



Management Accounting Pillar
Managerial Level Paper

P2 – Management Accounting -
Decision Management

21 May 2008 – Wednesday Morning Session

Instructions to candidates

You are allowed three hours to answer this question paper.
You are allowed 20 minutes reading time before the examination begins during which you should read the question paper and, if you wish, highlight and/or make notes on the question paper. However, you will not be allowed, under any circumstances , to open the answer book and start writing or use your calculator during the reading time.
You are strongly advised to carefully read ALL the question requirements before attempting the question concerned (that is, all parts and/or sub-questions). The requirements for the questions in Sections B and C are contained in a dotted box.
ALL answers must be written in the answer book. Answers or notes written on the question paper will not be submitted for marking.
Answer the ONE compulsory question in Section A. This has nine sub-questions and is on pages 2 to 5.
Answer ALL THREE compulsory questions in Section B on pages 6 to 7.
Answer TWO of the three questions in Section C on pages 8 to 13.
Maths Tables and Formulae are provided on pages 15 to 17. These pages are detachable for ease of reference.
The list of verbs as published in the syllabus is given for reference on the inside back cover of this question paper.
Write your candidate number, the paper number and examination subject title in the spaces provided on the front of the answer book. Also write your contact ID and name in the space provided in the right hand margin and seal to close.
Tick the appropriate boxes on the front of the answer book to indicate which questions you have answered.

P2 – Decision Management

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SECTION A – 20 MARKS

[the indicative time for answering this section is 36 minutes]

ANSWER ALL NINE SUB-QUESTIONS

Instructions for answering Section A:

The answers to the nine sub-questions in Section A should ALL be written in your answer book.

Your answers should be clearly numbered with the sub-question number and then ruled off, so that the markers know which sub-question you are answering. **For multiple choice questions, you need only write the sub-question number and the letter of the answer option you have chosen.** You do not need to start a new page for each sub-question.

For sub-question 1.9 you should show your workings as marks are available for the method you use.

Question One

1.1 A project has an initial investment of \$140,000 and a Net Present Value of \$42,500. The present value of the sales revenue generated by the project is \$385,000.

The sensitivity of the investment to changes in the value of sales revenue is closest to

- A 36%
- B \$342,500
- C 89%
- D 11%

(2 marks)

- 1.2** A company produces three products (X, Y and Z) from a common process. Each of these products may then be further processed in separate processes, which do not incur any incremental fixed costs.

When deciding whether or not to further process Product Z, the information required is:

- (i) The common costs of the joint process
- (ii) The further processing costs of Product Z
- (iii) The unit selling price of Product Z at the point of separation
- (iv) The unit selling price of Product Z after further processing
- (v) The percentage losses of further processing Product Z
- (vi) The actual output of Product Z from the common process

- A** (i), (ii), (iii) and (iv) only
- B** (ii), (iii), (iv) and (vi) only
- C** (ii), (iii), (iv), and (v) only
- D** All of the above

(2 marks)

- 1.3** A company has a real cost of capital of 6.00% per annum and inflation is currently 4.00% per annum.

The company's annual money cost of capital is closest to

- A** 10.24%
- B** 10.00%
- C** 2.00%
- D** 1.92%

(2 marks)

Section A continues on the next page

TURN OVER

The following data is to be used when answering questions 1.4 & 1.5

A company is considering investing in a new machine. The machine will cost \$15,000 and has an expected life of five years with a residual value of \$3,000. The machine will increase the operating cashflows of the company as follows:

<i>Year</i>	<i>Increase in operating cashflow</i>
	\$
1	2,500
2	3,000
3	5,500
4	4,000
5	3,000

1.4 Calculate the payback period of the new machine to the nearest 0.1 years.

(2 marks)

1.5 Calculate the average Annual Accounting Rate of Return over the lifetime of the investment in the new machine.

(2 marks)

1.6 A company is considering its costs in respect of a new product. The following tables show the predictions made by the company, together with their associated probabilities:

<i>Fixed costs</i>	
\$	<i>Probability</i>
100,000	0.35
130,000	0.45
160,000	0.20
<i>Variable costs</i>	
\$	<i>Probability</i>
70,000	0.40
90,000	0.35
110,000	0.25

Calculate the expected value of total costs.

