# BU247 W11 - ANSWERS TO SAMPLE QUESTIONS

1.

d. Sales Budget in Dollars

| | January | February | March | Total |
|---|---|---|---|---|
| Budgeted sales in units | 1,000 | 1,500 | 2,500 | 5,000 |
| Selling price | x $400 | x $400 | x $400 | x $400 |
| Budgeted sales | $400,000 | $600,000 | $1,000,000 | $2,000,000 |

b. Production Budget in Units

| | January | February | March | Total |
|---|---|---|---|---|
| Budgeted sales in units | 1,000 | 1,500 | 2,500 | 5,000 |
| Add: Desired ending inventory (10% of next month's sales) | 150 | 250 | *200 | 200 |
| Total units needed | 1,150 | 1,750 | 2,700 | 5,200 |
| Less: Beginning inventory | 80 | 150 | 250 | 80 |
| Units to be produced | 1,070 | 1,600 | 2,450 | 5,120 |

*2,000 units budgeted sales for April multiplied by 10 percent.

c. Purchases Budget in Dollars

| | January | February | March | Total |
|---|---|---|---|---|
| Units to be produced | 1,070 | 1,600 | 2,450 | 5,120 |
| Multiplied by: | | | | |
| Sq. ft. of oak per unit | x 20 | x 20 | x 20 | x 20 |
| Sq. ft. of material for production | 21,400 | 32,000 | 49,000 | 102,400 |
| Add: Desired ending inventory (20% of next month's needs) | 6,400 | 9,800 | 8,000 | 8,000 |
| Total sq. ft. needed | 27,800 | 41,800 | 57,000 | 110,400 |
| Less: Beginning inventory | 11,000 | 6,400 | 9,800 | 11,000 |
| Sq. ft. to be purchased | 16,800 | 35,400 | 47,200 | 99,400 |
| Multiplied by: Cost per sq. ft. | x $10 | x $10 | x $10 | x $10 |
| Cost of raw material purchases | $168,000 | $354,000 | $472,000 | $994,000 |

g. Direct Labour Budget

| | January | February | March | Total |
|---|---|---|---|---|
| Units to be produced | 1,070 | 1,600 | 2,450 | 5,120 |
| Direct labour hours per unit | x 5 | x 5 | x 5 | x 5 |
| Direct labour hours needed | 5,350 | 8,000 | 12,250 | 25,600 |
| Labour cost per hour | x $8 | x $8 | x $8 | x $8 |
| Total direct labour cost | $42,800 | $64,000 | $98,000 | $204,800 |

# BU247 W11 - ANSWERS TO SAMPLE QUESTIONS

Questions 1 cont'd

e. Manufacturing Overhead Budget

| | January | February | March | Total |
|---|---|---|---|---|
| Budgeted direct labour hours | 5,350 | 8,000 | 12,250 | 25,600 |
| Variable overhead rate | x $2 | x $2 | x $2 | x $2 |
| Budgeted variable overhead | $10,700 | $16,000 | $24,500 | $51,200 |
| Budgeted fixed overhead: | | | | |
| Supervisors' salaries | 6,000 | 6,000 | 6,000 | 18,000 |
| Insurance | 2,000 | 2,000 | 2,000 | 6,000 |
| Depreciation - equipment | 500 | 500 | 500 | 1,500 |
| Depreciation - facility | 10,000 | 10,000 | 10,000 | 30,000 |
| Total fixed overhead | 18,500 | 18,500 | 18,500 | 55,500 |
| Total budgeted overhead | $29,200 | $34,500 | $43,000 | $106,700 |

f. Cash Collections on Accounts Receivable

| | January | February | March | Total |
|---|---|---|---|---|
| Opening Acc. Rec. | *$200,000 | $ 160,000 | $240,000 | $200,000 |
| Add: sales | 400,000 | 600,000 | 1,000,000 | 2,000,000 |
| Due from customers | 600,000 | 760,000 | 1,240,000 | 2,200,000 |
| Cash collection: | | | | |
| 60% curr. month | 240,000 | 360,000 | 600,000 | 1,200,000 |
| 35% prev. month | **175,000 | 140,000 | 210,000 | 525,000 |
| Total cash collections | (415,000) | (500,000) | (810,000) | (1,725,000) |
| Deduct: write-offs: | | | | |
| 5% of prev. month | (25,000) | (20,000) | (30,000) | (75,000) |
| Closing Acc. Rec. | $160,000 | $240,000 | $400,000 | $400,000 |

