Paper F5
June 2014
Question 1 – Duff Co

Part (a)

	X $ per unit	Y $ per unit	Z $ per unit
Direct materials	25.00	28.00	22.00
Direct labour	30.00	36.00	24.00
Overheads	24.25	29.10	19.40
Full production cost	**$79.25**	**$93.10**	**$65.40**

Workings:

Total hours worked:

X:	20,000 units x 30/12 hours =	50,000
Y:	16,000 units x 36/12 hours =	48,000
Z:	22,000 units x 24/12 hours =	44,000
	Total hours worked	142,000

Overhead absorption rate = $1,377,400/ 142,000 hours = **$9.70 per hour**

Overheads per unit:

X:	30/12 hours x $9.70 =	$24.25
Y:	36/12 hours x $9.70 =	$29.10
Z:	24/12 hours x $9.70 =	$19.40

Part (b)

	X $ per unit	Y $ per unit	Z $ per unit
Direct materials	25.00	28.00	22.00
Direct labour	30.00	36.00	24.00
Overheads	24.64	19.25	26.21
Full production cost	**$79.64**	**$83.25**	**$72.21**

Workings:

Number of batches:

X:	20,000/500	=	40 batches
Y:	16,000/800	=	20 batches
Z:	22,000/400	=	55 batches
	Total		115 batches

Number of purchase orders:

X:	40 x 4	=	160 orders
Y:	20 x 5	=	100 orders
Z:	55 x 4	=	220 orders
	Total		480 orders

Machine hours:

X:	20,000 x 1.5	=	30,000 hours
Y:	16,000 x 1.25	=	20,000 hours
Z:	22,000 x 1.4	=	30,800 hours
	Total		80,800 hours

	Total		X		Y		Z
Set-up costs	280,000	40/115	97,391	20/115	48,696	55/115	133,913
Material ordering costs	316,000	16/48	105,333	10/48	65,833	22/48	144,833
Machine running + General facility	781,400	30/80.8	290,124	20/80.8	193,416	30.8/80.8	297,860
	1,377,400		492,848		307,945		576,606

Overheads per unit:

X:	492,848 / 20,000	=	$24.64 p.u.
Y:	307,945 / 16,000	=	$19.25 p.u.
Z:	576,606 / 22,000	=	$26.21 p.u.

Part (c)

Product X:

The cost per unit using activity based costing increases slightly.
Therefore, assuming that the company continues to use cost plus pricing, the **selling price will be slightly increased.**
Since demand for X is elastic, this will result in a **slightly lower sales volume**.

Product Y:

The cost per unit using activity based costing reduces substantially.
Therefore, assuming that the company continues to use cost plus pricing, the **selling price will be reduced substantially.**
Since demand for Y is elastic, the lower selling price will result in a **higher sales volume.**

Product Z:

The cost per unit using activity based costing increases substantially.
Therefore, assuming that the company continues to use cost plus pricing, the **selling price will also increase substantially**.
Since demand for Z is inelastic, this should result **in no change in the sales volume.**

Paper F5
June 2014
Question 2 – Tablet Co

Part (a)

X is the number of units of Xeno
Y is the number of units of Yong
C is the total contribution

Constraints:

Build labour:	24X + 20Y <= 1,800,000
Program labour:	16X + 14Y <= 1,680,000
Test labour:	10X + 4Y <= 720,000
Demand for X:	X <= 85.000
Demand for Y:	Y <= 66,000
Non-negative:	X >= 0
	Y >= 0

Objective:

Maximise the contribution C = 30X + 40Y

(See separate page for the graph)

The feasible region is labeled A, B, C, D, O, and using the iso-contribution line, the optimal mix is at point B where the demand for Y line crosses the build labour line.

At point B:

Y = 66,000
24X + 20Y = 1,800,000
Therefore, 24X + 1,320,000 = 1,800,000
X = 20,000

Tablet Co should therefore produce 20,000 units of Xeno and 66,000 units of Yong.

The maximum contribution C = (30 x 20,000) + (40 x 66,000) = $3,240,000
The fixed overheads for the quarter = 3 x 650,000 = $1,950,000

Therefore the **maximum profit** = 3,240,000 – 1,950,000 = **$1,290,000**

Part (b)

Slack resources

Build labour:

At the optimum mix, all of the build labour is being used and there is therefore **no slack**.

