BOSTES | BOARD OF STUDIES TEACHING & EDUCATIONAL STANDARDS NSW

2015 HSC Industrial Technology
Timber Products and Furniture Technologies
Marking Guidelines

Section I

Multiple-choice Answer Key

Question	Answer
1	C
2	C
3	A
4	B
5	C
6	B
7	A
8	D
9	B
10	C

Section II

Question 11

Criteria	Marks
• Provides a relevant purpose of dry cramping	1

Sample answer:

Dry cramping is used as part of the test fitting process to ensure all joints fit neatly prior to gluing.

Answers could include:

- Test joints for accurate fit
- To set all cramps in position prior to gluing
- Check for square/flatness
- To familiarise yourself with the order and processes required for efficient gluing operations.

Question 12

Criteria	Marks
• Provides a detailed description of why timber may distort AND how the alternation of boards in a widening joint can minimise distortion	3
• Provides a sound description of why timber may distort OR outlines how the alternation of boards in a widening joint may minimise distortion OR • Provides a limited description of why timber may distort AND how the alternation of boards in a widening joint can minimise distortion	2
• Provides a basic outline or lists a reason to alternate boards in a widening joint OR • Limited understanding of how it limits distortion evident	1

Sample answer:

Timber is prone to movement (cupping or distortion). When creating a widening jointed board such as a table top, failure to alternate the boards' grain direction can exacerbate cupping or distortion of the timbers. In the case of a table top this could create effective cupping across the entire width of the jointed boards. By alternating the grain the possibility of cupping is balanced out by flipping the direction of cupping between each board and thus providing a flatter top, which can be more securely fastened.

same direction
= excessive distortion

alternate direction
reduces distortion

Question 13

Criteria	Marks
• Identifies an appropriate new joint technology AND provides relevant examples	3
• Identifies an appropriate new joint technology AND provides a relevant advantage OR • Demonstrates a sound understanding of some of the characteristics and features that make new joint technologies advantageous OR • Provides two partially accurate advantages	2
• Provides an advantage of new joint technologies OR • Lists an example of a joint	1

Sample answer:

An alternative joint to a traditional mortise and tenon is the festo domino joint. The domino has two advantages: firstly it is quick to produce, replacing hand cut joint members with a machine cut mortise into which dominos (tenons) are glued. The large gluing area maintains the joint strength offered by a mortise and tenon. The domino is secondly fast and accurate to produce, significantly reducing production time while providing accurate, quality joints.

Answers could include:

- Knock down fitting
- Brackets and clip lock fittings
- Domino joints
- Flat packing – distribution advantages
- Increased efficiency in production therefore lower costs to both manufacturer and consumer
- Similar strengths and joint integrity achieved at significantly lower cost and less time, making products cheaper.

Question 14

Criteria	Marks
• Provides a detailed understanding of quarter sawn timber characteristics appropriate for quality furniture production	3
• Provides an understanding of quarter sawn timber characteristics appropriate for quality furniture production	2
• Provides a basic understanding of quarter sawn timber	1

Sample answer:

Quarter sawn timber while slower to convert provides several advantages to the designer/manufacturer. Quarter sawn timber has growth rings parallel to the short face, which typically shows the best grain on the face, provides better resistance to collapse and has better wear. It has lower shrinkage and less cupping and warping than other cuts thus providing stable, attractive material.

Answers could include:

- Best grain on face
- Good wear resistance
- Lower shrinkage
- Less warping and cupping
- High stability
- Visually appealing.

Question 15

Criteria	Marks
• Provides a detailed range of steps applicable to the construction of the laminated stool. All processes outlined are logical and correctly sequenced	5
• Provides a range of steps applicable to the construction of the laminated stool. All processes outlined are logical and correctly sequenced	3–4
• Provides a basic outline of some possible steps applicable to the construction of the laminated stool. Limited detail provided or limited logic evident in process	1–2

Sample answer:

Select materials: laminates, glues, etc

↓

Obtain suitable tools: cramps

↓

Mark/cut out allowing for waste

↓

Lay, apply glue and cramp laminate over jig/mould

↓

Repeat step 4 as necessary

↓

Remove from jig/mould

↓

Trim as required

↓

Shape handles and base: router

↓

Apple suitable finish

Answers could include:

- Vacuum press over a mould or jig
- Vacuum bag and mould

Section III

Question 16 (a)

