Institute of Incorporated Public Accountants

Module 13:

Advanced Management Accounting

May 2015

Instructions: **Answer five questions**

You must answer the three questions in Section A

Answer any two questions in Section B

All questions carry equal marks

Time Allowed: **3 Hours**

Section A - Compulsory Answer all three questions

Question 1

(i) Calculate the variable overhead rate per unit. [2 marks]

(ii) Calculate the Net profit under each volume. [6 marks]

(iii) Comment briefly as to which option is preferable. [3 marks]

(iv) Calculate the margin of safety under each volume. [3 marks]

(v) If the sales price is €74.00 per unit calculate the number of units required to be sold to make a net profit of €3,000,000 [3 marks]

(vi) Calculate by what percentage the sales price of €74 per unit would have to change if net profit of €3,000,000 to be achieved with an unchanged volume of .170,000 [3 marks]

Total **[20 marks]**

(a) Increase in total overhead €1,725,000-€1,600,000 = €125,000
=€5.00 per unit

Increase in units 145,000 u -120,000u 25,000u

(b)

Sales price per unit of Zilgon	€80.00	€77.00	€74.00
Production / Sales units	120,000 u	145,000 u	170,000 u
Sales revenue	€9,600,000	€11,165,000	€12,580,000
Input H 586	€3,000,000	€3,625,000	€4,250,000
Labour costs	€2,400,000	€2,900,000	€3,400,000
Variable overheads	€600,000	€725,000	€850,000
Contribution	€3,600,000	€3,915,000	€4,080,000
Fixed Overheads	€1,000,000	€1,000,000	€1,000,000
Marketing Budget	€120,000	€130,000	€140,000
Net Profit	**€2,480,000**	**€2,785,000**	**€2,940,000**

[6 marks]

(c) The volume of 140,000 units @€74 sales price shows the biggest contribution and the biggest net profit. Labour however is at full capacity which means there is no spare capacity for re-workings etc

[2 marks]

(d) Margin of Safety $\frac{\text{Actual sales level units minus B/E sales level units}}{\text{Actual sales level units}}$

Sales price per unit of Zilgon	€80.00	€77.00	€74.00
Production / Sales units	120,000 u	145,000 u	170,000 u
Total fixed costs	€1,120,000	€1,130,000	€1,140,000
Contribution per unit	€30.00	€27.00	€24.00
Calculate break even	37,333 u	41,852 u	47,500 u
Margin of safety %	69%	71%	72%

Answer should be for €74 but marks for correctly computing M/S for one of the other volumes. [3 marks]

(e) Target profit of €3,000,000 + TFC €1,140,000 [at SP of €74] =172,500 units

Contribution per unit €24 [at S.P. of €74] **[3 marks]**

(f) No change in volume, % change required in sales price of €74 to achieve target net profit of €3,000,000

			170,000 u
Target profit			€3,000,000
Total variable Costs	€50.00	per unit	€8,500,000
Total fixed costs	€1,000,000	€140,000	€1,140,000
Thus target revenue required			€12,640,000
divided by			170,000 u
Required sales price per unit			€74.35
Price change			0.48%

[4 marks]

Question 2 solution

(i) There was already in stock 1,500 units of Tylon which the company had planned to sell to an overseas buyer at a discount of 60% of its original sale price of €60

Comment: Opportunity costs 1,500 u x €24 [€60 x 40%] equals €36,000

(ii) Tylon requires 0.8 litres per unit of product of a chemical called T56 There are currently 1,200 litres in stock which were purchased at €5.00 per litre. The company has no other use for T56 and its current purchase price has risen to €5.75

Comment : [10,000u-1,500u] x0.80 litres =6,800 litres required
[6,800 litres -1,200 litres in stock] x €5.75
equals €32,200

(iii) Tylon also requires 0.50 litres per unit of product of a chemical called B 50 There are 4,500 litres in stock purchased at a price of €4.50. Due to its toxic nature, it had been planned to have it disposed of safely by a green energy company at a cost €1.85 per litre