Program labour

At the optimum mix, the amount of program labour being used is
(20,000 x 16) + (66,000 x 14) = 1,244,000 minutes
There is therefore slack of 1,680,000 – 1,244,000 = **436,000 minutes** (or 7,267 hours).

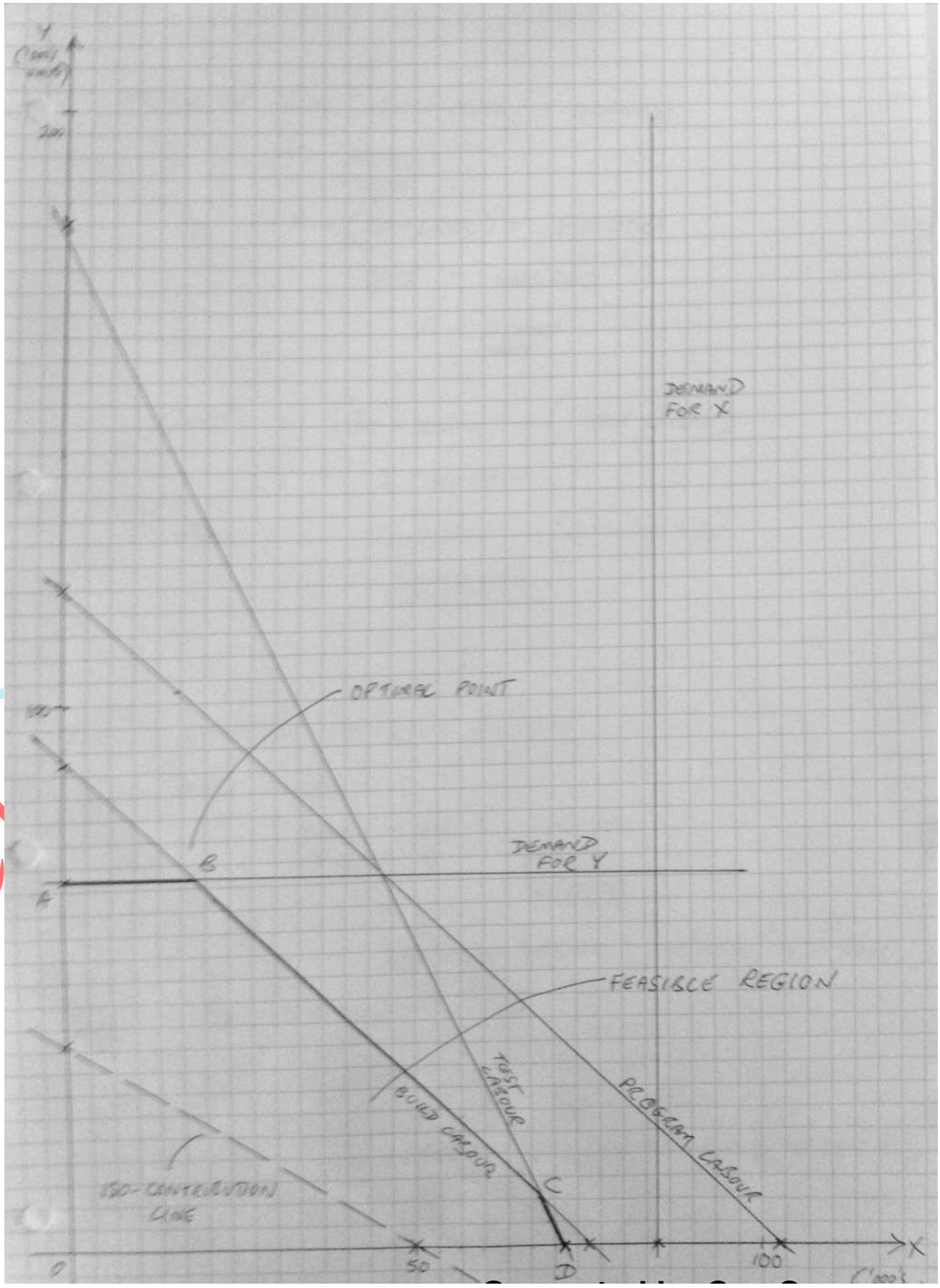
Test labour

At the optimum mix, the amount of test labour being used is
(20,000 x 10) + (66,000 x 4) = 464,000 minutes
There is therefore slack of 720,000 – 464,000 = **256,000 minutes** (or 4,267 hours).

