CMA APRIL 2019 SPECIAL EXAMINATION

PROFESSIONAL LEVEL –IV

SUBJECT: 402. STRATEGIC MANAGEMENT ACCOUNTING

Model Solution

Solution to the question No. 1

(a)

Economic value added (EVA) is a specific type of residual income measure that is calculated as follows:

Economic value added (EVA) = Adjusted operating income – (WACC x (Total assets – Current liabilities))

Operating income is adjusted as follows:
Operating income $ 630,000
Add back this period's advertising expense 90,000
Less amortized advertising (1/4 of year's expense) (22,500)
Adjusted operating income $ 697,500

Assets are adjusted as follows:
Total assets $5,550,000
Plus capitalized, unamortized advertising 67,500
Adjusted total assets $5,617,500

EVA = $697,500 – (0.09 × ($5,617,500 − $800,000))
= $697,500 − $433,575
= $263,925

(b)

i.

The operating income is:
Sales revenue ($12,000 × 10,000) $120,000,000
Less:
Direct materials ($3,000 × 10,000) $30,000,000
Setup ($1,300 × 6,000) 7,800,000
Production ($415 × 175,200) 72,708,000110,508,000
Gross margin 9,492,000
Selling and administration 7,340,000
Operating income $ 2,152,000

Average invested capital is ($13,500,000 + $13,400,000) ÷ 2 = $13,450,000

ROI = $ 2,152,000 = 16%
$13,450,000

ii.

Residual income = Operating income − (12% × Invested capital)
= $2,152,000 − (12% × $13,450,000)
= $2,152,000 − $1,614,000
= $538,000

(c)

Let the firm produce *x*1 units of product A, *x*2 units of products B and *x*3 units of product C.
The profit per unit of products A, B and C is Taka 50, 50, and Taka 80 respectively. Since the objective of the firm is to maximize the profit, therefore, the objective function is given by

Maximise Z = $50x_1 + 50x_2 + 80x_3$

The firm uses two types of raw materials I and II of which 5,000 and 7,500 units respectively are available. As per the given data, the raw material constraints can be formulated as given below:-

$3x_1 + 4x_2 + 5x_3 \le 5{,}000$ ...(i)

and $5x_1 + 3x_2 + 5x_3 \le 7{,}500$ ...(ii)

The labour time for each unit of product A is twice that of product B and three times that of product C. Also the entire labour force can produce the equivalent of 3000 units.

$x_1+\frac{x_2}{2}+\frac{x_3}{3} \le 3000$

or $6x_1 + 3x_2 + 2x_3 \le 18000$ ...(iii)

The minimum demand of the three products is 600, 650 and 500 units respectively.

Hence, $x_1 \ge 600$, $x_2 \ge 650$ and $x_3 \ge 500$ ...(iv)

Since the ratios of the number of units produced must be equal to 2: 3: 4, therefore,

$1/2\ x_1 = 1/3\ x_2$, and $1/3\ x_2 = 1/4\ x_3$

or $3x_1 = 2x_2$ and $4x_2 = 3x_3$ ...(v)

The linear programming model can be formulated as follows:

Maximize Z = $50x_1 + 50x_2 + 80x_3$

Subject to the constraints:

$3x_1 + 4x_2 + 5x_3 \le 5000$
$5x_1 + 3x_2 + 5x_3 \le 7500$
$6x_1 + 3x_2 + 2x_3 \le 18000$
$3x_1 = 2x_2$ and $4x_2 = 3x_3$
$x_1 \ge 600$, $x_2 \ge 650$ and $x_3 \ge 500$.

Solution to the question No. 2

(a)

Three methods that companies use to identify quality problems are:

(i) **a control chart** which is a graph of a series of successive observations of a particular step, procedure, or operation taken at regular intervals of time;

(ii) **a Pareto diagram**, which is a chart that indicates how frequently each type of failure (defect) occurs, ordered from the most frequent to the least frequent; and

(iii) **a cause-and-effect diagram,** which helps identify potential causes of defects using a diagram that resembles the bone structure of a fish.

(b)

i. Appraisal cost = Inspection cost = \$4 × 250,000 car seats = \$1,000,000
Internal failure cost = Rework cost = 9% × 250,000 × \$0.75 = 22,500 × \$0.75 = \$16,875
Out of pocket external failure cost = Shipping cost + Repair cost
= 3% × 250,000 × (\$7 + \$0.75)
= 7,500 × \$7.75
= \$58,125
Opportunity cost of external failure = Lost future profits
= (3% × 250,000) × 20% × \$300
= 1,500 car seats × \$300
= \$450,000

Total cost of quality control = \$1,000,000 + \$16,875 + \$58,125 + \$450,000 = \$1,525,000

ii. Quality control costs under the alternative inspection technique:
Appraisal cost = \$1 × 250,000 = \$250,000
Internal failure cost = 5% × 250,000 × \$0.75 = \$9,375
Out-of-pocket external failure cost = 7% × 250,000 × (\$7 + \$0.75)
= 17,500 × \$7.75