*40% of December sales of $500,000 **35% of December sales of $500,000

a. Cash Payments on Accounts Payable

| | January | February | March | Total |
|---|---|---|---|---|
| Opening Acc. Pay. | *$54,000 | $ 50,400 | $106,200 | $54,000 |
| Add: purchases | 168,000 | 354,000 | 472,000 | 994,000 |
| Amount owing to suppliers | 222,000 | 404,400 | 578,200 | 1,048,000 |
| Deduct Payments: | | | | |
| 70% curr. month | 117,600 | 247,800 | 330,400 | 695,800 |
| 30% prev. month | 54,000 | 50,400 | 106,200 | 210,600 |
| Total cash payments | (171,600) | (298,200) | (436,600) | (906,400) |
| Closing Acc. Pay. | $ 50,400 | $106.200 | $141,600 | $141,600 |

*30% of December purchases of $180,000

Questions 1 cont'd

h. Pro Forma Income Statement

| | January | February | March | Total |
|---|---|---|---|---|
| Sales | $400,000 | $600,000 | $1,000,000 | $2,000,000 |
| Variable Expenses | | | | |
| Production Expenses* | 250,000 | 375,000 | 625,000 | 1,250,000 |
| S&A Expenses (5% of sales) | 20,000 | 30,000 | 50,000 | 100,000 |
| Bad Debt Expenses (5%) | 20,000 | 30,000 | 50,000 | 100,000 |
| Total Variable | 290,000 | 435,000 | 725,000 | 1,450,000 |
| Contribution Margin | 110,000 | 165,000 | 275,000 | 550,000 |
| Fixed Expenses | | | | |
| Fixed Manu. O/H | 18,500 | 18,500 | 18,500 | 55,500 |
| Fixed S&A Expenses | 50,000 | 50,000 | 50,000 | 150,000 |
| Total Fixed | 68,500 | 68,500 | 68,500 | 205,500 |
| Operating Income | 41,500 | 96,500 | 206,500 | 344,500 |
| Interest Income | 0 | **1,000 | ***1,417 | 2,417 |
| Net Income before taxes | 41,500 | 97,500 | 207,917 | 346,917 |
| Income Tax Expense | 16,600 | 39,000 | 83,167 | 138,767 |
| Net Income | $24,900 | $58,500 | $124,750 | $208,150 |

*Consists of the following costs per unit:

| | |
|---|---|
| Direct materials (20 sq. ft. x $10 per sq. ft.) | $ 200 |
| Direct labour (5 hours per unit x $8 per hour) | 40 |
| Variable overhead (5 hours per unit x $2 per hour) | 10 |
| Total variable production costs per unit | $250 |

**$120,000 invested at the end of January x 10% return x 1/12 = $1,000

***$120,000 + $50,000 invested at the end of February x 10% return x 1/12 = $1,417

# BU247 W11 - ANSWERS TO SAMPLE QUESTIONS

2.

a. (i) Direct material standard cost:
10 × $6 = $60 per unit

(ii) Direct labour standard cost:
3 × $10 = $30 per unit

b. (i) Direct material:
Price variance = ($6.25 - $6.00) × 10,500 = $2,625 unfavourable
Usage variance = (10,500 - 10,000) × $6 = $3,000 unfavourable

| Actual Quantity × Actual Price | Actual Quantity × Standard Price | Standard Quantity × Standard Price |
|---|---|---|
| 10,500 x $6.25 | 10,500 x $6.00 | 10,000 x $6.00 |
| $65,625 | $63,000 | $60,000 |

Price Variance $2,625U
Usage Variance $3,000U
$5,625U

(ii) Direct labour:
Price variance = ($10.50 - $10.00) × 2,900 = $1,450 unfavourable
Usage variance = (2,900 - 3,000) × $10.00 = $1,000 favourable

| Actual Hours × Actual Rate | Actual Hours × Standard Rate | Standard Hours × Standard Rate |
|---|---|---|
| 2,900 x $10.50 | 2,900 x $10.00 | 3,000 x $10.00 |
| $30,450 | $29,000 | $30,000 |

Price Variance $1,450U
Usage Variance $1,000F
$450U

# BU247 W11 - ANSWERS TO SAMPLE QUESTIONS

3.

a. The Produce Division's avoidable costs are as follows:

| | | |
|---|---|---|
| Direct materials | $ 8.50 | |
| Direct labour | 12.50 | |
| Variable overhead | 2.50 | |
| Fixed overhead | 0.80 | ($2.40/3) |
| | $24.30 | - $28.00 = $(3.70) |

The company would lose $3.70 per unit if the Produce Division ceased to produce the part.

b. The transfer price should be negotiated between the Can and Produce Divisions and should fall between the total avoidable cost of $24.30 and the market price of $28.

