IT Questions (Intermediate Management Accounting)

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IT QUESTIONS (INTERMEDIATE MANAGEMENT ACCOUNTING)

Question 1

Structured data, mostly from internal sources such as the company's sales system, is the typical information requirement for which staffing level?

a) Employees and supervisors
b) Middle management
c) Senior management
d) The chief executive officer

Question 2

Northern Apparel Inc. is thinking of making a specialty parka for children. The initial research has determined that the parka could sell for $195. Fixed manufacturing overhead is $140,000 per month. Fixed selling costs are $31,000 per month. Variable costs to manufacture are estimated as follows:

Direct materials	$18.50
Direct labour	6.15
Manufacturing overhead	1.20

Variable selling cost is estimated at 3.5% of sales.

Required:

a) Calculate the break-even point in units and in dollars.

b) Calculate the new break-even point in units and sales dollars for each of the following independent situations:

   i. Variable manufacturing costs increased by 40%.

   ii. Fixed manufacturing overhead costs increased by 25% and variable manufacturing costs increased by 50%, except for direct materials, which doubled in price due to a problem with importing leather. Variable selling cost increased to 4% of sales.

   iii. The estimated selling price was overestimated, and the actual price is $150.

c) Using the revised estimates from part (b) (iii) as the best estimate, what is the margin of safety percentage if the company thinks it will sell 2,000 units per month?

d) The management accountant wants to provide the production department with relevant information for decision-making in relation to the production of this parka. Two of the key decision makers are the assembly supervisor and the vice-president of production. Contrast the information needs of each of these individuals as they relate to the following:

   i. decision type

   ii. information format

   iii. information source

Question 3

Spaworks Inc. makes hot tubs for residential use. The hot tubs, which consist of a fibreglass finish and proprietary insulation glass, are sold with an all-weather pump and heater unit for $2,750. The company is planning its annual budget for the coming year ending October 31, 2020, and the controller has provided the following data:

Sales

F2020	15,000 tubs
F2021	November sales: 1,800 tubs; December sales: 1,500 tubs

Selling price per tub: $2,750.00

Materials and labour requirements (per tub)

Direct materials		
Insulation	5.0	kg
Fibreglass	10.4	sq. metre (m^2)
Pumps	1	unit
Direct labour	8	hours

Inventories

Beginning:	Qty	Units	Cost
Finished goods	550	unit	$1,400.00
Direct materials			
Insulation	2,195	kg	$15.00
Fibreglass	6,500	m^2	$12.00
Pumps	550	unit	$850.00

Ending finished goods inventory is 25% of next month's sales.

Ending direct materials inventories are 20% of next month's production needs. Direct materials inventory is expected to change to the following:

Insulation	$ 16.00	per kg
Fibreglass	$ 13.00	per square metre
Pumps	$900.00	per unit

Other rates

Direct labour wage rate	$22.50	per hour
Variable manufacturing overhead	$26.00	per direct labour hour
Variable marketing costs	$250	per customer
Number of customers	15,000	

Other costs

Fixed manufacturing overhead	$319,275
Fixed non-manufacturing costs	$1,250,000

Required:

Prepare the following schedules of the master budget for the year ended October 31, 2020. Assume that the company uses first in, first out (FIFO) for inventory costs:

a) Revenue budget

b) Production budget

c) Direct materials usage budget

d) Direct materials purchases budget

e) Direct manufacturing labour budget

f) Manufacturing overhead budget

g) Computation of unit costs of finished goods inventory

h) Budgeted ending inventory

i) Budgeted schedule of cost of goods sold

j) Budgeted income statement

k) A good budget must start with credible data. Both internal and external factors can affect the quality of the data used to develop a budget.

   i. Identify two external factors that should be considered when developing this budget.

   ii. Explain how Spaworks' management team could control the risk of using unreliable data in its operating budgets.

Question 4

Markman Industries employs a standard cost system. It has established the following standards for the prime costs of its air rifle product line:

	Standard quantity	Standard price	Standard cost
Direct materials	4 kg	$21.80/kg	$ 87.20
Direct labour	0.5 direct labour hours (DLH)	$20.00/DLH	4.00
			$ 91.20

During November, Markman purchased 13,000 kg of direct materials at a total cost of $295,100. The total factory wages for November were $38,000, 90% of which were for direct labour.

