New Specification

Rewarding Learning

General Certificate of Secondary Education
2011

Technology and Design

Unit 3:
Product Design

[GTD31]

MONDAY 6 JUNE, MORNING

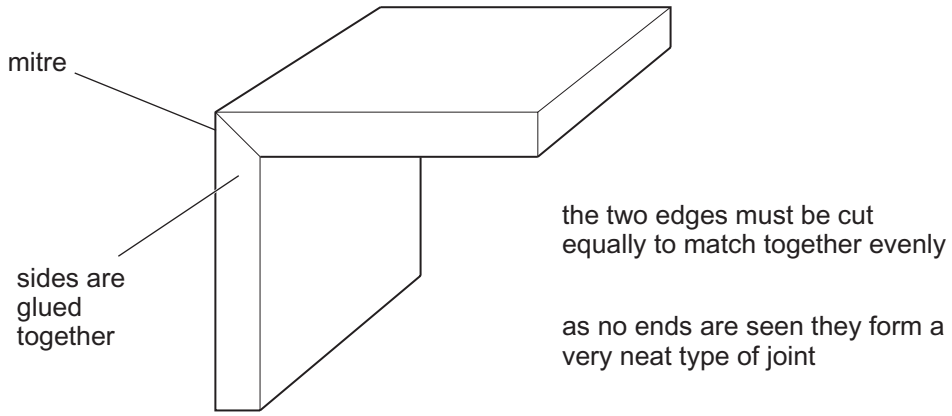
MARK SCHEME

			AVAILABLE MARKS
1	(a)	Thermosetting: heated and moulded into shape, cannot soften when reheated. Rigid crosslinks formed when set. [1] Thermoplastic: soften when heated and can be shaped when hot. Will harden when cooled but can be reshaped if heated up again (post forming). [1]	
	(b) (i)	Urea formaldehyde [1]	
	(ii)	Electrical insulation from user/Heat insulation/ Ease of operation of switch/pins need to fit conventional plug. Visual mark to show position of switch (2 × 1) [2]	
	(c) (i)	Compression moulding/press moulding/injection moulding [1]	
	(ii)	Place preformed slug in mould (Compression/press moulding) Inject plastic into mould (Injection Moulding) Heat mould to suitable temperature Close mould and hold closed for period of time/cure time Open mould and eject product (2 × 1) [2]	8
2	(i)	Thought shower: To assist in developing solutions or ideas, etc. [1] A Prototype: To test a design e.g. To test if a new system or mechanism works Or To see what the final product looks like Or To check that everything will fit correctly etc. Any suitable explanation [1]	
	(ii)	Sketches Models Drawings Photographs, etc. *Any two* 2 × 1 [2]	
	(iii)	Mobile phones Cameras Portable drills, etc. *Any two* 2 × 1 [2]	
	(iv)	Disadvantage: Limited range, [1] Reason: Limited availability of recharging facilities [1]	8
3	(a) (i)	Cold chisel, bevel chisel, wood chisel [2]	
	(ii)	Suitable description of a task [2]	
	(b)	Main steps Heat point of chisel to suitable temperature Quench the point quickly Reheat the tip area again Remove heat/watch colour movement Quench when tip reaches suitable colour (4 × 1) [4]	8

AVAILABLE MARKS

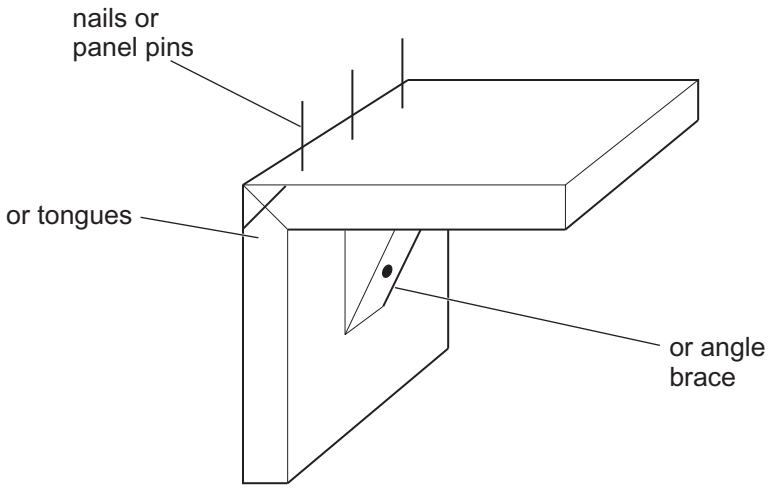
4 **(a)** Better Appearance
Stronger
Longer lasting 2×1 [2]

(b) Suitable annotated sketch outlining the main features of a mitre joint



Suitable annotated sketches [3]

(c) Suitable annotated sketch outlining the strengthening of the joint



Normally they are nailed with panel pins or it can be strengthened with glue blocks, or angle braces or tongues.

Suitable annotated sketches [3] 8

AVAILABLE MARKS

5 **(a)** Acrylic paint
Non-toxic paint
Not harmful to children
Colourful, attractive to children 2×1 [2]

(b) **(i)** Coping saw
(ii) CNC Router/Scroll saw 2×1 [2]

(c) **Batch Production:**

Advantages: batch production is a flexible method and can change product easily;
Uses less expensive machinery;
Can change number in batch quickly;
Disadvantages: Down time, non-productive can be expensive;
Limits to large production runs;
Skilled workforce; 2×1

Mass production:

Advantages: reduces the cost of product;
Less skilled workforce required;
Less workforce required;
More automation faster production;
Produces high volume of products;
Disadvantages: Expensive machinery;
If part of the production line breaks down this can cause large holdups;
Not easy to change to a new product;
Specialised training for specific machines;
Smaller workforce required; 2×1 [4] 8

		AVAILABLE MARKS
6 **(a)** **(i)**	Getting another company to manufacture/supply the circuit board. [1]	
(ii)	Cost effective/specialist circuit requirements/has no means of production/can fix some costs/fixed price for number of units supplied/mobile phone designed for a standardised circuit board which the sub-contractor manufactures/reliability of the circuit board/reliability of the sub-contactor (2 × 1) [2]	
(b)	Technological: Addition of Bluetooth/television/internet/music/email etc (2 × 1) [2] Social: Immediate contact for family members/Social networking/ Business use when travelling/reduced costs of mobile phones/ reduced costs of lines/contract deals etc. *(any one)* [1]	
(c)	Plastic difficult to degrade/materials can be reused for other products/ save earths resources/save energy costs in extracting new materials/ landfill sites are not environmentally friendly etc. [2]	8
7 **(a)** **(i)**	Height of the seats above the ground. Distance of the handles from the seats etc. *any one* [1]	
(ii)	Identifying potential hazards [1]	
(iii)	Strength Stability Sharp edges etc. *any two* 2 × 1 [2]	
(b)	Sketches illustrating: Higher pivot Longer frame Increased distance from seat to handle etc. Explanatory notes [2] Sketches [2]	8
8	Dimensions should be included in the drawing. • Must be freestanding and stable to sit on a desk or table [4] • Hold two pens, two pencils and an eraser in an efficient and effective manner [4] • Efficient use of material [4] • Suitable ergonomic factors [4] • Aesthetic factors [4] • Material(s) selection and justification for use [4]	24
	The answer to each specification point should be holistically marked.	
	Total	**80**