The **implications** of the slack are as follows:

- if Tablet is not already employing the labour, then they should only employ the number of hours required for the optimal production
- if Tablet is already employing the labour in full, then they need to make program and test labour redundant or alternatively consider retraining them to be able to work on the build stage. This would relax the build labour constraint and enable more units to be produced, and hence generate more profit.

  Since build labour is paid at a lower rate than both program and test labour, it would suggest that it requires less skill and that therefore retraining should not be a problem.



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June 2014
Question 3 – Rotech group

Part (a)

	W Co		C Co
	Design division	Gearbox division	
ROCE	25.49%	11.99%	8.45%
Asset turnover	0.61	0.79	0.19
Operating profit margin	41.96%	15.17%	45.05%

A discussion of the performance of C Co and the divisions of W Co could include the following:

- The Design division is achieving the highest return on capital employed, far in excess of either the Gearbox division or C Co.
- The ROCE is determined by a combination of the operating profit margin achieved by the business, and the level of sales achieved for the size of the business (the asset turnover). ROCE = asset turnover x profit margin.
- The Design division achieves its high ROCE due primarily to having a high profit margin. This is hardly surprising given the nature of the business (supplying designs under licences as opposed to manufacturing).
- C Co also has a high profit margin, but a very low asset turnover. This is likely due to the fact that there are limits on their capacity, the reason for which needs investigating.
- The Gearbox division is the worst performer in terms of their ROCE. Although they have the highest asset turnover, they suffer due to the fact that their profit margin is much lower than the others. This could be partly due to the fact that they are currently forced to buy components from C Co, which they could source more cheaply.
- For a more detailed discussion it would be necessary to have information about previous years and about similar businesses.

Part (b)

The objective in setting transfer prices should be to motivate the managers of C Co and the Gearbox division of W Co to trade in such a way as to maximise the profit of the Rotech Group.

Currently, the C Co is satisfying 60% of the external demand. There is therefore unsatisfied external demand of 40/60 x 8,010 = $5,340.

For this quantity, C Co should continue to quote the same price to Gearbox as to external customers because there will be an opportunity cost to C Co of the lost contribution from external sales.
As a result, the Gearbox division should be allowed to purchase this amount from an external supplier as the price will be lower by 5% - i.e. total cost to Gearbox of 95% x 5,340 = $5,073.

C Co will then be selling a total of 8,010 + 5,340 = $13,350 externally. This leaves capacity of 15,560 – 13,350 = $2,210 (at current external selling prices) that cannot be sold externally.
Selling these to the Gearbox division will therefore not lose any contribution, and these can be sold at any transfer price in excess of the marginal (variable) cost.
C Co has variable costs of 40% of revenue, and so the transfer price for these units should in total be anything in excess of 40% x 2,210 = $884.
The Gearbox division could purchases these units externally at 5% less than C Co's external selling price i.e. 95% x 2,210 = $2,099.50.
So the transfer price may be negotiated between $884 and $2,099.50.

If we assume that the transfer price were to be $884, then the end result should be as follows:

The Gearing division buys components $5,073 externally and $884 from C Co.

C Co sells components $13,350 externally, and $884 to the Gearing division.

The resultant profits will be as follows:

	Gearbox division	C Co
External sales	25,535	13,350
Sales to Gearbox division		884
	25.535	14,234
Cost of sales excluding components (16,200 – 7550)	(8,650)	(5,280)
Components bought externally	(5,073)	
Transfers from C Co	(884)	
Administration costs	(4,200)	(2,600)
Distribution costs	(1,260)	(670)
Operating profit	5,468	5,684

This gives a total profit for the two of $11,152, and against the current total profit of $10,885

(As stated above, the transfers may be at any price between $884 and $2,099.50 – the total profit would remain the same, only the split of profit between the two would change.)

(The same conclusion could have been arrived at in different ways.
C Co's revenue is falling by charging the Gearing division 60% less on the excess of the current sales over the maximum external sales. i.e. a fall in revenue and in profit 60% x (15,560 – 13,350) = $1,326.

