MSIN0066 Management Accounting for Engineers Individual Coursework

1.

Assuming a machine hour basis for overhead absorption

	LISTEN	FEEL	SIXSENSE
Machine hours per unit (component x 2)	20 x 2 = 40	35 x 2 = 70	50 x 2 = 100

Total machine hours = machine hours x units sold

	LISTEN	FEEL	SIXSENSE
Total machine hours	40 x 8000 = 320,000	70 x 4000 = 280,000	100 x 14,000 = 1,400,000

Combined machine hours = 320,000 + 280,000 + 1,400,000 = 2,000,000

Total overheads = £15,646,000 (sum of all overheads from table 3)

Overhead rate per machine hour = 15,646,000 / 2,000,000 = £7.823

Overheads per unit = overhead rate x machine hours per unit

	LISTEN	FEEL	SIXSENSE
Overhead cost per unit (machine hour basis)	40 x 7.823 = £312.92	70 x 7.823 = £547.61	100 x 7.823= £782.30

Total costs also include the direct costs (direct labour cost per unit and direct material cost per unit)

Labour cost per unit = Labour hours per unit x hourly wage

Hourly wage = £50 + 20% increase = £60

	LISTEN	FEEL	SIXSENSE
Direct labour hours per unit	0.25 x 2 = 0.5	0.5 x 2 = 1	1.25 x 2 = 2.5

	LISTEN	FEEL	SIXSENSE
Direct labour costs per unit	60 x 0.5 = £30	60 x 1 = £60	60 x 2.5 = £150

	LISTEN	FEEL	SIXSENSE
Direct material costs per unit	75 x 2 = £150	100 x 2 = £200	110 x 2 = £220

Total cost = overheads per unit + direct labour cost per unit + direct material costs per unit

	LISTEN	FEEL	SIXSENSE
Total cost per unit	312.92 + 30 + 150 = £492.92	547.61 + 60 + 200 = £807.61	782.30 + 150 + 220 = £1,152.30

Unit profit = profit rate x total cost per unit

	LISTEN	FEEL	SIXSENSE
Unit profit	10% of 492.92 = £49.29	10% of 807.61 = £80.76	15% of 1152.30 = £172.85

Price = total cost + unit profit

	LISTEN	FEEL	SIXSENSE
Price	492.92 + 49.29 = £542.21	807.61 + 80.76 = £888.37	1152.30 + 172.85 = £1,325.15

2.

Combined total machine hours = 2,000,000 (worked out already in question 1)

Total labour hours = labour hours per unit x number of units

	LISTEN	FEEL	SIXSENSE
Total labour hours	0.5 x 8000 = 4,000	1 x 4000 = 4,000	2.5 x 14,000 = 35,000

Combined total labour hours = 4000 + 4000 + 35,000 = 43,000

Total sales = 8000 + 4000 + 14,000 = 26,000

Total delivery cost = delivery rate per unit x number of units sold

	LISTEN	FEEL	SIXSENSE
Total delivery cost	25 x 8000 = 200,000	40 x 4000 = 160,000	60 x 14,000 = 840,000

Combined total delivery cost = 200,000 + 160,000 + 840,000 = 1,200,000

Moulding cost driver rate = Total moulding overhead cost / total number of machine hours
Quality control cost driver rate = Total Q.C overhead cost / total number of labour hours
Installation cost driver rate = Total installation overhead cost / total number of sales
Delivery cost driver rate = Total delivery overhead cost / total cost of delivering all units
Other cost driver rate = Other delivery overhead cost / total number of sales

	Moulding	Quality Control	Installation	Delivery	Other
Cost driver rate	2,000,000 / 2,000,000 = £1	9,976,000 / 43,000 = £232	988,000 / 26,000 = £38	1,200,000 / 1,200,000 = £1	1,482,000 / 26,000 = £57

Moulding overheads per unit = moulding cost driver rate x number of machine hours per unit
Q.C overheads per unit = Q.C cost driver rate x number of labour hours per unit
Installation overheads per unit = installation cost driver rate x 1
Delivery overheads per unit = delivery cost driver rate x delivery cost per unit
Other overheads per unit = other cost driver rate x 1

	LISTEN	FEEL	SIXSENSE
Moulding Overheads per unit	1 x 40 = £40	1 x 70 = £70	1 x 100 = £100
Q.C Overheads per unit	232 x 0.5 = £116	232 x 1 = £232	232 x 2.5 = £580
Installation overheads per unit	£38	£38	£38
Delivery overheads per unit	1 x 25 = £25	1 x 40 = £40	1 x 60 = £60
Other overheads per unit	£57	£57	£57
Total overheads per unit	£276	£437	£835

Direct costs are the same as question 1. Total costs are sum of direct costs per unit and total overhead costs per unit.

	LISTEN	FEEL	SIXSENSE
Total cost per unit	276 + 30 + 150 = £456	437 + 60 + 200 = £697	835 + 150 + 220 = £1,205
Unit profit	10% of 456 = £45.60	10% of 697 = £69.70	15% of 1,205 = £180.75

Price	456 + 45.60 = £501.60	697 + 69.70 = £766.70	1,205 + 180.75 = £1385.75

3.

