



The Institute of Certified Management Accountants

FINANCIAL MODELLING

INSTRUCTIONS TO CANDIDATES

1. CANDIDATES ARE REMINDED THAT THEY SHOULD HAVE NO BOOKS, NOTES, PAPER OR OTHER MATERIAL IN THEIR POSSESSION UNLESS THEIR USE IS SPECIFICALLY PERMITTED BY "INSTRUCTIONS TO CANDIDATES" SET OUT BELOW.

2. READING TIME IS OF 10 MINUTES DURATION

3. EXAMINATION IS OF 3 HOURS DURATION

4. This paper consists of 6 questions.

5. PLEASE CHECK BEFORE COMMENCING. This is a FINAL paper.

5. THIS IS AN OPEN BOOK EXAM.

6. Please read instructions at the top of each section carefully before answering.

7. Each section has an equal weighting in the allocation of marks.

8. Electronic hand held calculators are permitted.

9. EXAM PAPER IS TO BE HANDED IN INTACT AT CONCLUSION OF EXAM.

PART A

This is a Compulsory Question

Question 1

Falcomm Pty Ltd is interested in converting its fleet of 6-cylinder cars used by its sales force from petrol to Liquid Petroleum Gas (LPG). In order to determine how long (in months) it would take to recover the initial cost of conversion, a model has been built using Microsoft Excel. This model calculates the cost savings achieved per month as a result of using the lower priced LPG, and then produces a "cost recovery" table taking additional factors such as depreciation, tax and proportion of personal use into account.

Required:

Using the model shown on pages 3 and 4, list the Excel formulas to be used within the following cells:

E23	The cost of running the vehicle per 100 kms if petrol only is used	(1½ marks)
E24	The cost of running the vehicle per 100 ms if LPG only is used	(2 marks)
E26	The fuel cost savings per 100 kms if LPG only is used	(1 mark)
E28	The fuel cost savings per 100 kms if LPG and petrol are used according to the percentage given in the data section	(1 mark)
E30	The fuel cost savings per month if LPG and petrol are used as for E28	(1½ marks)
E32	Simple payback month	(1 mark)
C45	The monthly opening written down value (WDV) of the conversion cost	(½ mark)
D45	The monthly depreciation expense (using the reducing balance method)	(1 mark)
E45	The closing written down value	(1 mark)
F45	The business use portion of the tax saved from the monthly depreciation expense	(1½ marks)
G45	The business use portion of the fuel cost savings per month (net of tax)	(2 marks)
H45	The private use portion of the fuel savings per month	(1½ marks)
I45	The total savings per month	(1½ marks)
J45	The present value (PV) of these savings per month	(2 marks)
K45	The cumulative PV up to that month	(1 mark)
L45	The cumulative kilometres travelled	(1 mark)
M96	Payback month (Hint : this formula should use the VLOOKUP function)	(5 marks)

Notes:

1. With the exception of formulas E23, E24, E26, E28, E30, E32 and M96, all formulas will need to be constructed so that they can be copied down to the last row in the cost recovery table.
2. An LPG efficiency factor of 90% means that while a given number of litres of petrol would allow a vehicle to travel 100 kilometres, the same number of litres of LPG would only allow that vehicle to travel 90 kilometres.
3. Manufacturers of the LPG conversion unit that is fitted to the vehicles recommend the car not run entirely on LPG. Hence the input data value of 98% for percentage of travel using LPG.

	A	B	C	D	E	F	
1	Financial Modelling 2003						
2							
3	-----	-----	-----	-----	-----	-	
4	DATA SECTION						
5							
6	LPG capital conversion cost				\$1,800		
7	Projected kms travelled per month				2,000		
8	LPG cost per litre (cents)				24.5		
9	Petrol cost per litre (cents)				68.9		
10	Petrol consumption (Ltrs/100km)				11.36		
11							
12					Percentage Data		
13	Marginal tax rate				39.000%		
14	Depr rate per month (Reducing Bal)				1.875%		
15	Percentage of travel business use				90.000%		
16	Percentage of travel using LPG				98.000%		
17	LPG efficiency factor				90.000%		
18	Discount rate per month				1.000%		
19							
20	-----	-----	-----	-----	-----	-	
21	CALCULATION SECTION						
22							
23	Petrol cost per 100 kms				\$7.83		
24	LPG cost per 100 kms				\$3.09		
25	(assumes all kms on LPG)						
26	Cost savings/100kms				\$4.73		
27	(assumes ALL kms on LPG)						
28	Cost savings/100kms				\$4.64		
29	(assumes actual % on LPG)						
30	Cost savings per month				\$93		
31	(assumes actual % on LPG)						
32	Simple Payback Month				19		

