
DESIGN AND TECHNOLOGY

9705/33

Paper 3

October/November 2018

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.

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This document consists of **11** printed pages.

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.

Question	Answer	Marks						
Section A								
Part A – Product Design								
1(a)	suitable material: <ul style="list-style-type: none"> – abs/polypropylene – appropriate hardwood for laminating / bending – aluminium alloy, brass. Copper – mild steel (with finish) – stainless steel reasons: <ul style="list-style-type: none"> – will not react to moisture – can be bent to required shape – will hold shape when full – look attractive in desired environment 	3						
1(b)	quality of description: <table style="width: 100%; border: none;"> <tr> <td style="padding-left: 20px;">– fully detailed</td> <td style="text-align: right; padding-right: 20px;">3 – 7</td> </tr> <tr> <td style="padding-left: 20px;">– some detail,</td> <td style="text-align: right; padding-right: 20px;">0 – 2</td> </tr> <tr> <td style="padding-left: 20px;">– quality of sketches</td> <td style="text-align: right; padding-right: 20px;">up to 2</td> </tr> </table>	– fully detailed	3 – 7	– some detail,	0 – 2	– quality of sketches	up to 2	9
– fully detailed	3 – 7							
– some detail,	0 – 2							
– quality of sketches	up to 2							
1(c)	explanation could include: <ul style="list-style-type: none"> – change in process; – change in materials; – use of jigs, formers, moulds; – simplification of design. quality of explanation: <table style="width: 100%; border: none;"> <tr> <td style="padding-left: 20px;">– logical, structured</td> <td style="text-align: right; padding-right: 20px;">4 – 6</td> </tr> <tr> <td style="padding-left: 20px;">– limited detail,</td> <td style="text-align: right; padding-right: 20px;">0 – 3</td> </tr> <tr> <td style="padding-left: 20px;">– quality of sketches</td> <td style="text-align: right; padding-right: 20px;">up to 2</td> </tr> </table>	– logical, structured	4 – 6	– limited detail,	0 – 3	– quality of sketches	up to 2	8
– logical, structured	4 – 6							
– limited detail,	0 – 3							
– quality of sketches	up to 2							

Question	Answer	Marks										
2	<p>Discussion could include:</p> <ul style="list-style-type: none">– quantity production methods– product designers – predominantly batch/large batch production– designer makers often one-off/small batch– material, bulk buying benefits– energy/facilities costs– advertising/promotion– market accessibility <p>examples / evidence could be</p> <ul style="list-style-type: none">– specific products– specific designers graphics/fashion/jewellers, etc.– specific cost variations <p>examination of issues</p> <table><tbody><tr><td>– wide range of relevant issues</td><td>4 – 8</td></tr><tr><td>– limited range</td><td>0 – 3</td></tr></tbody></table> <p>quality of explanation</p> <table><tbody><tr><td>– logical, structured</td><td>4 – 8</td></tr><tr><td>– limited detail,</td><td>0 – 3</td></tr></tbody></table> <p>supporting examples / evidence</p> <table><tbody><tr><td></td><td>4</td></tr></tbody></table>	– wide range of relevant issues	4 – 8	– limited range	0 – 3	– logical, structured	4 – 8	– limited detail,	0 – 3		4	20
– wide range of relevant issues	4 – 8											
– limited range	0 – 3											
– logical, structured	4 – 8											
– limited detail,	0 – 3											
	4											

Question	Answer	Marks
3(a)	<p>description of process</p> <ul style="list-style-type: none">– fully detailed 3 – 5– some detail, 0 – 2– quality of sketches up to 2 <p style="text-align: right;">7×2</p>	14
3(b)	<p>wood turning</p> <ul style="list-style-type: none">– quality finish– relatively quick set up for all operations– relatively low cost,– quick production/finish can be applied as part of process <p>extrusion</p> <ul style="list-style-type: none">– consistent cross section– range of colours available– cost effective for large batches– high standard finish <p>sand casting</p> <ul style="list-style-type: none">– relatively complex shape in one operation– quick process– limited additional processes or finishing required <p style="text-align: right;">3×2</p>	6

Question	Answer	Marks	
Part B – Practical Technology			
4(a)(i)	Thermistor temperature sensor as temp increases resistance decreases Variable resistor/potentiometer Adjust sensitivity	1 1 1 1	4
4(a)(ii)	Decrease in resistance of the variable resistor requires increase in temperature to increase output voltage	1 1 1	3
4(a)(iii)	<p>resistor transistor correct arrangement</p>	1 1 1	3