Comment [10,000u-1,500u] x 0.50 litres x €1.85 equals savings of (€7,863)

(iv) Labour cost are €10 per hour and it requires 1.50 hours of labour for each unit of output

Comment 1 [10,000u-1,500u] x 1.50 hours=12,750 hr x €10 equals €127,500

Comment 2

Contribution of a unit of Zilgon is €24[SP€74-DM€25+DL€20+VAR O/H€5]

Contribution per limiting factor is €24 divided by 2 hours equals €12

Opportunity cost 12,750 hours x €12 equals €153,000

(v) Variable overheads are charged at the same rate per unit as in the production of Zilgon

Comment 8,500 u x €5 equals 42,500

This question continues on the next page

Question 2 continued section A

(vi) Machinery, used in relation to the production of Tylon, which was going to be sold immediately for €28,000. However if the order is accepted the sale of the machine would be postponed until the order was completed. It was estimated it could then be sold for €27,500. Depreciation of the machine is €1,800 for period during which the order would be processed.

Comment Loss in sales value –opportunity cost €500
Depreciation is not relevant

(vii) Where relevant the sales price of Zilgon, the new product, is to be assumed to be €74 per unit of output

Comment : Incorporated in point (iv) comment 2

Summarising

		In stock is 1,500u Thus to produce 8,500 units		10,000 u	1 u
	1,500u	Tylon units Opportunity cost of sale €24	1 mark	€36,000	€3.60
	6,800	T 56 [6,800 litres-1,200 litres] x €5.75	3 marks	€32,200	€3.22
8,500 u	4,250	litres of alloy at €1.85 per litre	2 marks	(€7,863)	(€0.79)
0.50					
8,500 u	12,750	Hrs x €10 per hour equals Labour-direct cost	2 marks	€127,500	€12.75
€5.00	8,500	Variable overheads	1 marks	€ 42,500	€ 4.25
	€12.00	[Zilgon €24 cont/2 hrs] x 12,750 labour hours	4 marks	€153,000	€15.30
		OC. of delayed sale of machinery:Ignore Dep	2 marks	€500	€0.05
		Total	**15 marks**	€383,838	€38.38

Question 2 section A continued

(b) Comment on other factors that should be taken into account

Will diversion and temporary stoppage of production of Zilgon cause badwill amongst new customers for Zilgon and potential loss of sales?
Does Macro Widgets plan to order more.
In that event the following issues may arise.

(i) Will they expect another minimum price quote.?

(ii) Should consideration given to expanding production capacity.

(iii) Will the continued production of Tylon affect the sales of Zilgon because it
might be considered an acceptable cheaper substitute.

(iv) Should the minimum price quoted be at least equal to that of Zilgon regardless of costs or would this destroy any hope of additional orders.

(v) Is it possible to sub-contract the order with another company?

Question 3 Section A continued

(a) Compute the optimum sales price, sales quantity and total contribution for the new product Zilgon.

Volume variance	Volume units	Sale price per unit	Sales price Variance
	120,000 u	€80.00	
25,000 u			€3.00
	145,000 u	€77.00	
25,000 u			€3.00
	170,000 u	€74.00	

Assuming a linear relationship this mean that at price of €94.40there would zero quantity of sales.
i.e. €80 plus €14.40 [120,000u/25,000u] x €3.00] equals €94.40

co-efficient $\frac{\text{Increase in sale price}}{\text{decrease in quantity}} = \frac{3}{25{,}000} = .00012$

Sales price equals €94.40 minus .00012Q

TR equals €94.40 Q minus .00012Q^2

Dtr/Q €94.40 minus .00024Q

Marginal cost is Direct Material €25 + Direct Labour €20 + Variable O/H €5=€50

Optimisation takes place when MR = MC

94.40 minus .00024Q equals €50

44.4 equals .00024Q

185,000 equal Q equals optimum quanity.