A	B	C	D	E	F	G	H	I	J	K	L	M	
34	REPORT												
35													
36		COST RECOVERY TABLE (assuming tax paid/saved at month end)											
37													
38							BUS USE						
39							FUEL	PRIVATE					
40							BUS USE	SAVING(\$)	USE				
41					CLOSING	TAX SAVED	NET OF	FUEL	TOTAL	PV OF	CUM PV	CUM KM	
42	MONTH	COST(\$)	WDV(\$)	DEPN	WDV	FROM DEPN	TAX	SAVING(\$)	SAVINGS	SAVINGS	TO MONTH	TRAVELLED	MONTH
43													
44	0	(1,800)			1,800					(1,800)	(1,800)	0	0
45	1		1,800	34	1,766	12	51	9	72	71	(1,729)	2,000	1
46	2		1,766	33	1,733	12	51	9	72	70	(1,658)	4,000	2
47	3		1,733	32	1,701	11	51	9	72	70	(1,589)	6,000	3
48	4		1,701	32	1,669	11	51	9	71	69	(1,520)	8,000	4
49	5		1,669	31	1,637	11	51	9	71	68	(1,452)	10,000	5
50	6		1,637	31	1,607	11	51	9	71	67	(1,385)	12,000	6
51	7		1,607	30	1,577	11	51	9	71	66	(1,319)	14,000	7
52	8		1,577	30	1,547	10	51	9	71	65	(1,254)	16,000	8
53	9		1,547	29	1,518	10	51	9	70	64	(1,190)	18,000	9
54	10		1,518	28	1,490	10	51	9	70	64	(1,126)	20,000	10
55	11		1,490	28	1,462	10	51	9	70	63	(1,063)	22,000	11
56	12		1,462	27	1,434	10	51	9	70	62	(1,001)	24,000	12
57	13		1,434	27	1,407	9	51	9	70	61	(940)	26,000	13
58	14		1,407	26	1,381	9	51	9	69	60	(880)	28,000	14
59	15		1,381	26	1,355	9	51	9	69	60	(820)	30,000	15
60	16		1,355	25	1,330	9	51	9	69	59	(761)	32,000	16
61	17		1,330	25	1,305	9	51	9	69	58	(703)	34,000	17
62	18		1,305	24	1,280	9	51	9	69	58	(645)	36,000	18
63	19		1,280	24	1,256	8	51	9	69	57	(589)	38,000	19
64	20		1,256	24	1,233	8	51	9	68	56	(532)	40,000	20
65	21		1,233	23	1,210	8	51	9	68	55	(477)	42,000	21
66	22		1,210	23	1,187	8	51	9	68	55	(422)	44,000	22
67	23		1,187	22	1,165	8	51	9	68	54	(368)	46,000	23
68	24		1,165	22	1,143	8	51	9	68	53	(315)	48,000	24
69	25		1,143	21	1,121	8	51	9	68	53	(262)	50,000	25
70	26		1,121	21	1,100	7	51	9	68	52	(210)	52,000	26
71	27		1,100	21	1,080	7	51	9	67	52	(158)	54,000	27
72	28		1,080	20	1,060	7	51	9	67	51	(107)	56,000	28
73	29		1,060	20	1,040	7	51	9	67	50	(57)	58,000	29
74	30		1,040	19	1,020	7	51	9	67	50	(7)	60,000	30
75	31		1,020	19	1,001	7	51	9	67	49	42	62,000	31
76	32		1,001	19	982	7	51	9	67	49	91	64,000	32
77	33		982	18	964	6	51	9	67	48	139	66,000	33
78	34		964	18	946	6	51	9	67	47	186	68,000	34
79	35		946	18	928	6	51	9	66	47	233	70,000	35
80	36		928	17	911	6	51	9	66	46	280	72,000	36
81	37		911	17	894	6	51	9	66	46	325	74,000	37
82	38		894	17	877	6	51	9	66	45	371	76,000	38
83	39		877	16	860	6	51	9	66	45	415	78,000	39
84	40		860	16	844	6	51	9	66	44	460	80,000	40
85	41		844	16	828	6	51	9	66	44	503	82,000	41
86	42		828	16	813	5	51	9	66	43	547	84,000	42
87	43		813	15	798	5	51	9	66	43	589	86,000	43
88	44		798	15	783	5	51	9	65	42	632	88,000	44
89	45		783	15	768	5	51	9	65	42	674	90,000	45
90	46		768	14	754	5	51	9	65	41	715	92,000	46
91	47		754	14	739	5	51	9	65	41	756	94,000	47
92	48		739	14	726	5	51	9	65	40	796	96,000	48
93	49		726	14	712	5	51	9	65	40	836	98,000	49
94	50		712	13	699	5	51	9	65	39	875	100,000	50
95													
96											PAYBACK MONTH:	31	

(30 marks)

PART B

Answer One of Questions 2 and 3

Question 2

The evolution of microcomputers and spreadsheet software in the early 1980's has led to dramatic changes in the way in which accountants and managers perform tasks such as budget preparation and analysis. Modelling languages for mainframe computers, such as IFPS and FCS, were developed prior to spreadsheet software. Contemporary versions of modeling languages, such as MasterModeller and SuperModeller, are available for microcomputers but are not as widely used as spreadsheet software. Discuss the similarities and differences between current modeling languages and spreadsheet software.

