**Name: ­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_­­­­\_\_\_\_\_\_ **Due: End of Week 2** (Two in-class sessions)

**Practical Investigation 2 - Cabinet Making Business**

**\_\_\_\_\_\_ / 50**

Charlie Splinter runs a one person Cabinet Making Business. During quiet times when she is not building custom-made kitchens or furniture to order, she manufactures, among other things, pine bookcases.

These bookshelves are 1830mm high, 920mm wide and 303mm deep. The last 3mm of the depth is the 3 ply (a particular thickness of plywood) covering the back of each bookcase – known as a unit. The plywood is 1830mm x 920mm x 3mm.

The shelves – there are **five** plus a “top” shelf – are wedged between the two outside planks ie.

20mm thick timber is used for the shelves and the outside planks.

Shelves

Outside Planks

The distance from the top of the bookcase (the top shelf) to the top of the first shelf is **330mm.**

The distance from the top of the first shelf to the top of the second shelf is **330mm.**

From the top of the second shelf to the top of the third shelf is **330mm.**

From the top of the third shelf to the top of the fourth shelf is **410mm.**

From the top of the fourth shelf to the top of the fifth shelf is **410mm.**

From the top of the fifth shelf to the top of the floor shelf is **20mm.**

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| **Question 1** | **13 marks** |

*Show all working out*

1. Draw a scale diagram (front view) of the bookcase, use **scale 1:10.**
2. Draw a diagram showing each shape of wood to be used, giving the dimensions and how many of each are necessary.

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| **Question 2** | **6 marks** |

*Show all working out*

Calculate:

1. the total length of pine planking 300mm wide used per unit (i.e. per bookcase.)
2. the area of 3 ply used per unit.

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| **Question 3** | **3 marks** |

The making of each unit involves the cutting of the dressed timber, gluing the pine pieces together, screwing them together, tacking the back (the 3 ply) onto the unit and then spray painting 3 coats of clear satin finish (paint) to finish it.

1. Draw a flow chart of the process.

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| **Question 4** | **7 marks** |

*Show all working out*

Charlie buys pine boards in 3 metre lengths. These lengths are 300mm wide and 20mm thick so she merely needs to cut necessary lengths. Each 3m length costs $42.90.

Calculate:

1. How many 3m lengths are needed to make three units.
2. The total wastage on these lengths.
3. The cost of the pine for one unit.

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| **Question 5** | **5 marks** |

*Show all working out*

Charlie can buy the 3 ply already cut to size – 1830mm x 920mm x 3mm – for **$11.45 each**.  
  
When painting the units, she uses 250ml paint @ $30/L and 250ml of thinners @ $17/L per unit.  
  
Each unit uses 200ml of wood glue which cost $15/L. 24 woodscrews are needed per unit. They cost $4.50 for 100. 24 tacks are used @ $12 per 1000.

1. Find the total cost of materials – including the wood – for one unit. Note: to allow for wastage for the tacks, round to the nearest 5 cents.

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| **Question 6** | **4 marks** |

*Show all working out*

Charlie can mark out and cut up sufficient pine for three units in **one hour**. It takes her **one hour** to glue and screw the pine in place on one unit and **10 minutes** to tack the backboard on.

Spraying 4 units non-stop (allowing other 3 to dry as she sprays another coat per unit) with 3 coats of paint takes **3 hours**.

1. What is the total time taken to build one unit?

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| **Question 7** | **2 marks** |

*Show all working out*

She charges $50/hr for labour. This covers the overheads incurred in running the business.

1. How much is the labour cost per unit?

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| **Question 8** | **3 marks** |

*Show all working out*

Charlie then adds 15% mark-up for profit after adding the cost of the labour to the cost of the materials.

1. How much does she charge for each bookcase (round up to the nearest dollar)?

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| **Question 9** | **5 marks** |

*Show all working out*

A large furniture store (George’s Emporium) finds it sells a lot of these bookcases and so it places an order for **40** to be delivered within **12 working days**.  
  
Charlie usually works from 7.30am to 4.00pm Monday to Friday with a 25 minute break at 9.30am, a 45 minute lunch break at 11.15am and a 20 minute tea break at 1.30pm.

1. Can Charlie complete the bookcases within the time without working overtime? If not, how many hours overtime will she have to work?

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| **Question 10** | **2 marks** |

*Show all working out*

1. After deducting the cost of materials and labour, how much profit will Charlie make on the order?

**Answers**

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| **Question 1** | **13 marks** |

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| **Question 2** | **6 marks** |

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| **Question 3** | **3 marks** |

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| **Question 4** | **7 marks** |

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| **Question 5** | **5 marks** |

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| **Question 6** | **4 marks** |

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| **Question 7** | **2 marks** |

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| **Question 8** | **3 marks** |

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| **Question 9** | **5 marks** |

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| **Question 10** | **2 marks** |