The Gearbox division's cost of sales is falling (and therefore their profit increasing) for two reasons.
Of the $7,550 that they are currently paying to C Co, part (currently costing $5,340) is now being bought externally at a 5% discount. – i.e. for $5,073.
The remainder (currently costing 7,550 – 5,340 = $2,210) are now being bought from C Co at their variable cost of 40% x 2,210 = $884.)

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Question 4 – Gam Co

Part (a)

(All table figures in $'000's)

Selling price	Sales volume	Cont'n per unit	Total contribution	Advert. Costs	Fixed costs	**Profit**
$30	120,000	$19	2,280	900	450	**930**
$30	110,000	$19	2,090	900	450	**740**
$30	140,000	$19	2,660	900	450	**1,310**
$35	108,000	$24	2,592	970	450	**1,172**
$35	100,000	$23	2,300	970	450	**880**
$35	94,000	$23	2,162	970	450	**742**

Part (b)

Expected value of profit for a selling price of $30:

(0.4 x 930) + (0.5 x 740) + (0.1 x 1,310) = **$873**

Expected value of profit for a selling price of $35:

(0.3 x 1,172) + (0.3 x 880) + (0.4 x 742) = **$912.4**

On this basis Gam Co should choose to **fix the selling price at $35 per unit**.

Part (c)

The maximin decision rule is a risk avoider approach, which involves determining the worst possible outcome for each course of action, and then choosing the course of action that gives the best of these worst outcomes.

With a selling price of $30, the worst outcome is a profit of $740.
With a selling price of $35, the worst outcome is a profit of $742.

Therefore the **price that should be charged on this basis is $35 per unit**.

Part (d)

Factors that may give rise to uncertainty when setting budgets include the following:

- the likely actions of competitors

  this may effect the level of demand and the selling price

- the level of inflation

  this will affect the costs to be budgeted, and possibly the selling price

- the state of the economy

  this may affect the spending power of customers and therefore the level of demand

- the choice of selling price

  this is likely to affect the level of demand

Paper F5
June 2014
Question 5 – Valet Co

Part (a)

Contribution per unit for full valet = 44.6% x $50 = $22.30
Contribution per unit for mini valet = 55.0% x $30 = $16.50

(i) Mix variance:

Actual sales, actual mix, at standard contribution:

Full valet:	4,000 units x $22.30 =	89,200
Mini valet:	3,980 units x $16.50 =	65670
Total:	7,980 units	$154,870

Actual total sales, standard mix, at standard contribution:

Full valet: 3,600/5,600 x 7,980 = 5,130 x $22.30 = 114,399
Mini valet:2,000/5,600 x 7,980 = 2,850 x $16.50 = 47,025

Total:	7,980 units	$161,424

Mix variance = 161,424 – 154,870 = $6,554 (adverse)

(ii) Quantity variance

Actual total sales, standard mix, at standard contribution = 161,424
Budget total sales, standard mix, at standard contribution = 113,280

Quantity variance = 161,424 – 113,280 = $48,114 (favourable)

(Note: the variances could have been calculated in several different ways – all giving the same answers.)

Part (b)

The sales mix variance measures the effect on the contribution of selling a greater proportion of one of the services and a resulting lower proportion of the other service.

The sales quantity variance measures the effect on the contribution of selling more or less total services, ignoring any change in the mix between the two.

Part (c)

A discussion of the sales performance of the business could include the following:

- Valet Co has an adverse sales mix variance caused by selling a larger proportion of mini valets (which generate a lower contribution) and a corresponding lower proportion of full valets (which generate a higher contribution).

  This is almost certainly due to the fact that **customers have a lower disposable income** and are therefore choosing the cheaper mini valet.

  In addition to this, the fact that customers are keeping their cars longer could mean that they are less interested in having a full valet on an older car.

- Despite the fall in the disposable income of Valet's customers, the overall number of valets demanded has increased substantially (by 42.5%) and this is the reason for the large favourable quantity variance.

  This is due (certainly in part) to the fact that **one of their competitors closed down three months ago**. Without information as to the size of this competitor it is not possible to say whether this is wholly responsible for the increase or whether Valet Co has also gained customers from the remaining competitors.

- Overall, the sales performance of Valet Co is **substantially better than budget** – the quantity variance has far exceeded the adverse mix variance, giving an overall increase in standard contribution (ignoring any cost changes) of $41,560 (a 37% increase on budget).