(10 marks)

Question 3

- (a) Given that the four components or sources of variation in a time series are: Trend, Seasonal, Cyclical and Irregular, describe each component briefly.
- (b) One of the tutorial exercises this semester involved building a financial model based on the cost-volume-profit (CVP) analysis concept. Briefly explain why organisations may choose to perform CVP analysis and identify the main assumptions that a CVP model user must consider when using a CVP model as a decision support tool.

(10 marks)

PART C

Answer Two of Questions 4, 5 and 6

Question 4

Suresell Ltd operates a mail order business, selling a variety of consumer products. At the end of 2002, Suresell's major shareholder, Beesknees Ltd., instigated major changes in Suresell's management, in the hope of an improvement in performance. The management was given two years to implement improved policies. Beesknees Ltd. has retained you as a consultant to analyse the changes resulting from the new management policies.

Profit and loss statement for the year ending 30 June

	2002		2003	
	\$000	%	\$000	%
Sales	8 125	100.0	9 000	100.0
<i>less</i> Cost of goods sold	<u>5 687</u>	<u>70.0</u>	<u>6 300</u>	<u>70.0</u>
Gross profit	2 437	30.0	2 700	30.0
<i>less</i> Expenses				
Selling and administration	1 382	17.0	1 260	14.0
Interest charges	<u>256</u>	<u>3.2</u>	<u>400</u>	<u>4.4</u>
Profits before tax	800	9.8	1 040	11.6
<i>less</i> Tax	<u>150</u>	<u>1.8</u>	<u>140</u>	<u>1.6</u>
Net profit	<u>650</u>	<u>8.0</u>	<u>900</u>	<u>10.0</u>

Balance sheet as at 30 June

	2002		2003	
	\$000	%	\$000	%
Current assets				
Inventory	750	11.9	2 400	26.7
Accounts receivable	<u>1 500</u>	<u>23.9</u>	<u>1 650</u>	<u>18.3</u>
Total current assets	2 250		4 050	
Long-term assets (at net book value)				
Land and buildings	2 010	32.0	2 200	24.4
Plant and equipment	<u>2 015</u>	<u>32.1</u>	<u>2 750</u>	<u>30.6</u>
Total assets	<u>6 275</u>	<u>100.0</u>	<u>9 000</u>	<u>100.0</u>
Current liabilities				
Bank overdraft	150	2.4	600	6.7
Accounts payable	<u>975</u>	<u>15.5</u>	<u>2 100</u>	<u>23.3</u>
Total current liabilities	1 125		2 700	
Long-term liabilities				
Debentures	2 000	31.9	3 950	43.9
Owners' equity				
Capital	2 000	31.9	2 000	22.2
Retained profits	<u>1 150</u>	<u>18.3</u>	<u>350</u>	<u>3.9</u>
	<u>3 150</u>		<u>2 350</u>	
Total owners' equity and liabilities	<u>6 275</u>	<u>100.0</u>	<u>9 000</u>	<u>100.0</u>

Account Balances at 30 June 1997

Total Assets	4,800
Accounts Receivable	1,200
Inventory	600

Additional Information:

- Notes:*
All sales are made on credit and the normal credit period allowed is 65 days.
Suresell Ltd.'s shares are fully paid \$2 shares.
In any computations, assume a 365 day year, and treat the bank overdraft as a quick liability.
- Compute any ratios you consider necessary to answer the requirements below and present them as follows:

<i>Formula</i>	2002	2003
$\frac{\text{gross profit}}{\text{sales}}$	$\frac{2438}{8125} = 30\%$	$\frac{2700}{9000} = 30\%$

Required:

Prepare a report to the management of Beesknees Ltd. on the performance of Suresell Ltd., between 2002 and 2003 under the following headings:

- performance
- efficiency
- financial stability
- recommendations (give reasons)

(30 marks)

Question 5

George Kramer, a successful ideas man, is considering the establishment of a chain of internet-based laundries, to be known as **Washlist.Com**. He plans to acquire one laundry and use it as a base to which customers will be attracted via an internet web page. If returns are good, he will then expand as quickly as possible. He has obtained quotations from the Kleena Washer Manufacturing Co. Ltd for ten Kleena Washers and five Fasta dryers. Installation would be done by a subcontractor supervised by Kleena. George plans to lease a shop and renovate and refurnish it. He loves setting up web pages, and hopes to do some of that work himself. Estimates of the total capital expenditure are given in Exhibit 1.