Markman manufactured 3,500 air rifles during November, using 13,500 kg of direct materials and 1,900 direct labour hours.

Required:

a) What was the direct materials purchase price variance for November?

b) What was the direct materials quantity variance for November?

c) What was the direct labour rate variance for November?

d) What was the direct labour efficiency variance for November?

e) Over the past year, Markman's management team attempted to reduce the number of customer complaints relating to the product by sourcing higher-quality direct materials from a different supplier. Explain the effect this has had on direct materials costs.

f) Continuing from part (e), explain, using the CPA Way, how the use of a dashboard (type of graph or summary data) could help the management team continue to monitor customer satisfaction based on the quality of direct materials and at the same time control the cost of direct materials and increase sales. Your explanation should include key performance indicators, their likely sources, and a description of how this would be presented on a dashboard.

Question 5

Kesla Inc. manufactures a unique fuel injection system that yields dramatic cost savings through improved fuel efficiency. The effectiveness of the system is dependent upon the quality of a specialized sensor. These sensors are purchased from an external supplier for $21 each.

For the past few years, an average of 10% of the sensors purchased from the supplier have not met Kesla's quality requirements. The number of unusable sensors has ranged from 5% to 25% of the total number purchased and has resulted in failures in meeting

production schedules. In addition, Kesla has incurred additional costs to replace the defective units because the rejection rate of the units is within the range agreed upon in the contract.

Kesla is considering a proposal from its engineering department to manufacture the sensors internally. Kesla has the facilities and equipment to produce the components. The engineering department has designed a manufacturing system that will produce the sensors with a defect rate of 5% of the number of units produced. The following schedule presents the engineers' estimates of the probabilities that different levels of variable manufacturing cost per sensor will be incurred under this system. Additional annual fixed costs incurred by Kesla, if it manufactures the sensor, will amount to $42,500.

Estimated variable manufacturing cost per sensor	Probability of occurrence
$12	10%
$15	30%
$18	40%
$21	20%

Kesla will need 18,000 sensors to meet its annual demand requirements.

Required:

a) Prepare an expected-value analysis to determine whether Kesla should manufacture the sensors.

b) The engineers used internal costing records of similar internal processes when estimating the probabilities of variable manufacturing costs. However, they realized the estimates of the probability did not take into account that the new manufacturing system consisted of newer, more efficient machines and a different gauge of steel.

   Identify other sources of data that could reduce the estimated range of variable manufacturing cost per sensor.

Solutions

Solution to Question 1

Option a) is **correct**. Employees and supervisors make routine decisions. As such, the data is usually structured and often can be found in the organization's transaction processing systems or Excel spreadsheets.

Option b) is incorrect. Middle management makes tactical decisions. As such, the data is usually in a semi-structured format, usually taken from management reports or via Excel analysis tools and dashboards.

Option c) is incorrect. Senior management makes decisions requiring data from a variety of internal and external sources. As such, it is non-structured.

Option d) is incorrect. As a senior manager, the chief executive officer makes decisions requiring data from a variety of internal and external sources. As such, it is non-structured.

Solution to Question 2

a) Break-even in units = $\dfrac{\$140{,}000 + \$31{,}000}{\$195.00 - \$18.50 - \$6.15 - \$1.20 - (\$195 \times 0.035)}$

= $171,000/$162.33
= 1,053.4
= rounded up to 1,054 units

Break-even in dollars = $171,000/($162.33/195)
= $205,421.22

OR

= 1,054 units × $195 = $205,530

b) i. New CM = $195.00 – ($18.50)(1.40) – ($6.15)(1.40) – ($1.20)(1.40) – ($195*0.035)
= $195.00 – $25.90 – $8.61 – $1.68 – $6.13 = $151.99

CM percentage = 155.99/195.00 = 0.7794

Break-even in units = $171,000/151.99
= 1,125.1
= rounded up to 1,126

Break-even in dollars = $171,000/0.7794 = $219,396.65
OR

= 1,126 × $195 = $219,570

ii. New CM = \$195.00 – (\$18.50)(2) – (\$6.15)(1.50) – (\$1.20)(1.50) – (\$195*0.04)