# BU247 W11 - ANSWERS TO SAMPLE QUESTIONS

4.

Direct material:

Price variance = ($17 - $15) × 1,750 = $3,500 unfavourable

Usage variance = [1,750 - (400 × 4)] × $15 = $2,250 unfavourable

Flexible-budget variance = $3,500 U + $2,250 U = $5,750 unfavourable

Direct labour:

Price variance = ($14 - $15) × 850 = $850 favourable

Usage variance = [850 - (400 × 2)] × $15 = $750 unfavourable

Flexible-budget variance = $850 F - $750 U = $100 favourable

# BU247 W11 - ANSWERS TO SAMPLE QUESTIONS

5.

a.

The lower boundary of the bargaining range would be the selling division's variable cost of $25. This would be the minimum amount the selling division would accept.

b.

The upper boundary of the range would be $100 (the amount the buying division would pay an outside supplier).

c.

If the D division could sell 8,000 units to outside customers for $100 each, the D division would have to receive $100 per unit from the J division.

If the D division sells to the J division, it foregoes $100 per unit from outside customers. Therefore, to be as well off, the D division must receive $100 per unit from the J division.

# BU247 W11 - ANSWERS TO SAMPLE QUESTIONS

6.

a.

$300,000 × 15 percent = $45,000

b.

$45,000/8 percent = $562,500

c.

$45,000 - ($300,000 × 12 percent) = $9,000

d.

$90,000/9 percent = $1,000,000

e.

$90,000/$400,000 = 22.5 percent (f must be calculated first)

f.

$1,000,000/2.5 = $400,000

g.

$90,000 - $30,000 = $400,000 × cost of capital

$60,000 = $400,000 × cost of capital

$60,000/$400,000 = 15 percent

h.

$70,000 × 12 percent = $8,400

i.

$8,400/$168,000 = 5 percent

j.

$8,400 - ($70,000 × 10 percent) = $(1,400)

| | Division A | Division B | Division C |
|---|---|---|---|
| Income | ***$45,000*** | $90,000 | ***$8,400*** |
| Revenue | ***$562,500*** | ***$1,000,000*** | $168,000 |
| ROI | 15% | ***22.5%*** | 12% |
| Invested capital | $300,000 | ***$400,000*** | $70,000 |
| Return on sales | 8% | 9% | ***5%*** |
| Cost of capital | 12% | ***15%*** | 10% |
| Residual income | ***$9,000*** | $30,000 | ***$(1,400)*** |

# BU247 W11 - ANSWERS TO SAMPLE QUESTIONS

7.

a.

| Investment Opportunity | Income | Investment | ROI |
|---|---|---|---|
| 1 | $ 80,000 | $200,000 | 40% |
| 2 | 120,000 | 600,000 | 20% |
| 3 | 80,000 | 500,000 | 16% |
| 4 | 50,000 | 200,000 | 25% |

If the division manager accepts only project 1, his ROI will be 40%. Accepting any of the other projects would lower his ROI. For example, if the divisional manager accepts project 1 and project 4, his ROI would drop from 40% to 32.5%, calculated as follows:

ROI = ($80,000 + $50,000)/($200,000 + $200,000) = 32.5%

b.

If the divisional manager is evaluated based on RI, he or she would accept any project that has a return of 20% or more since the firm uses a required return of 20% when calculating RI. Therefore, the manager would accept projects 1, 2, and 4.

c.

The president of the firm would want the division to accept any project with a return in excess of the firm's required return of 20%. Using RI would encourage the divisional manager to take this action.

# BU247 W11 - ANSWERS TO SAMPLE QUESTIONS

8.

a.
The transfer price would be the market price of $120 each.

If division R sells to division J, it would forego $120 per unit; therefore, to be as well off, division R must receive $120 per unit from division J. Division J would pay the market price of $120 whether it purchased the component from division R or from an outside supplier.

b.
The floor of the bargaining range is $60 per unit (division R's variable cost to produce the component).

The ceiling of the range would be the lower of:

a. the buying division's outside purchase price ($150), or
b. the transfer price that results in a zero contribution margin on the goods for the buying division ($200 - $40 variable cost = $160).

The ceiling would be $150 (the amount division J would pay to acquire the component from an outside supplier).

# BU247 W11 - ANSWERS TO SAMPLE QUESTIONS

9.