Sale price €94.40 minus .00012 x 185,000u equals €72.20

Contribution is [€72.20 minus €50] x 185,000 u equals €4,107,000
Less total fixed costs €1,140,000
Revised total net profit €2,967,000

Question 3 section A continued

(b) Would computations arrived at in (a) affect the minimum quotation price for Tylon?

The cut in sales price from €74 to €72.20 would reduce the contribution per unit of Tylon from €24 per unit to €22.20 per unit and therefore a contribution per limiting factor- labour hours- from €12.00 to €11.10 or €0.90 per labour hour
The number of labour hours involved in producing Tylon was 12,750 so that the overall quotation could be reduced by a further 12,750 x .90=€11,475

[4 marks]

(c)

(i) This is a product that has not been launched and consequently there is no actual data from which to construct an optimal price.

(ii) It might be argued that without referenced data that the range of estimated volumes of 120,000 units to 170,000 units is too short to extrapolate down by 120,000 units to zero and be confident that €94.40 is the price at which zero units would be sold instead of some lesser sales price.

(iii) The answer of 185,000 units breach the capacity limits of labour and therefore is not in fact a feasible solution unless another 30,000 labour hours can be found.

(iv) Price is not necessarily the only factor involved as can be seen from the preference of Macro Widgets for Tylon and instead of Ziglon.
Given that it is untried product it will take time to determine what factors customers will attribute to the new product.

Question 4 section B

	Actual	Budget
Sales Volumes	18,000 units	20,000 units
Total Sales revenues	€3,240,000	€3,000,000
Production volumes	18,000 units	20,000 units
Direct materials X	84,000 kilograms	80,000 kilograms
Total Material X costs	€100,800	€120,000
Direct Materials Y	102,600 kilograms	120,000 kilograms
Total Material Y costs	€451,440	€480,000
Total Labour hours	99,000 hours	100,000 hours
Total labour costs	€891,000	€1,000,000
Fixed Production overhead	€1,320,000	€1,200,000
Total size of national market	88,000 units	80,000 units

Note standard contribution is €70 i.e. €150 minus [€6+€24+€50]

Sales price variance

[A.S.P. minus Budgeted S.P.] x actual units
[€180 minus €150] x 18,000 equals €540,000 F [1 mark]

Market share

[Actual market minus budgeted market] x std % x std contribution.
[88,000 minus 80,000] x 25% x €70 €140,000 F [2 marks]

Market size

[Actual units –[Market size x std %]] x standard contribution
[18,000 -22,000 u i.e.88,000u x 25%] x €70 equals (€280,000)A [2 marks]

Material price variance

[Standard price minus Actual price] x actual inputs
Material X [€1.50 minus €1.20] x 84,000 kilograms = €25,200 F
Material Y [€4.00 minus €4.40] x 102,600 kilograms = (€41,040) A
(€15,840) A [2 marks]

Question 4 solution section B continued

Total of variances from previous page €384,160 F

Material Mix

[Actual materials in std mix –Actual materials in actual mix] x std price

DM X [186,600 kg x 40%= 74,640 kg minus 84,000 kg] x €1.50 equals
(€14,040) A [2marks]

DM Y [186,600 kg x 60%=111,960 kg minus 102,600 kg] x €4.00 equals
€37,440 F [2 marks]

Yield variance

[Std inputs for actual outputs minus actual inputs in std mix] x std. price

DM X [18,000u x 4kg =72,000 kg minus 74,640 kg] x €1.50 equals
(€3,960) A [2.marks]

DM Y [18,000 x 6 kg =108,000 kg minus 111,960 kg] x €4 equals
(€15,840) A [2 marks]

Labour Wage rate

[Std wage rate minus Actual Wage rate]
[€10 minus €9] x 99,000 hours equals €99,000 F [1 mark]

Efficiency variance

[Std input for actual output minus actual hours] x std wage rate

[18,00u0 x 5=90,000 hours minus 99,000 hours] x €10 (€90,000) A [2 marks]