= \$195.00 – \$37.00 – \$9.23 – \$1.80 – \$7.80 = \$139.17

New CM percentage = \$139.17/\$195.00 = 0.7137

Break-even in units = [(\$140,000 × 1.25) + \$31,000]/\$139.17
= \$206,000/\$139.17
= 1,480.2
= rounded up to 1,481

Break-even in dollars = \$206,000/0.7137
= \$288,637

OR

= 1,481 × \$195.00
= \$288,795

iii. Break-even in units

$$= \frac{\$140{,}000 + \$31{,}000}{\$150.00 - \$18.50 - \$6.15 - \$1.20 - (\$150 \times 0.035)}$$

$$= \frac{\$171{,}000}{\$150.00 - \$18.50 - \$6.15 - \$1.20 - (\$150 \times 0.035)}$$

$$= \frac{\$171{,}000}{\$150.00 - \$18.50 - \$6.15 - \$1.20 - \$5.25}$$

$$= \frac{\$171{,}000}{\$118.90}$$

= 1,438.2
= rounded up to 1,439 units

Break-even in dollars = \$171,000/(\$118.90/150.00)
= \$171,000/.7927
= \$215,718

OR

= 1,439 units × \$150.00
= \$215,850

c) The margin of safety if sales are 2,000 units per month is (2,000 – 1, 439)/2,000 = 0.2805, or 28%.

d) Assembly supervisor:

- Decision type — The decisions will be related to operations and are usually routine (for example, how many people to schedule in the next week, how much raw material is required).
- Information format — The information will be highly structured and taken from the organization's transaction processing systems (accounting and scheduling databases).
- Information source — The information will be sourced internally. Examples are customer demand, employee time sheets, and direct materials in inventory.

Vice-president of production:

- Decision type — The decisions will be related to strategic, longer-term goals. Examples from this situation might relate to major purchases of equipment or development of new manufacturing plants.
- Information format — This will consist of more non-structured data that would be summarized and compiled into documents.
- Information source — Much of the information will be sourced externally. Examples are geographical locations to manufacture, labour market data, and government restrictions such as taxes or tariffs if sourcing outside the country. This information could be enhanced via the use of expert and decision support systems, which will also contain internal data.

Solution to Question 3

a)

Revenue budget

For the year ended October 31, 2020

Budgeted units	15,000
Selling price	2,750
Budgeted sales ($)	$41,250,000

b)

Production budget (in units)

For the year ended October 31, 2020

Budgeted units	15,000
Add: target ending finished goods inventory (25% × 1,800)	450
Total requirements	15,450
Deduct: beginning finished goods inventory	550
Units to be produced	14,900

Production for the first month of F2021 (November 2020)	
Budgeted sales	1,800
Add: target ending inventory (25% × 1,500)	375
Total requirements	2,175
Deduct: beginning finished goods inventory	450
Units to be produced in November	1,725

c)

Direct materials usage budget

For the year ended October 31, 2020

	Insulation				Fibreglass				Pumps				Total
Units	**Qty**	**Unit**	**Production**	**Total**	**Qty**	**Unit**	**Production**	**Total**	**Qty**	**Unit**	**Production**	**Total**	
To be used in production	5	kg	14,900	74,500	10.4	m^2	14,900	$154,960	1	Each	14,900	14,900	
Costs (FIFO)													
Available from beginning inventory	2,195	kg	$15.00	$32,925	6,500	m^2	$12.00	$78,000	550	Each	$850.00	$467,500	
To be used from purchases this period	72,305	kg	$16.00	$1,156,880	148,460	m^2	$13.00	$1,929,980	14,350	Each	$900.00	$12,915,000	
Total cost and direct materials to be used	74,500	kg		$1,189,805	154,960	m^2		$2,007,980	14,900	Each		$13,382,500	**$16,580,285**

d)