Incremental Analysis of accepting the Street Bob Project (SBP) instead of the Night Bob Project (NBP):

| | | Year | | | | |
|---|---|---|---|---|---|---|
| Present Value | Discount Factor | 0 | 1 | 2 | 3 | 4 |
| 10,000 | 1 | 10,000 | | | | |
| | | | (20,000) | (15,000) | 19,000 | 35,000 |
| | | | 9,800 | 9,750 | (670) | (5,150) |
| (8,947) | 0.8772 | | (10,200) | | | |
| (4,040) | 0.7695 | | | (5,250) | | |
| 12,373 | 0.675 | | | | 18,330 | |
| 17,674 | 0.5921 | | | | | 29,850 |
| 2,914 | 2.9137 | | 1,000 | 1,000 | 1,000 | 1,000 |
| 5,921 | 0.5921 | | | | | 10,000 |
| 35,894 | | | | | | |

# BU247 W11 - ANSWERS TO SAMPLE QUESTIONS

10.

a. $100,000 + $170,000 + $300,000 + $35,000 = $605,000 to make
versus
$64 × 10,000 units = $640,000 to buy.
Continue to make the part for a savings of $35,000.

b. $640,000 - $50,000 = $590,000 net cost to buy
versus
$605,000 to make.
Recommend to buy the part which will save the company $15,000

# BU247 W11 - ANSWERS TO SAMPLE QUESTIONS

11.

Since direct labour hours are limited, the company should first produce the product that has the highest contribution margin per direct labour hour.

| | 12-07 | 19-01 |
|---|---|---|
| Contribution margin per unit | $10 | $ 8 |
| Divided by Direct labour hours required per unit | 5 | 2 |
| Contribution margin per DLH | $ 2 | $ 4 |

To maximize contribution margin, the Royer Company should produce:

10,000 units of 19-01
And
4,000 units of 12-07.

| Product | Units | DLH Per Unit | DLH |
|---|---|---|---|
| 19-01 | 10,000 | 2 | 20,000 |
| 12-07 | 4,000 | 5 | 20,000 |
| Totals | 14,000 | | 40,000 |

# BU247 W11 - ANSWERS TO SAMPLE QUESTIONS

12.

a. Van Sickle should:

- Process Product F further, as this will add to profits.
- Be indifferent as far as Product D goes, since there is no additional profit in processing it further.

b.

| Product D: | |
|---|---|
| Additional revenue ($52,500 - $42,500) | $10,000 |
| Additional cost | 11,000 |
| Net loss | $ 1,000 |

| Product E: | |
|---|---|
| Additional revenue ($102,500 - $ 82,500) | $20,000 |
| Additional cost | 27,000 |
| Net loss | $ (7,000) |

| Product F: | |
|---|---|
| Additional revenue ($187,500 - $120,000) | $67,500 |
| Additional cost | 57,500 |
| Net profit | $10,000 |

13.

| | |
|---|---|
| Cash flow from operations ($100,000 - $30,000) | $70,000 |
| Less: income tax (15 percent) | 10,500 |
| | $59,500 |
| Plus: cash effects of amortization ($850,000 × .3 × 15 %) | 38,250 |
| Total net after-tax inflow | $97,750 |

# BU247 W11 - ANSWERS TO SAMPLE QUESTIONS

14.

a. Payback Period = Capital Investment/Annual Net Cash Inflows
= $200,000/$50,000
= 4 years

b. Internal Rate of Return:

Use the following equation to solve for the present value factor.

Investment = Annual Cash Flows x Annuity Discount Factor
$200,000 = $50,000 x Annuity Discount Factor

Annuity Discount Factor = 4

Under 5 years in the present value Table of annuity the discount factor of 4 falls between 6% and 8%.

The exact IRR can be determined using interpolation:

| | | |
|---|---|---|
| Discount Factor 6% | 4.212 | 4.212 |
| Discount Factor - IRR | 4.000 | |
| Discount Factor 8% | _____ | 3.993 |
| | .212 | .219 |

IRR = 6% + [2% x (.212/.219)] = 7.94%

c. NPV using a 6% discount rate:

| | |
|---|---|
| Investment | ($200,000) |
| Present value of cash inflows: | |
| (Cash Inflow x Annuity Discount Factor, 5 years, 6%) | |
| ($50,000 x 4.212) | 210,600 |
| Net Present Value | $ 1 0,600 |

# BU247 W11 - ANSWERS TO SAMPLE QUESTIONS

15.

a. The minimum transfer price should be the total of all variable costs per unit as follows:

$2.20 + $1.60 + $0.50 + $0.40 = $4.70 per zipper

b. The maximum transfer price should be equal to the market price of $7.00 per zipper.

# BU247 W11 - ANSWERS TO SAMPLE QUESTIONS

16.
a.

| Investment Opportunity | Income | Investment | ROI |
|---|---|---|---|
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