



Institute of Incorporated Public Accountants

Module 13:

**Advanced Management
Accounting**

2013

Instructions: Answer five questions
You must answer the three questions in
Section A

Answer any two questions from
Section B

All questions carry equal marks

Time Allowed: 3 Hours

Answer question 1 (a)

(3 marks)

Analysis of outboard costs between variable and fixed

Engines	Total Costs	Total Revenue	Projected Profit
150	€ 392,000	€ 424,800	€ 32,800
300	€ 734,000	€ 786,600	€ 52,600

Increase of 150 engines equal increase of €342,000.

Thus variable costs per engine is €2,280

Total variable costs for 150 units is thus €342,000 (2 marks)
 Thus Total fixed costs are € 50,000 (1 mark)

Answer 1 (b) (10 marks)

Optimum number of outboard engines and its selling price.

At 150 engines the sales price per unit is €2,832 [€424,800/150 engines]

At 300 engines the sales price per unit is €2,622 [€786,600/300 engines]

Assuming a linear relationship between sales price and volume then for every €210 increase in sales price there is a fall of 150 units.

Thus at price of €3,042 [€2,832 +€210] there would be zero units sold (1 mark)

The rate of change price for quantity is €210 divided by 150u =1.40

Hence sales price per engine equation is
 €3,042 minus Q x 1.40 where Q is the quantity in engines (1 mark)

Total revenue is quantity multiplied by sales price per unit/engine

Thus total revenue i.e. TR equals 3,042Q minus 1.40Q²

At optimum quantity Marginal Revenue equals Marginal Cost

Marginal costs equals variable costs equals €2,280 as per 1 (a)

Question 1 (b) continued

Differentiating total revenue with respect to change in quantity
Differentiating $3,042Q$ minus $1.40Q^2$

$3,042$ minus $2.8Q$ equals marginal cost $€2,280$

Thus $2.8Q$ equals 762 [$3,042-2,280$]

Thus Q equals **272 engines [rounded]** (6 marks)

Sales price is thus

$€3,042$ minus 272 engines $\times 1.4$ equals $€2,661$ [rounded (2 marks)]

Answer (c) Projected Net Profit

Contribution per unit is $€2,661-€2,280=€381$

Total contribution is 272 engines $\times €381$ equals	$€103,686$
Total fixed costs as per (a) above	<u>$(€ 50,000)$</u>
Projected net profit	<u>$€ 53,686$</u>

Answer (d) 5 marks

The transfer price includes both transport costs $€200$ and a profit margin of $€280$

Given that the Outboard division is located in a sectioned off area the transport cost are clearly not justified.

Thus the transfer price should be reduced from $€1,680$ to $€1,480$

Further as the Yacht division is operating at 95% it is producing the basic engine for the outboard division within its spare capacity. This means that from the company wide perspective the marginal cost is $€1,200$ which is less than the tender price of $€1,300$ by the outside supplier

For that reason it would not be in the company interest for the Outboard to purchase outside. The divisional managers should negotiate a transfer price between $€1,200$ and $€1,300$

(5 marks)

Question 2 (a) 5 marks

Time taken to produce the tenth engine

$$Y = A \times Q^b$$

Where Y is the average time taken to produce an engine
 A is the time taken to make the first engine
 Q is the number of engines
 b is the co-efficient of an 80% learning curve i.e -0.32193

For 9 engines the average is 4.93 [$10 \times (9^{-0.32193})$] thus total is 44.37
 For 10 engines the average is 4.77 [$10 \times (10^{-0.32193})$] thus total is 47.70

The tenth engine thus took labours hours of 3.33

(b) Analysis of the revised cost per engine

Original variable cost per engine	€2,280	
Less transfer price	(€1,680)	
Less Labour costs 10 hours x €20	(€ 200)	
Less Variable overheads 10 hours x €10	<u>(€ 100)</u>	
Thus cost of cowling, rudder and tiller	€ 300	2 marks
Revised transfer price €1,680-€200	€1,480	1 mark
Labour costs 3.33 hours x €20	€ 66.66	1 mark
Variable O/H 3.33 hours x €10	<u>€ 33.33</u>	<u>1 mark</u>
Total revised cost per engine	<u>€1,879.99</u>	<u>5 marks</u>
Rounded to	€1,880	