= $135,625
Opportunity cost of external failure = 17,500 car seats × 20% × $300
= 3,500 car seats × $300
= $1,050,000

Total cost of quality control = $250,000 + $9,375 + $135,625 + $1,050,000 = $1,445,000

(c) Annual Relevant Costs of Current Production System and JIT Production System for Champion Hardware Company

Relevant Items	Relevant Costs under Current Production System	Relevant Costs under JIT Production System
Annual tooling costs	-	100,000
Required return on investment:		
15% per year 1,000,000 of average inventory per year	150,000	
15% per year 200,000[a] of average inventory per year		30,000
Insurance, space, materials handling, and setup costs	300,000	225,000[b]
Rework costs	200,000	140,000[c]
Incremental revenues from higher selling prices	–	(160,000)[d]
Total net incremental costs	650,000	335,000
Annual difference in favor of JIT production	315,000	
[a] 1,000,000 (1 – 80%) = 200,000 [b] 300,000 (1 – 0.25) = 225,000 [c] 200,000 (1 – 0.30) = 140,000 [d] 4 × 40,000 units = 160,000		

The annual net benefit of 315,000 to Champion Hardware Company of implementing a JIT production system.

Solution to the question No. 3

Required (A):
The expected returns p.a from each system at 2019

	Low Demand	High Demand Taka
System A	TK 20,000 x.4	TK70,000x.6= 50,000
System B	TK 25,000 x.4	TK70,000x.6=52,000
System C	TK32,000 x.4	TK80,000x.6=60,800

i. With 15%inflation: System A

Year	Flow	Actual flow	PV @20%
0	-1,00,000	-1,00,000	-1,00,000
1	50,000	50,000	41,667
2	50,000x1.15	57,500	39,931
3	50000x1.15x1.15	66125	38267
1-3	-4000	-4000	-8426
3	10000	10000	5787
NPV			**17226**

System B

Year	Flow	Actual flow	PV @20%
0	-130000	-130000	-130000
1	52000	52000	43333
2	52000x1.15	59800	41528
3	52000x1.15x1.15	68770	39797
1-3	-5000	-5000	-10532
3	15000	15000	8681
NPV			**-7193**

System C

Year	Flow	Actual flow	PV @20%
0	-150000	-150000	-150000
1	60800	60800	50667
2	60800x1.15	69920	48556
3	60800x1.15x1.15	80408	46532
1-3	-8000	-8000	-16852
3	15000	15000	8681
NPV			**-12416**

ii. With 25%inflation: System A

Year	Flow	Actual flow	PV @20%
0	-1,00,000	-1,00,000	-1,00,000
1	50,000	50,000	41,667
2	50,000x1.25	62,500	43403
3	50000x1.25x1.25	78125	45211
1-3	-4000	-4000	-8426
3	10000	10000	5787
NPV			**27642**

System B

Year	Flow	Actual flow	PV @20%
0	-130000	-130000	-130000
1	52000	52000	43333
2	52000x1.25	65000	45139
3	52000x1.25x1.25	81250	47020
1-3	-5000	-5000	-10532
3	15000	15000	8681
NPV			**3641**

System C

Year	Flow	Actual flow	PV @20%
0	-150000	-150000	-150000
1	60800	60800	50667
2	60800x1.25	76000	52778
3	60800x1.25x1.25	95000	54977
1-3	-8000	-8000	-16852
3	15000	15000	8681
NPV			**251**

Therefore expected NPVs are

System A TK17226x.3+ 27642x.7= 24517

System B TK-7193x.3+ 3641x.7= 391

System C TK-12416x.3+ 251x.7= -3549

Therefore, Machine A should be purchased.

Required (B)

Additional factors that may affect the decision:

- Customers demand & Design for digital Watch
- Environment for the market
- Regulation & Taxation impact

Required (C)

Limitations of using expected value as a criterion for making investment decision under uncertainty:

- The probabilities used are usually very subjective.
- The EV is merely a weighted average and therefore has little meaning for a one-off project.
- The EV gives no indication of the dispersion of possible outcomes about the EV, i.e. the risk.
- The EV may not correspond to any of the actual possible outcomes.

Solution to the question No. 4

Required (a):
FIVE benefits of product life cycle costing.

1. All costs (production and non-production) will be traced to individual products over their complete life cycles and hence individual product profitability can be more accurately measured.

2. The product life cycle costing results in earlier actions to generate revenue or to lower costs than otherwise might be considered.

3. Better decisions should follow from a more accurate and realistic assessment of revenues and costs, at least within a particular life cycle stage.