EXHIBIT 1
Capital Expenditure – Washlist.Com

Kleena Washers	\$ 680 each
Fasta Dryers	1,090 each
Hot water unit, pump, flues	3,200
Installation expense	1,100
Web page Development	2,650
Shop renovation expense	2,130
Chairs, benches, tables	250
Floor tiling and carpet	145
Signs	55
Coin changer and soap dispensers	250
Stocks of oil, soap, cleaners	450
Deposits to SEC and Gas and Fuel Corporation	400

George has developed some costing estimates with the help of his Certified Management Accountant, showing estimated expenses and revenue (see Exhibit 2). Other revenue arising from the sales of soap powder, bleaches, water softeners. etc. only covers the costs of providing those services, and therefore can be ignored.

EXHIBIT 2
Costing Estimates for Washlist.Com

Item	Average Daily Cycles per unit	No, of Units	Revenue Per Cycle
Washers	8	10	\$4.00
Dryers	48	5	\$0.50

Variable expenses per day:

Water, gas and oil	\$50.00
Internet Access	\$20.00
Power	\$10.00
Supplies	\$8.00

Weekly fixed expenses:

Rent	\$320.00
Cleaning & Supervision	\$249.60
Depreciation & Maintenance on Machines	\$620.00
Advertising & Insurance	\$60.00

George's best alternative investment is in real estate, which yields him 8 per cent net before tax per annum on invested capital.

Additional Information

As an opening day attraction, George plans to offer free washing and drying at his laundry. He estimates that about 200 people who otherwise would not use his laundry will take advantage of his offer. The offer will be limited to one wash cycle and related amounts of drying cycles per person. The alternative means of promotion that he is considering is a four-week series of advertisements in the local newspaper, which will cost \$300 per week.

Required

Assuming that the ratio of total drying cycles to total washing cycles remains constant:

- (1) Calculate the number of combined washing and drying cycles required per week to break even [*Hint: One combined cycle consists of one washing cycle and more than one drying cycle*].
- (2) Based on the combined breakeven cycles calculated in part 1, calculate the number of washing cycles and the number of drying cycles required per week to break even.
- (3) Calculate the return to George for 1000, 1400, and 2000 combined washing and drying cycles per week.
- (4) Assuming George can invest the same amount in real estate as he plans to invest in Washlist.com, how many combined washing and drying cycles per week will be needed to generate the same return?
- (5) If cost is the only consideration, which method of promotion would you recommend?

(30 marks)

Question 6

Stanley Baker worked in research and development at the General Corporation for 35 years, retiring as vice president 10 years ago at the age of 60. When he retired, he bought the rights to several ideas management had decided not to commercialize. Working in his garage, he developed a laboratory model incorporating one of these ideas. He sold the invention to the American Company seven years ago. This company then spent several hundred thousand dollars to perfect the device and make it commercially feasible.

During the negotiations for the purchase of the invention, American offered to pay Mr. Baker \$200,000 for the rights to his invention. The payment was to be made exactly seven years ago.

Mr Baker refused this offer and made a counterproposal that American pay him \$10,000 a year for five years, followed by \$50,000 for each of the next three years, and \$100,000 for each of the three years after that. He reasoned that American placed less value on distant cash than on cash to be paid in the near future, and would pay him more on that basis. He also knew the company would have to spend a substantial amount to develop the invention and make it marketable, and his proposal would reduce the immediate strain on the company's cash flow. American's management agreed, the contract was signed, and the first \$10,000 payment was made seven years ago.

Additional Information

A recent development is a local businesswoman in need of ready cash, who has offered to buy the remainder of this contract, including this year's payment, promising to pay Mr. Baker or his heirs \$40,000 a year for ten years, the first payment to be made a year from now.

American at the time of the original contract used 15 percent as its minimum acceptable return on investments. Mr Baker was and still is a conservative investor, and places any idle funds in savings accounts earning 6 percent interest. Annual compounding is appropriate in each case.

Ignore Taxes in all cases

Required:

- (1) American believes they were justified in accepting Mr. Baker's counterproposal. However, Mr Baker is still convinced he made a good deal. Do you agree? What are your arguments?
- (2) Mr. Baker has the right to sell or assign his interest in the deferred payment agreement. He is due to receive this year's payment from American tomorrow. Instead, should Mr. Baker accept the local businesswoman's recent offer? What factors should he consider?

(30 marks)