(c) Quote to speed boat club

For 3 engines the average is 7.02 [$10 \times (3^{-0.32193})$] Thus total is 21.06
 For 9 engines the average is 4.93 [$10 \times (9^{-0.32193})$] thus total is 44.37
 Thus total hours for engine 4 to 9 inclusive will be 23.31
 The tenth and eleventh engine will be (a) 3.33×2 6.66
 Thus total hours for contract will be 29.97

Labour and variable overhead 29.97 x [€20+€10}	€ 899 rounded	
Basic engine €1,480 x 8 engines	€11,840	
Materials added €300 x 8 engines	<u>€ 2,400</u>	
Total estimated costs for 8 engines	€15,139	
15% on sales i.e. cost mark up of 15/85	<u>€ 2,671</u>	
Total sales value	<u>€17,810</u> rounded	
Average price for 8 engines is	€ 2,226	

Question 2 (d)

Learning curve is appropriate where the labour activity input is large relative to the production activity and where there is a recorded experience in respect of the labour hours of production of a new product.

In relation to the proportion of activity of labour, the table below shows the proportion of costs before and after the learning curve affect.

		Original	after Learning Curve	
74%	Transfer price	€ 1,680	€ 1,480	79%
13%	Materials	€ 300	€ 300	16%
87%	Total material	€ 1,980	€ 1,780	95%
9%	Lab costs	€ 200	€ 67	4%
4%	Variable costs	€ 100	€ 33	2%
	Total costs	€ 2,280	€ 1,880	

It can be seen that materials are by far the highest proportion of costs. After the learning curve affect they represent 95%. Thus labour activity input is not a significant proportion of costs.

Further there is no previous history of working on the product. Since the new division hired new employees working on a new product it must be questioned as to how an 80% learning curve could be determined.

Question 3

- (a) Four purposes of transfer pricing are
- (i) Information that motivates divisional managers
 - (ii) Information for evaluating the managerial and economic performance of the divisions
 - (iii) To ensure divisional autonomy is not undermined
 - (iv) To recognise the natural independence of a division which can sell its intermediate goods on an available market, but instead is providing raw material input to another division.

(4 marks)

(b) **Dysfunctional decision** making

Dysfunctional decision making occurs when there is a sub-optimisation of the company wide profit. This can arise in the above context where the reward is based on maximising returns to the division in order to maximise the 10% bonus payment.

Thus the Outboard division can get the basic motor from an outside supplier for €1,300 whereas even after a reduction of €200 the transfer price is €180 greater per engine.

Yet the company wide marginal cost of producing the basic engine is €1,200 since there are no transport costs and the internal profit is an avoidable charge set by the Yacht's division.

Thus from a company wide perspective, if Outboard division were to purchase from outside, then the company will incur an avoidable loss of €100 per engine ie. the €1,300 supplier price versus the €1,200 marginal cost.

(6 marks)

(c)

350	engines at	15	hours per engine equals	5,250	hours
300	engines at	15	hours per engine equals	<u>4,500</u>	hours
			Total labour hours	9,750	

95% capacity measured in labour hours means a total capacity of 9,750/95% equals 10,263 labours

Thus spare capacity is 513 hours [10,263 minus 9,750]

In engine terms this equates to 34 engines [rounded to nearest engine] (2 marks)

30 engines from the French customer would require 450 hours. This would still be within the capacity level of the Yacht division and thus would not interfere with its ability to produce the required 300 engines for the Outboard division. (2 marks)

If another 20 engines are produced for the German customer then 4 of these could be produced within the capacity range. However the remaining 16 could not be without a corresponding reduction in supply of engines to Outboard division. Thus a potential lost contribution of €8,960 [16 x €560] will be incurred if the Yacht division keeps its commitment to supply 300 engines to Outboard division.

To compensate for this lost contribution the Yacht's division would need to add €29.86 [€87,960/300] opportunity cost to the total cost of its manufacturing the basic motor. Of course should the Outboard division decide to order less than 300 then the opportunity costs will decrease. (4 marks)

Alternatively overtime might be paid at the rate of €37.33 [€8,960/(16x15 hours)] to increase available labour hours. (2 marks)
(10 marks)

Total marks (a),(b),(c) (20 marks)

Question 4 answer (a)