Direct materials purchases budget

For the year ended October 31, 2020

Units	**Insulation**	**Fibreglass**	**Pumps**	**Total**
Production usage (from direct materials usage budget)	74,500	154,960	14,900	
Add target ending inventory (Note 1)	1,725	3,588	345	
Total requirements	76,225	158,548	15,245	
Deduct beginning inventory	2,195	6,500	550	
Purchases	74,030	152,048	14,695	
Cost budget (Purchases * Price)	$1,184,480	$1,976,624	$13,225,500	**$16,386,604**

Note 1

Target ending inventory:

Units to be produced in November (from part b)	1,725
Target	20%
	345

Ending direct materials inventory requirement:

Insulation: 345 × 5 kg	1,725
Fibreglass: 345 × 10.4 m^2	3,588
Pumps: 345 × 1	345

e)
Direct manufacturing labour budget
For the year ended October 31, 2020

	Production units	DLH per unit	Total hours	Cost per DLH	Total
Manufacturing labour	14,900	8	119,200	$22.50	$2,682,000

f)
Manufacturing overhead budget
For the year ended October 31, 2020

	Units produced (production budget)	DLH per unit	Total DLH	Cost per DLH	Total
Variable manufacturing overhead cost	14,900	8	119,200	$26.00	$3,099,200
Fixed manufacturing overhead					$319,275
Total manufacturing overhead costs					**$3,418,475**

g)
Cost of ending inventory per unit
October 31, 2020

	Cost	Unit	Inputs	Total
Direct materials				
Insulation	$16.00	kg	5	$80.00
Fibreglass	$13.00	m^2	10.4	$135.20
Pump	$900.00	each	1	$900.00
Direct manufacturing labour	$22.50	hours	8	$180.00
Variable overhead	$26.00	DLH	8	$208.00
Fixed overhead[1]				$21.43
Total cost per unit				$1,524.63

[1] Fixed overhead / units produced:
$319,275/14,900

h)
Budgeted ending inventory
October 31, 2020

	Quantity	Unit	Cost per unit	Total
Direct materials (from part d)				
Insulation	1,725	kg	$16.00	$27,600.00
Fibreglass	3,588	m^2	$13.00	$46,644.00
Pump	345	each	$900.00	$310,500.00
Finished goods				
Hot tubs (from part b)	450	each	$1,524.63	$686,083.50
Total ending inventory				**$1,070,827.50**

i)

Cost of goods sold budget

For the year ended October 31, 2020

	From		**Total**
Beginning finished goods inventory (550 × $1,400)			$770,000
Direct materials used (from part c)	DM budget	$16,386,604	
Direct manufacturing labour (from part e)	Direct manufacturing labour budget	$2,682,000	
Variable manufacturing overhead (from part f)	Manufacturing overhead budget	$3,099,200	
Fixed manufacturing overhead (from part f)	Manufacturing overhead budget	$319,275	
Cost of goods manufactured			$22,487,079
Cost of goods available for sale			$23,257,079
Deduct ending finished goods inventory	Budgeted ending inventory		$686,083
Cost of goods sold			$22,570,996

j)

Budgeted income statement for Spaworks Inc.

For the year ended October 31, 2020

Revenue		Revenue budget	$41,250,000
Costs			
Cost of goods sold		Cost of goods sold schedule	$22,570,996
Gross margin			$18,679,004
Operating costs			
Variable non-manufacturing costs[1]	$3,750,000		
Fixed non-manufacturing costs	1,250,000		$5,000,000
Operating income			$13,679,004

Note 1:

Cost per customer × number of customers: $250 × 15,000

k) i. A number of external factors could affect this budget. Examples include the following:

- media endorsement of the positive psychological effects of having a self-care environment at home
- effect on supply of pumps if supplier is planning to downsize its operations
- cost of direct labour if the forecast is for a labour shortage

ii. The Spaworks management team could ensure the budgeting process is interdepartmental, meaning all budget committee members are aware of budget needs in other departments. As such, they hold each other accountable for the budget figures used to make up the master budget. These committee members are then responsible for monitoring and reporting variances. The data used in the budget should also be validated based on quotes from suppliers, historical information, or other confirmation related to the costs incurred. The assumptions used should also be clearly spelled out, and management must perform sensitivity analyses to ensure they are reasonable.

