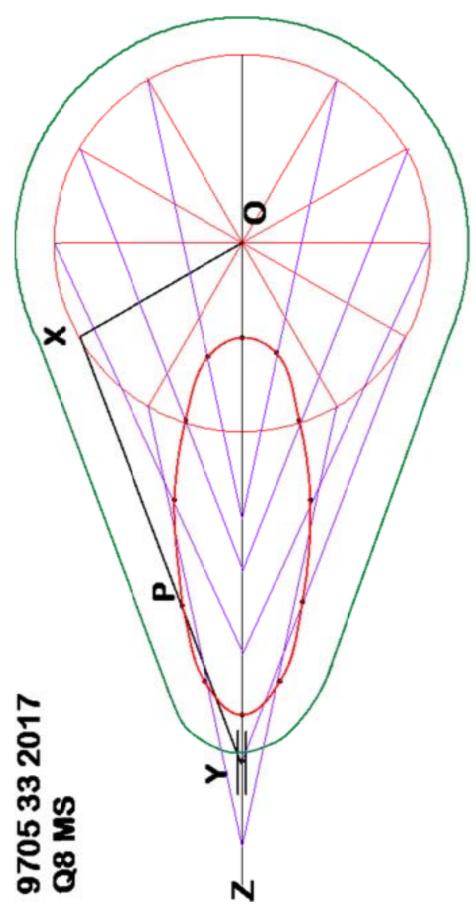
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Question	Answer		Marks
7(a)	 (i) cashaft diameter 24 (ii) in line flat follower (iii) minimum distance of 24 from the flat follower to camshaft centre (iv) clockwise direction (v) 0°-180° rise 30 simple harmonic motion (vi) 180°-210 dwell (vii) 210-360° fall with simple harmonic motion Accuracy 	1 1 1 4 2 3 2	15
7(b)	ratchet described, pawl identified Example	4 1	5

Question	Answ	/er	Marks
8(a)(i)	size/scale Circle divided (angular or trammel) Loci plotted Accuracy	2 1 3 2	8
8(a)(ii)	accurate guard profile	up to 4	4
8(b)	isometric Exploded parts in line Accuracy rendering	2 3 3	8

Answer	
Discussion could include:	20
materials (e.g. smart)printing technologiesvirtual reality	
examination of issues	
 wide range of relevant issues limited range 0–4 	
quality of explanation	
 logical, structured limited detail, 4–7 0–3 16 	
supporting examples / evidence	
 specific CAD/Internet/simulation VR etc. programmes/usage specific printing/manufacturing technologies specific consumer/manufacturer examples 	
	Discussion could include: - materials (e.g. smart) - printing technologies - virtual reality 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 16 supporting examples / evidence - specific CAD/Internet/simulation VR etc. programmes/usage - specific printing/manufacturing technologies





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Section B

Question	Answer		Marks
	Analysis		80
	Analysis of the given situation/problem.	0–5	
	Specification		
	Detailed written specification of the design requirements. At least five specification points other than those given in the question	0–5	
	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 	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 solutiondetails/dimensions	0–10 0–5	
	Evaluation		
	Written evaluation of the final design solution.	0–5	

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