Fixed overhead expenditure variance (€120,000)A[1mark]

Total variances €276,760

(g) **Budget net profit**

20,000 units x std contribution €70= €1,400,000
Less budgeted fixed costs (€1,200,000)

€,200,000
Thus actual net profit is €476,760

Computed as follows

Actual sales	€3,240,000
Total actual variable costs	(€1,443,240)
Total actual fixed costs	(€1,320,000)

€476,760 [5 marks]

Question 5 Section B

	Cumulative	**same**			
	Average time per unit	**answer**	**Cumulative**		
cumulative	**70%**	**$y=AX^{-b}$**	**Total**	**increase**	
	Tabular method	**formula**			
1	100.00	100.00	100.00	<------	1st bike (a)
2	70.00	70.00	140.00	<------	1st two bikes (b)
3	not possible	56.82	170.45		<-3rd bike
4	49.00	49.00	196.00	25.55	<-4th bike (c)
8	34.30	34.30	274.40		
15	not possible	24.82	372.31		
16	24.01	24.01	384.16	11.85	<-16th bike (e)
			(d) /|		

All can be done use formula approach. .Tabular approach included for info only
Since the learning curve affect ceases at the 16th unit then all the remaining units will take 11.85 hours to do.

	Labour	**Labour**	**Var O/H**	**Material**	**Total cost**	**Margin**	**Total**	**per**	
comment	**hrs**	**€10.00**	**25%**	**€500**		**20%**		**Bike**	**16.00**
1s Bike	100.00	€1,000	€250	€500	€1,750	€438	€2,188	€2,188	**2.00**
1st two bikes	140.00	€1,400	€350	€1,000	€2,750	€688	€3,438	€1,719	**3.00**
4th Bike	25.55	€255	€64	€500	€819	€205	€1,024	€1,024	**3.00**
1st 16	274.40	€2,744	€686	€7,600	€11,030	€2,758	€13,788	€862	**4.00**
17 to 21	59.24	€592	€148	€2,500	€3,241	€810	€4,051	€810	**4.00**

Note the 16th bike per table above took 11.85 hours after which learning curve ceases.
Thus 5 bikes [17th to 21st inclusive] is 5 x 11.85 hours =59.24 hours

Limitations of the learning curve theory

(i) Learning curve phenomenon is not always present

(ii) It assumes stable conditions at which will enable learning to take place .It is not always practicable with labour turnover

(iii) It assumes a degree of motivation amongst employees that may not be present

(iv) Breaks between repeating production of an item must not be too long or worker will forget the learning process

Question 6 section B

(a) Explain what is meant by zero based budgeting

The principal of zero based budgeting is that the budget for each cost centre should made from scratch or zero. Every item must be justified in its entirety in order to be included in next years budget.

[3 marks]

(b) Set out and discuss briefly the three steps involved in zero based budgeting- something along the following lines

Step 1

Define items or activities for which costs should be budgeted and spending decisions should be planned. This requires one to define decision packages. Decision packages are items or activities about which a decision should be made. Decision packages are used to rank activities in order of priority or preference.

Step 2

Evaluate and rank the packages in order of priority, eliminating packages whose costs exceed their value.

Step 3

Allocate resources to decision packages according to their ranking. Where resources such as money are in short supply they are allocated to the most valuable activities.

[7 marks]

(c) Set out four advantages of zero based budgeting

(i) It is possible to identify and remove inefficient operations.

(ii) It forces employees to avoid wasteful expenditures.

(iii) It responds to changes in the environment.

(iv) It can increase motivation of staff by promoting a culture of efficiency. [5 marks]

(d) Set out four disadvantages of zero based budgeting

(i) It can be time consuming with no resultant advantage.

(ii) It may call for skills such the constructing of decision packages and their ranking which management does not possess.

(iii) The ranking of decision packages may be difficult particularly those with qualitative rather than quantitative characteristics.

(iv) The organisation's information systems may not be capable of providing suitable information. [5 marks]