Question	Answer	Marks
4(b)	<p>Discussion could include:</p> <ul style="list-style-type: none"> – smaller products – cheaper products – high spec goods available for most – wireless opportunities <p>examples / evidence could be</p> <ul style="list-style-type: none"> – specific technology examples, e.g. chip reduction/speed – specific product advance – battery life improvement – specific product cost TVs, etc. <p>examination of issues</p> <ul style="list-style-type: none"> – range of relevant issues 3 – 4 – limited range 0 – 2 <p>quality of explanation</p> <ul style="list-style-type: none"> – logical, structured 3 – 4 – limited detail, 0 – 2 <p>supporting examples / evidence 2</p>	10
5(a)(i)	<p>suitable material:</p> <p>Metal</p> <ul style="list-style-type: none"> – aluminium alloy, brass. copper – titanium alloy – chromed steel <p>Plastic</p> <ul style="list-style-type: none"> – polycarbonate – abs 1 – polyurethane – polypropylene <p>Reasons :</p> <ul style="list-style-type: none"> – easily machined/shaped – resistant to knocks – takes finish, range of finish options – look high quality 1 	2

Question	Answer	Marks
5(a)(ii)	quality of description: – fully detailed 4 – 6 – some detail, 0 – 3 quality of sketches up to 2	8
5(b)	Discussion could include: – production/material costs – target market – function v aesthetic balance – speed of production examples / evidence could be – specific product examples – specific detail of production benefit/drawback – target marketing, trends/fashion examination of issues – range of relevant issues 3 – 4 – limited range 0 – 2 quality of explanation – logical, structured 3 – 4 – limited detail, 0 – 2 supporting examples / evidence 2	10
Question	Answer	Marks
6(a)	alloys. Brass copper (65–90%) zinc (10–35%) Bronze copper (78–95%) tin (5–22%) Stainless steel Iron (50%+), chromium (10–30%), plus smaller amounts of carbon, nickel, manganese, molybdenum Duralumin Aluminum (94%), copper (4.5–5%), magnesium (0.5–1.5%), manganese (0.5–1.5%). 1 mark for alloy, 2 mark for materials 3 × 2	6
6(a)(ii)	application, e.g. Cooking utensils, sink 2 × 1 explanation to include – extends material range – specific qualities/properties produced For each application 2 × 2	6
6(b)(i)	Tensile strength = ability to resist stretching/pulling 1 before deformation and breaking 1	2

Question	Answer	Marks
6(b)(ii)	product description 1 1	2
(b)(iii)	appropriate test for stretching material quality of communication: up to 2 up to 2	4

Question	Answer	Marks
7(a)	– correct 2 point perspective – correct proportion – main building – porch – roof/Dormer – windows – overall quality 2 2 2 2 2 2 2	14
7(b)	– quality of render 6	6

Question	Answer	Marks
8(a)	suitable material: – polypropylene – HDPE – solid white board – qualified card with gsm 1 reasons: – appropriate strength to hold ball – takes print – folds without deterioration 2	3
8(b)	quality of description: – fully detailed – some detail, 4 – 7 0 – 3 quality of sketches up to 2	9

Question	Answer	Marks
8(c)	<p>explanation could include:</p> <ul style="list-style-type: none"> – change in process; – change in materials; – use of jigs, formers, moulds; – simplification of design. <p>quality of explanation:</p> <ul style="list-style-type: none"> – logical, structured 4 – 6 – limited detail, 0 – 3 <p>quality of sketches up to 2</p>	8

Question	Answer	Marks
9	<p>Discussion could include:</p> <ul style="list-style-type: none"> – checking demand of target market, quantity predictions – promotion/offers – placement – material/manufacturing/advertising cost balance <p>examples / evidence could be</p> <ul style="list-style-type: none"> – specific product examples – specific detail of marketing methods – specific detail of offers/BOGOF – <p>examination of issues</p> <ul style="list-style-type: none"> – range of relevant issues 4 – 8 – limited range 0 – 3 <p>quality of explanation</p> <ul style="list-style-type: none"> – logical, structured 4 – 8 – limited detail, 0 – 3 <p>supporting examples / evidence 4</p>	20

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