		August	September	October	November	Total
W/N1	Sales receipts	€ -	€ -	€ 20,000	€ 20,000	€ 40,000
W/N2	Materials payments		€ -	(€ 5,400)	(€ 5,400)	(€ 10,800)
W/N3	Variable overheads	€ -	€ -	(€ 3,600)	(€ 3,600)	(€ 7,200)
W/N 4	Labour payments	(€ 3,000)	(€ 3,000)	(€ 3,000)	(€ 3,500)	(€ 12,500)
	Fixed costs paid		(€ 11,600)	(€ 11,600)	(€ 11,600)	(€ 34,800)
		‘	‘	‘	‘	‘
	Operating cash flow	(€ 3,000)	(€ 14,600)	(€ 3,600)	(€ 4,100)	(€ 25,300)
	Capital plant paid	(€ 48,000)				(€ 48,000)
	Investment by owner		€ 50,000			€ 50,000
		‘	‘	‘	‘	‘
	Net Cash flow	(€ 51,000)	€ 35,400	(€ 3,600)	(€ 4,100)	(€ 23,300)
	Opening balance	€ -	(€ 51,000)	(€ 15,600)	(€ 19,200)	€ -
		‘	‘	‘	‘	‘
	Closing balance	(€ 51,000)	(€ 15,600)	(€ 19,200)	(€ 23,300)	(€ 23,300)

(13 marks)

Answer (b)

Projected Income statement for the four months end 30/11/13

Revenue/Sales	€100,000	W/N 1
Production		
Materials	€ 22,500	W/N 2
Labour	€ 12,500	W/N 3
Variable O/Heads	€ 15,000	W/N 4
Total Variable Costs	€ 50,000	
Contribution	€ 50,000	
less		
Fixed Costs	(€ 46,400)	
Depreciation	(€ 1,600)	
Net Profit	€ 2,000	

(7 marks)

Note as there are no opening or closing inventory it would not have mattered how fixed production costs were treated because such costs would all have been written off in the period anyway under both TAC and MC approach.

Question 4 answer continued

Projected Balance sheet at 30th November [not asked for]

Non Current Assets		
Machine	€ 48,000	
less accum. Depreciation	(€ 1,600)	
		€ 46,400
Current Assets		
Inventory	€ -	
Receivables W/N 1	€ 60,000	
		€ 60,000
Total Assets		<u>€106,400</u>
Share Capital	€ 50,000	
Retained profits	€ 2,000	
Total equity		€ 52,000
Current Liabilities		
Purchases/Payables W/N 2	€ 11,700	
Variable Overhead W/N 3	€ 7,800	
Labour W/N 4	€ -	
Fixed Costs W/N 5	€ 11,600	
Bank O/D see (a)	€ 23,300	
		€ 54,400
Total equity plus Liabilities		<u>€106,400</u>

Question 4 continued working notes

Working notes

Closing inventory

Since production totals for the period are 2,500 units and sales for the period are 2,500 units there is no closing inventory.

It is assumed that one unit of input results in one unit of output.

W/N 1 - Total sales for income statement and monthly cash receipts

	August	September	October	November	Total
Sales units	500 u	500 u	700 u	800 u	
Selling price	€40.00	€40.00	€40.00	€40.00	
Sales "pattern"	€20,000	€20,000	€28,000	€32,000	€100,000
Cash receipts			€20,000	€20,000	€40,000

Thus total sales for I/S for the period is €100,000

Total cash received is for period is €40,000

Thus receivable at period end is €60,000 [not asked for]

Customers were given two months credit.

W/N 2 Total purchase for income statement and monthly payments

	August	September	October	November	Total
Production units	600 u	600 u	600 u	700 u	
Cost per unit per question	€9.00	€9.00	€9.00	€9.00	
Materials costs "pattern"	€5,400	€5,400	€5,400	€6,300	€22,500
Cash payments			€5,400	€5,400	€10,800

Total purchases for the income statement is €22,500

Total cash payment for the period is €10,800

Thus amount owing at period end is €11,700 [not asked for]

W/N 3 Variable Overheads for I/S and monthly payments

	August	September	October	November	Total
Units	600 u	600 u	600 u	700 u	
Variable O/H rate	€6.00	€6.00	€6.00	€6.00	
Variable overheads I/S	€3,600	€3,600	€3,600	€4,200	€15,000
Payments			€3,600	€3,600	€7,200

Total variable overheads chargeable to I/S is €15,000

Variable overheads paid [2 months credit] €7,200

The amount of variable O/H owing at end €7,800 [not asked for]

Question 4 continued working notes

W/N 4

Labour costs charged for period and the amounts paid are the same

	August	September	October	November	Total
	600 u	600 u	600 u	700 u	
	€5.00	€5.00	€5.00	€5.00	
Labour cost	€3,000	€3,000	€3,000	€3,500	€12,500
Cash paid	€3,000	€3,000	€3,000	€3,500	€12,500

Total labour costs charged to I/S is thus €12,500

Total labour costs paid €12,500

Thus no amount owing at period end

W/N 5 Fixed Production costs €12,000

These are to be treated as period costs which means they are not included in production costs nor in unsold production i.e inventory. Since there is no closing inventory it will be written of the period.

