1.2 Timber and manufactured boards: 10-minute Pack

AQA 8552 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions.

1 A permanent right-angle corner in a timber storage frame needs to withstand a 250 N test load. The making time limit per corner is 12 minutes. Trials using the actual frame material and the same adhesive give: plain butt joint, 180 N and 6 minutes; dowelled butt joint, 280 N and 9 minutes; mortise and tenon joint, 360 N and 18 minutes. Select a joint using both limits and explain why each other option fails a limit. State one assembly control for the selected joint and explain its purpose.

(Total for Question 1 is 4 marks)

2 A straight timber handle is 240 mm long. It will be pulled along its length. In this question, grain direction means the main direction of the wood fibres. Identical samples from the available batch failed at 820 N when pulled parallel to the grain and at 190 N when pulled across the grain. Explain how the grain should run in the handle, using the data, and give one reason for rejecting a blank with a large knot near the middle.

(Total for Question 2 is 3 marks)

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Mark scheme · 1.2 Timber and manufactured boards: 10-minute Pack

Question 1

Select dowelled butt joint and relate it to both limits: 280 N ≥ 250 N and 9 ≤ 12 minutes.	**B1**
Reject plain butt joint because its 180 N failure load is below 250 N.	**B1**
Reject mortise and tenon because 18 minutes exceeds 12 minutes, even though its load result passes.	**B1**
One appropriate assembly control with purpose: dowelling jig/accurate marking for matching holes; dry assembly to check fit before glue; or clamp/check diagonals/use a square to hold the corner square during curing. Accept another valid control linked to its purpose. Do not credit a named tool alone.	**B1**

Answer: Choose the dowelled butt joint: 280 N exceeds 250 N and 9 minutes is within 12 minutes. The plain butt joint fails the load requirement (180 N). The mortise and tenon fails the time limit (18 minutes). Use a dowelling jig to align matching holes so the dowels and faces fit accurately; a suitable alternative is to clamp square during adhesive curing.

Question 2

Grain/fibres running along the length of the handle, parallel to the pull.	**B1**
Links this orientation to the higher measured failure load: 820 N rather than 190 N. Accept the equivalent comparison without both figures.	**B1**
Large knot interrupts/deflects fibres or creates local weakness, linked to increased splitting or failure risk. Accept a loose knot could fall out and leave a weakened section. Do not accept that every knot always causes failure.	**B1**

Answer: Run the grain along the 240 mm length. The supplied batch withstood 820 N parallel to the grain compared with 190 N across it. A large knot can interrupt or deflect the grain, creating a weak area where the handle may split or fail.

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