(2 marks)

1.7 A company is considering the following investments for the year ending 30 June 2009:

<i>Investment</i>	<i>Capital required</i>	<i>NPV</i>
	\$	\$
W	100,000	56,000
X	150,000	75,000
Y	140,000	68,000
Z	190,000	91,000

None of the investments are divisible. They cannot be undertaken more than once within each year. The company has only \$350,000 available to invest in the year to 30 June 2009. There are no other investments available at this time.

Which investments (if any) should the company undertake?

(2 marks)

1.8 A company is considering a short-term pricing decision to utilise some spare capacity. The item to be manufactured and sold would use 1,500kgs of raw material Q.

Material Q is in regular use by the company. It currently has 1,000kgs in inventory, which was purchased last month at a cost of \$4 per kg. The current replacement cost of material Q is \$4.80 per kg and the current inventory could be sold for \$4.30 per kg.

Calculate the relevant cost of material Q for the purposes of this decision.

(2 marks)

1.9 A company is considering the price of a new product. It has determined that the variable cost of making the item will be \$24 per unit. Market research has indicated that if the selling price were to be \$60 per unit then the demand would be 1,000 units per week.

However, for every \$10 per unit increase in selling price, there would be a reduction in demand by 50 units; and for every \$10 reduction in selling price, there would be an increase in demand of 50 units.

Calculate the optimal selling price.

(4 marks)

Note: If Price $P = a - bx$ then Marginal Revenue = $a - 2bx$

(Total for Section A = 20 marks)

Reminder

All answers to Section A must be written in your answer book.

Answers to Section A written on the question paper will **not** be submitted for marking

End of Section A

Section B starts on the next page

TURN OVER

SECTION B

[the indicative time for answering this section is 54 minutes]

ANSWER ALL THREE QUESTIONS

Question Two

You are the Management Accountant of XY, an engineering company that assembles components into engines for sale to the automotive industry. The company is constantly under pressure from its customers to provide more efficient engines, which are also less damaging to the environment. The company uses value chain analysis as a tool in the management of its activities.

The Managing Director of XY has recently been invited to a conference to give a presentation entitled "The concept of the Value Chain and the management of profits generated throughout the chain in XY."

Required:

Prepare a report for the Managing Director explaining the points that should be covered in the presentation.

(Total for Question Two = 10 marks)

Question Three

A company experiences changing levels of demand, but produces a constant number of units during each quarter. The company allows inventory levels to rise and fall to satisfy the differing quarterly demand levels for its product.

Required:

- (a) Identify and explain the reasons for THREE cost changes that would result if the company changed to a Just-In-Time production method for 2009. Assume there will be no inventory at the start and end of the year. *(6 marks)*
- (b) Briefly discuss the importance of Total Quality Management to a company that operates a Just-In-Time production method. *(4 marks)*

(Total for Question Three = 10 marks)

Question Four

A company has developed a new product that it will manufacture in its workshop. The product is highly specialised and initially will be produced to order only. The product will be manufactured in batches. The estimated labour time required for the first batch is 40 hours, but due to the nature of the product and the manufacturing method to be used, it is expected that an 80% learning curve will apply.

Required:

(a) Calculate the expected time for the eighth batch. (3 marks)

(b) When production commenced the first batch took 45 hours. The actual learning rates observed were as follows:

<i>Month</i>	<i>Total batches produced to date</i>	<i>Actual learning rate</i>
1	1	
2	2	75%
3	4	75%
4	8	90%

For each of months 2 and 4, state possible reasons why the actual learning rates differed from the expected rates.

(3 marks)

(c) The total time taken to produce the first eight batches was 182.25 hours. Calculate the cumulative learning rate up to the end of Month 4. (Remember that the first batch took 45 hours).

(4 marks)

(Total for Question Four = 10 marks)

(Total for Section B = 30 marks)

End of Section B

Section C starts on page 8

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SECTION C – 50 MARKS

[the indicative time for answering this section is 90 minutes]

ANSWER TWO QUESTIONS OUT OF THREE

Question Five

An engineering company manufactures a number of products and components, using a team of highly skilled workers and a variety of different metals.