4. Product life cycle thinking can promote long-term rewarding in contrast to short-term profitability rewarding.

5. It helps management to understand the cost consequences of developing and making a product and to identify areas in which cost reduction efforts are likely to be most effective. Very often, 90% of the product's life-cycle costs are determined by decisions made in the development stage. Therefore, it is important to focus on these costs before the product enters the market.

Required (b):
Five reasons that may account for unsuccessful implementation of a budgetary control system.

1. Participation: There has lack of people involve from other department. We should involve as many people as possible in drawing up a budget.
2. Comprehensiveness: embrace the whole organization. Normally we make the budget from Finance department.
3. Standards: base it on established standards of performance.
4. Flexibility: allow for changing circumstances.
5. Feedback: constantly monitor performance
6. Analysis of costs and revenues: this can be done on the basis of product lines, departments or cost centres.

Required (c):
Give two reasons why the dual-pricing system of transfer pricing is not widely used:
1. It leads to problems in computing the taxable income of subunits located in different tax jurisdictions
2. It insulates managers from the frictions of the marketplace since market prices don't affect the revenues of the supplying division.

Multinationals companies can use (or misuse) transfer pricing practice by altering their taxable income, thus reducing their overall taxes. The transfer pricing mechanism is a way that companies can shift tax liabilities to low-cost tax jurisdictions.

Required (d)
- **i.** See column (1) of the following Table. The net cost of the in-house option is $570,000.
- **ii.** See columns (2a) and (2b) of following Table

	Transfer 20,000 CD players to Assembly. Sell 2,000 in outside market at $45 each (1)	**Buy 20,000 CD players from Hawei at $44. Sell 22,000 CD players in outside market at $45 each (2a)**	**Buy 20,000 CD players from Hawei at $51. Sell 22,000 CD players in outside market at $45 each (2x)**	**Buy 20,000 CD players from Hawei at $52. Sell 22,000 CD players in outside market at $45 each (2b)**
Incremental cost of CD Division supplying 20,000 CD players to Assembly Division $30 20,000; 0; 0; 0	$(600,000)	$ 0	$ 0	$ 0
Incremental costs of buying 20,000 CD players from Hawei $0; $44 20,000; $51 20,000; $52 20,000	0	(880,000)	(1,020,000)	(1,040,000)
Revenue from selling CD players in outside market $45 2,000; 22,000; 22,000; 22,000	90,000	990,000	990,000	990,000
Incremental costs of manufacturing CD players for sale in outside market $30 2,000; 22,000; 22,000; 22,000	(60,000)	(660,000)	(660,000)	(660,000)
Revenue from supplying head mechanism to Hawei $24 0; 20,000; 20,000; 20,000	0	480,000	480,000	480,000
Incremental costs of supplying head mechanism to Hawei $18 0; 20,000; 20,000; 20,000	0	(360,000)	(360,000)	(360,000)
Net costs	**$(570,000)**	**$(430,000)**	**$(570,000)**	**$ (590,000**

Comparing columns (1) and (2a), at a price of $44 per CD player from Hawei, the net cost of $430,000 is less than the net cost of $570,000 to Bosh Corporation if it made the CD players in-house. So, Bosh Corporation should outsource to Hawei.

Comparing columns (1) and (2b), at a price of $52 per CD player from Hawei, the net cost of $590,000 is $20,000 is greater than the net cost of $570,000 to Bosh Corporation if it made the CD players in-house. Therefore, Bosh Corporation should reject Hawei's offer.

Now consider column (2x) of Solution Table. It shows that at a price of $51 per CD player from Hawei, the net cost is exactly $570,000, the same as the net cost to Bosh Corporation of manufacturing in-house (column 1). Thus, for prices between $44 and $51, Bosh will prefer to purchase from Hawei. For prices greater than $51 (and up to $52), Bosh will prefer to manufacture in-house.

iii.

The CD Division can manufacture at most 22,000 CD players and it is currently operating at capacity. The incremental costs of manufacturing a CD player are $30 per unit. The opportunity cost of manufacturing CD players for the Assembly Division is (1) the contribution margin of $15 (selling price, $45 minus incremental costs $30) that the CD Division would forgo by not selling CD players in the outside market plus (2) the contribution margin of $6 (selling price, $24 minus incremental costs, $18) that the CD Division would forgo by not being able to sell the head mechanism to external suppliers of CD players such as Hawei (recall that the CD division can produce as many head mechanisms as demanded by external suppliers, but their demand will fall if the CD Division supplies the Assembly Division with CD players). Thus, the total opportunity cost to the CD Division of supplying CD players to Assembly is $15 + $6 = $21 per unit.

Using the general guideline,
Minimum transfer price = Incremental cost up to the point of transfer + Opportunity cost
= $30 + $21 = $51

Thus, the minimum transfer price that the CD Division will accept for each CD player is $51. Note that at a price of $51, Bosh is indifferent between manufacturing CD players in-house or purchasing them from an external supplier.

=THE END =