Since monthly production costs included €400 depreciation then only €11,600 represent cash paid or owing

As it is paid a month in arrears then total cash paid is €11,600 x 3 months equals €34,800 whilst the balance €11,600 is amount owing at end of year

The income statement can thus show either €12,000 x 4 months=€48,000

Or cash elements of fixed costs for period €11,600 x 4 months=€46,400

Plus depreciation for the four months € 400 x 4 months € 1,600

Question 5

Sales price variance

[Actual S.P. minus Std Sales Price] x Actual volume
 [€78.75 minus €75] x 11,000 u = (1.00) €41,250 F

Sales volume in standard contribution

[Actual sales minus Budgeted sales] x Std Contribution
 11,000 U minus 10,000] x €27 = (1.50) €27,000 F

Materials Price

[Std Price minus Actual Price] x actual inputs
 [€6.00 minus €6.21] x 56,650 equals (1.00) (€11,896) A

Material usage

[Std input required minus actual output] x Std price
 [55,000 kg minus 56,650 kg] x €6 (1.50) (€9,900) A

Wage rate variance

[Std wage rate minus actual wage rate] x actual hours
 [€5.00 minus €5.25] x 21,340 equals (1.00) (€ 5,335) A

Wage efficiency variance

[Std input hrs required minus Actual Hours] x Std wage rate
 [22,000 hours minus 21,340] x €5.00 (1.50) €3,300 F

Variable Overhead expenditure variance

[Std Variable O/H rate minus Actual Var. O/H rate] x Act hrs
 [€4.00 minus €4.20] x 21,340 (1.00) (€4,268) A

Variable overhead efficiency

[Std input required minus Actual hours] x Std Var O/H rate
 [22,000 minus 21,340] x €4 equals (1.50) €2,640 F

Note since the only difference with labour on which it is Based for efficiency is the rate then short cut would have Been €3,300 x 80% [€4/€5]

Fixed overhead expenditure variance

Actual minus Budgeted (1.00) (€1200)A
 (1.00) € 41,591

Budget net profit 12,000 units x €24

(1.00) €240,000

Thus actual net profit

€281,591

11 marks for computation plus 3 marks for reconciliation

Ideal standards and attainable and basic 2 of 6 marks

Question 6

Question 6 (a)

As per Drury the controllability principle means that it is appropriate to charge to an area of responsibility only those costs that are significantly influenced by the manager of that responsibility centre

Question 6 (b)

As per Drury- Three guidelines for applying the "Controllability principle"

- (i) If a manager can control the quantity and the price paid for the service then the manager is responsible for all the expenditure incurred for the service.
- (ii) If the manager can control the quantity of the service but not the price paid for the service then only that amount of the difference between the actual and budgeted expenditure that is due to usage should be identified with the manager
- (iii) If the manager cannot control either the quantity or the price paid for the service then the expenditure is uncontrollable

Question 6 (c)

Drury identifies three types of uncontrollable factors

- (i) Economic and competitive factors
- (ii) Acts of nature
- (iii) Interdependencies

(i) **Economic and competitive factors.**

References here should be made to changes in customers tastes, competitors' actions, business cycles, product cycles, government regulations, and affects of foreign exchange rates on sales revenues and costs

(ii) **Acts of nature**

References should include unusual weather events for example excessively dry summers, or floods and their affect on input costs such as wheat or barley on production costs of bread or beer manufactures.

Other examples are machine break down, fire, both mitigated to some extent by insurance cover. Managers can still be held accountable by not for example having adequate insurance, or regular machine maintenance or routine fire safety checks etc.

Question 6 © continued

(iii) Interdependencies

References here should include the use of common resources by different centres and the need to predetermine at budget time a charge out rate per unit or per hour or some other suitable denominator for use of that pooled resource. This is to avoid any inefficiencies, arising within the pooled resource, being charged to the user of that pooled resource through the application of actual charge out rates instead of budgeted rates. Reference to sequential interdependence and reciprocal interdependency should also be made.