Note: The external factors are not exhaustive. Students may identify other external factors that can impact a budget in this industry.

Solution to Question 4

a) Direct materials price variance = actual quantity purchased × (AR – SR)

= 13,000 × ($22.70 – 21.80)
= $11,700 Unfavourable

b) Direct materials quantity variance = SP × (actual quantity used – standard quantity allowed)

= $21.80 × [13,500 – (3,500 × 4 kg)]
= $21.80 × (13,500 – 14,000)
= $10,900 Favourable

c) DL rate variance = AH × (AR – SR)

= 1,900 × (18.00* – 20.00)
= $3,800 Favourable

* $38,000 × 90% ÷ 1,900 hours = $18.00

d) DL efficiency variance = SR × (AH – SHA)

= $20 × [1,900 – (0.5 × 3,500)]
= $20 × (1,900 – 1,750)
= $3,000 Favourable

e) According to the direct materials price variance, the higher-quality direct materials cost $0.90 more per kilogram. However, this was offset by the more efficient use of this material: production used 0.15 kg less per rifle (4 – [13,500/3,500]). While the materials efficiency will not entirely offset the higher cost of the materials, when combined with the additional savings on labour of $3,000 it will result in a total cost reduction of $2,200 (or, $0.63 per rifle).

f) **The CPA Way: Analyze Major Issues**

Markman Industries is concerned with the number of customer complaints relating to its product. Management is associating this complaint with the quality of the direct materials used to manufacture the product and has addressed it by sourcing higher-quality direct materials. While this has had an immediate positive effect on direct materials usage, there needs to be a way to continue monitoring the effect of direct materials quality on customer satisfaction, direct materials costs, and sales.

The CPA Way: Conclude and Advise

The implementation of a dashboard would provide management with highlights of key performance indicators necessary to monitor the following:

- customer satisfaction in relation to direct materials quality
- effects on costs
- effects on revenues

The key performance indicators would consist of the following:

- customer satisfaction rating scale in relation to target
- direct materials price variance and quantity variance within an acceptable range
- actual percentage sales increase in relation to a target increase
- optimal point where the revenues resulting from an increase in sales due to better-quality material are greater than the change in cost due to purchasing and using that material

Sources of data to report key performance indicators:

- customer surveys, return rates, and social networks where product is sold/discussed
- direct materials, standard cost and usage, and actual cost and usage
- tolerance levels for direct materials price and quantity variances
- sales revenues/quantities

Ways in which the data could be formatted on the dashboard:

- trend lines to show sales revenues in relation to product quality or product cost and customer satisfaction
- gauges to illustrate tolerance levels for direct materials price and quantity variances
- regression analysis data for the correlation between customer satisfaction and quality of direct materials

There are a number of other ways in which this problem could be addressed. Another approach is to take this one step further by including data from several qualified suppliers of the direct materials that have been used in the past. The level of customer satisfaction could also be assessed along with the change in sales and direct materials costs.

Solution to Question 5

a) **The CPA Way: Analyze Major Issues**

Expected variable cost to make:

Estimated variable manufacturing cost per sensor	Probability of occurrence	Weighted manufacturing cost
$12	10%	$1.20
$15	30%	$4.50
$18	40%	$7.20
$21	20%	$4.20
TOTAL	100%	$17.10

Cost to buy (18,000 ÷ 0.90 × $21.00)		$420,000
Cost to make:		
Variable costs (18,000 ÷ 0.95 × $17.10)	$324,000	
Annual fixed costs	42,500	366,500
Annual savings if sensors are made		$ 53,500

The CPA Way: Conclude and Advise

The company will save $53,500 a year if it makes the sensors rather than buying them, based on the current price and cost information.

b) This question relates to uncertainty and data veracity. Using internal data that does not relate specifically to the process tends to increase the range of costs and the potential for error. Better sources of data could be the following:

- operations statistics from the supplier of the manufacturing equipment specific to the manufacture of the sensors
- external costing data relating to the steel that is being used for the process
- online sources of statistical modelling and simulation to determine better ways to manufacture the sensors

NOTE: This list is not exhaustive. The key point of this solution is to understand that reliable data sources (data with high veracity) tend to reduce uncertainty.