The current supplier has announced that the amount of M1, one of the materials it currently supplies, will be limited to 1,000 square metres in total for the next three-month period because there will be insufficient M1 to satisfy demand.

The only items manufactured using M1 and their production costs and selling prices (where applicable) are shown below:

	<i>Product P4 \$/unit</i>	<i>Product P6 \$/unit</i>	<i>Component C3 \$/unit</i>	<i>Component C5 \$/unit</i>
Selling price	125	175	n/a	n/a
Direct materials:				
M1 *	15	10	5	10
M2	10	20	15	20
Direct labour	20	30	16	10
Variable overhead	10	15	8	5
Fixed overhead **	20	30	16	10
Total cost	<u>75</u>	<u>105</u>	<u>60</u>	<u>55</u>

* Material M1 is expected to be limited in supply during the next three months. These costs are based on M1 continuing to be available at a price of \$20 per square metre.

** Fixed overhead is absorbed on the basis of direct labour cost.

Products P4 and P6 are sold externally. Components C3 and C5 are used in other products made by the company. These other products do not require any further amounts of material M1.

The estimated total demand for these products and components during the next three months is as follows:

P4	2,000 units
P6	1,500 units
C3	500 units
C5	1,000 units

Components C3 and C5 are essential components. They would have to be bought in if they could not be made internally. They can be purchased from external suppliers for \$75 and \$95 per unit respectively. The bought in components are of the same quality as those manufactured by the company. The products they are used in have sufficient margins to remain financially worthwhile if C3 and C5 are bought in at these prices.

Required:

- (a) Prepare calculations to show the most profitable course of action for the company for the next three months, assuming that there are no other suppliers of material M1, and advise the company on THREE other factors that it should consider before making its decision. *(14 marks)*
- (b) Calculate the maximum prices that the company should pay to obtain further supplies of material M1 from an alternative supplier, and the quantities of material M1 to which each of these prices apply. *(6 marks)*

The company has now become aware of a contract that it has already accepted, for the immediate delivery of 500 units of P4 at a selling price of \$125 per unit. This contract has a financial penalty clause for non-delivery. This contract is in addition to the 2,000 units of estimated demand for P4 stated previously. Assume that there is no alternative supplier of material M1.

- (c) Calculate the minimum financial penalty that would change your recommendation. *(5 marks)*

(Total for Question Five = 25 marks)

Section C continues on the next page

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Question Six

H is a well-established manufacturer of household products. It produces its accounts to 31 December each year.

The machinery that is currently being used to manufacture one of H's products will have to be scrapped on 31 December 2008, because H can no longer obtain a safety certificate for it. H is considering investing \$500,000 in new machinery on 1 January 2009 in order to continue manufacturing this product. If the project does not go ahead, H will no longer be able to manufacture the product.

The new machinery will have sufficient production capacity to meet the expected sales demand levels for the next five years. It will have a life of five years, and at the end of that time it will be sold for \$100,000. It will qualify for tax depreciation at the rate of 20% per annum on a reducing balance basis.

Sales revenues and production costs for the current year, which ends on 31 December 2008, are predicted to be as follows:

	<i>\$000</i>
Sales revenue	540
Production costs	
Variable production costs	240
Fixed overhead *	<u>120</u>
	<u>360</u>
Fixed non-production costs	80
Profit before tax	100

* Fixed production overhead cost includes \$20,000 for depreciation of the existing machinery.

Sales

The following table of index numbers (2008 = 100) shows the predicted levels of sales volume.

	2009	2010	2011	2012	2013
Sales:					
Volume	103	105	109	107	110

Assume there are no changes in the selling price other than those caused by selling price inflation, which is expected to be 4% per year.

Costs

Production costs are not expected to change as a result of investing in the new machinery, but production cost inflation is expected to be 5% per year. Non-production cost inflation is expected to be 3% per year.

Taxation

H is liable to pay tax on its profits at the rate of 30%. Half of this is payable in the year in which the profit is earned and the remainder is payable in the following year.

H has a post tax money cost of capital of 14% per annum.