Criteria	Marks
• Detailed understanding of the causes and effects of restructuring a business on quality control	5
• Provides characteristics and features of the causes and effects of restructuring a business on quality control	3–4
• Indicates the main features of restructuring and/or quality control	1–2

Answers could include:

- Restructuring can involve personnel, systems, processes, physical environment
- Effects can be positive and negative
- Restructuring can cause stress/anxiety on workers, causing a lowering of the quality of the product/services
- Workers moved during a restructure may initially lack the skills to perform new tasks, retraining must be under taken to provide knowledge to overcome lack of experience. This can lead to a short drop in quality of the product/services.
- New workers can provide a fresh attitude and show less complacency, possibly improving the quality of product/services
- The introduction of new machinery can improve the quality of products through increased accuracy, precision and output
- Restructuring personnel into specific teams with designated roles can help to improve product quality through skill specialisation

Question 16 (b)

Criteria	Marks
• Provides a detailed judgement of the value of new technology with an explanation of its effects on production and efficiency in the industry	10
• Provides an effective judgement of the value of new technology with a description of its effects on production and efficiency in the industry	8–9
• Provides some measure of the value of new technology with features of its effects on production and efficiency in the industry	5–7
• Attempts to provide an assessment of the effect of new technology on production and/or efficiency in the industry	3–4
• Lists aspects of new technology or production or efficiency in the industry	1–2

Sample answer:

There are ways to determine the value of new technology improving production and efficiency. CAD drawings have allowed faster production due to reduced time in planning and drawing. These drawings are able to have elements such as a library of parts, which can be reused and save time for the business, therefore increasing efficiency in the production of drawings. For example, if you consistently use one component of a drawing, eg a particular cog, then you can save complex drawings and reuse and edit them. CAD drawings allow for electronic distribution of drawings around the world via the internet (even attached to emails). This could previously not have been done with hand drawings, as the drawings would have to be physically sent. This fast method of distribution is a significant cost saving, which is more efficient due to the time and cost saved by not having down time when waiting for delivery. With electronic distribution, there are no postal costs and no flying workers around the world with drawings/plans to attend meetings. In addition, if you were sending physical drawings, these may be lost. CAD allows for multiple backups to be made so the work will be able to be sent again reducing duplication of effort. As this globalisation has been made so much easier by the introduction of new technologies, you also have access to a global work force, and companies can get more qualified and experienced staff which are then likely to work more efficiently, thus increasing the amount of drawings produced in a set time.

3D printing allows rapid prototyping in the early stages of production. It allows concept sketches to be produced quickly, and then tested as a physical prototype to scale. This physical prototype is faster to generate than previous methods such as creating cardboard models thus reducing money the company may have spent on labour costs and freeing up this capital for re-investment. This model can then be shown to clients and feedback given which is then applied to the model. The time within the design process in preparing for production is then minimised, as changes can be made quickly and easily to the model based on feedback. This is a more efficient process, as previously, feedback would be received, drawing would have to be modified then new drawings printed, or perhaps new models created. This can all be done in the one process now with the model that is used for the prototype can then be repurposed and sent out for production, thus saving time in making a separate prototype and product, therefore being more efficient. Some 3D printers also print in different resins that can be used for things such as moulding and casting of multiple copies of objects. This is time and cost efficient and allows smaller businesses that do not have access to large budgets to be competitive in the market.

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Mapping Grid

Section I

Question	Marks	Content	Syllabus outcomes
1	1	Processes, tools and machinery	H1.2
2	1	Processes, tools and machinery	H1.2
3	1	Materials	H1.2, H4.3
4	1	Processes, tools and machinery	H1.2
5	1	Processes, tools and machinery	H1.2
6	1	Materials	H1.2
7	1	Processes, tools and machinery	H1.2
8	1	Processes, tools and machinery	H1.2, H4.3
9	1	Processes, tools and machinery	H1.2, H4.3
10	1	Processes, tools and machinery	H1.2, H4.3

Section II

Question	Marks	Content	Syllabus outcomes
11	1	Processes, tools and machinery	H1.2, H4.3, H6.2
12	3	Processes, tools and machinery	H3.1
13	3	Processes, tools and machinery	H2.1, H4.3
14	3	Materials	H2.1, H4.3
15	5	Processes, tools and machinery	H2.1, H4.3

Section III

Question	Marks	Content	Syllabus outcomes
16 (a)	5	Structural considerations	H1.1, H2.1, H6.1, H6.2
16 (b)	10	Structural considerations	H1.1, H2.1, H7.2