A major issue with the traditional costing system is that it neglects the unique costs associated with a company like ChipBit, such as the cost of installation and quality control costs. Due to the nature of the business, the quality control process needs to be extremely stringent, and accordingly expensive, to minimize human risk. However, the importance of and the costs associated with this process are unable to be captured by a simple absorption costing system using a machine hour basis, since it lumps all labour hours with the direct costs. A similar problem can be seen with the installation procedure associated with the product. The role of nurses doesn't neatly fall into any categories of the traditional absorption-based costing method. The best is likely the labour hour category, but even this paints an incomplete picture. The absolute number of labour hours is likely dominated by the direct manufacturing labour cost of producing the chips, and so the nurses would make up only a tiny fraction of the total labour hours per unit. However, their role is far more specialized and skilled, which means their skills cost much more for the same amount of time, an important distinction that isn't captured by simply assigning labour hours to the direct costs. The activity-based costing system is a good attempt at combatting these flaws as it tries to assign the total overheads to these unique and costly activities that might otherwise go unidentified. Using ABC, we immediately see that the total cost of LISTEN and FEEL is around 10-15% lower compared to what absorption costing indicates, while the cost of SIXSENSE is around 5% higher than what absorption costing indicates. Due to this, the profit ratio per product at the current selling price completely flips. LISTEN and FEEL, which are supposed to be sold at a lower profit margin of 10% generate around 20-30% profit, while SIXSENSE drops to around 10% profit. This means that Alyssa's plans of promoting SIXENSE over the LISTEN and FEEL would backfire, generating lower profits than if she had focused on the other two. This illustrates how insightful ABC can be since its results necessitate a completely different marketing strategy, pivoting ChipBit from focusing on higher-end product tiers to lower-end ones, potentially changing their brand image and reputation. This discrepancy can be attributed to ABC being able to capture the increasing manufacturing complexity from LISTEN to FEEL to SIXSENSE due to the inclusion of Q.C and moulding cost pools, factors which far outweigh the simple increase in machine hours that the absorption costing is based on. However, there are still issues with the current implementation of ABC. For example, the cost driver for the installation activity is based on number of sales, despite some product lines such as SIXSENSE requiring multiple potential installations per sale. This would significantly drive-up costs but is not accurately captured by the ABC analysis. ChipBit will need to invest heavily in data collection mechanisms to alleviate such issues.

4.

The application of ABC would benefit ChipBit's management team. It would help ChipBit better understand the cost structure of their products, and make more sound decisions on product pricing, marketing, product mix etc. As discussed previously, the analysis of traditional absorption with ABC analysis demonstrated how ChipBit's current methods severely underestimate the cost of higher tier products such as SIXSENSE, significantly cannibalizing their profits. By utilizing the results of the ABC analysis, ChipBit could pivot to the more profitable lower tier lines. For the sake of pursuing the perceived 15% profit margin on SIXSENSE, ChipBit was likely neglecting several issues with the product line and sabotaging the rest of the product lines. Ignoring the massive cost increases due to manufacturing complexities, the product also had a high failure rate in the form of client discomfort, significantly affecting ChipBit's reputation. Furthermore, most customers were already hesitant of the technology and would be unwilling to spend thousands of pounds on a 2-year-old technology. By focusing on the lower tier lines, ChipBit would not only generate more profits according to the ABC analysis, but also likely serve their technology in a much more palatable manner, attracting many more potential customers. Alyssa already mentioned that the LISTEN products sold at a higher volume than expected, so the fact that the ABC analysis agrees with this should be a good sign for the management team at ChipBit. However, there are still several issues that prevent ChipBit from being able to properly utilize ABC analysis. ABC requires a keen understanding of the product operations, something that is extremely difficult to attain in a product line that's in its infancy. These products are at the cutting-edge and many unexpected changes could alter the cost breakdown of the products. For example, quality control costs could go down significantly as the technology becomes more reliable, or chip shortages could increase manufacturing costs significantly. The unpredictable nature of ChipBit's costs makes it difficult to accurately allocate overheads to the identified cost pools. A glimpse of this was seen when the installation cost pool failed to consider repeated installations due to failures. Another issue is Alyssa's difficult personality, making the time-consuming and expensive data collection required for ABC much tougher, especially when she sees no benefit to the process. A key improvement that needs to happen is the upheaval of the current managerial system. There needs to be clearly defined separation of responsibilities, where accountants like Patrice can make decisions regarding their area of expertise, such as with implementing ABC. Another key improvement is to do with data collection. For example, ChipBit could collect data on client discomfort rates by directing them an online survey. Such data is invaluable for ABC and would help ChipBit make better informed decisions. Lastly, ChipBit should work on automating the Q.C process since it is a massive cost driver and depends solely on labour hours. Developing testing kits and the like would help significantly bring these costs and the overall cost of the products down.