Required:

- (a) Calculate the Net Present Value (NPV) of the project (to the nearest \$000).
(15 marks)
- (b) Calculate the post tax money cost of capital at which H would be indifferent to accepting/rejecting the project.
(4 marks)
- (c) Explain your treatment of inflation in your solution to part (a) above and describe an alternative method that would have provided the same NPV.
(6 marks)

(Total for Question Six = 25 marks)

Section C continues on the next page

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Question Seven

A bank is reviewing the bank account it offers to its business customers and the charges it makes for routine transactions (for example paying into the account, writing cheques, making electronic payments and transfers). Currently, the bank's charges to its business customers are £0.60 per routine transaction. The bank pays interest to the customer at 0.1% per year on any balance in the account.

According to the bank's records, there are currently one million business customers. Each customer makes one thousand routine transactions each year; 45% of business customers maintain an average balance of £2,000 in their account. The accounts of the other 55% of business customers are overdrawn with an average overdraft balance of £4,000. Interest on overdrawn accounts is charged at 20% per year.

In addition, the bank has a number of savings account customers which, together with the bank's business customers, result in a balance of net funds that are invested by the bank and yield an annual return by 3% per year.

The bank is concerned about a growing tendency for its competitors to provide routine transactions free of charge to their business customers. As a result the bank is considering two account options:

Account Option One

An account that charges the business customer a fixed fee of £10 per month, with no further charges for any routine transactions. Interest would be paid to the business customer at 0.5% per year on any balances in the account. The bank expects that if it adopts this charging structure, it will increase the number of business customers by 5% from its present level;

Account Option Two

An account that does not charge the customer for any routine transactions, but pays no interest on any balances in the account. The bank expects that if it adopts this charging structure, this will increase the number of business customers by 10% from its present level.

The bank does not expect the profile of new business customers to be different from existing business customers in terms of the balances in their accounts or the number of routine transactions they make. Interest will continue to be charged at 20% per year on overdrawn accounts. The bank does not expect that either of these options will result in any changes to its existing staffing or other resources.

The bank also expects that if it takes no action and continues with its existing bank account that the number of business customers will fall by 20%.

Required:

- (a) Recommend which course of action the bank should take by preparing calculations to show the annual profits from:
- (i) continuing with the existing bank account
 - (ii) each of the two account options described above.

(12 marks)

The bank is also reviewing its policy with regard to small loans. Currently, the bank charges an arrangement fee of £500 per loan and interest on the average loan balance. The profit the bank makes on the interest it charges is 5% of the average loan balance. The bank's records show that there are 200,000 small loans in issue at any one time. The average loan balance is £5,000.

Market research undertaken by the bank has shown that if it were to carry out an advertising campaign that specifically targeted the small loans market, the number of loans would increase, though the amount of the increase is uncertain. It is predicted that the advertising campaign may increase the number of loans in issue at any one time to 250,000, 280,000 or 300,000.

Furthermore, it is believed that the advertising campaign would increase the value of the loans. The amount of the increase is uncertain, but it is believed that the average loan balance may increase to £7,500; or that they may increase by £9,000; or that they may increase by £10,000.

The expected total cost of the advertising campaign and the associated administrative costs are £112 million.

Required:

(b)

- (i) Prepare a two-way data table that shows profit that would be earned by the bank for each of the NINE possible outcomes that are expected to arise as a result of the advertising campaign.

(8 marks)

- (ii) State any other factors the bank should consider before making its decision and advise the bank on whether or not it should carry out the advertising campaign.

(5 marks)

(Total for Question Seven = 25 marks)

(Total for Section C = 50 marks)

End of Question Paper

Maths Tables and Formulae are on pages 15 to 17

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PRESENT VALUE TABLE

Present value of \$1, that is $(1+r)^{-n}$ where r = interest rate; n = number of periods until payment or receipt.

Periods (n)	Interest rates (r)									
	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239
16	0.853	0.728	0.623	0.534	0.458	0.394	0.339	0.292	0.252	0.218
17	0.844	0.714	0.605	0.513	0.436	0.371	0.317	0.270	0.231	0.198
18	0.836	0.700	0.587	0.494	0.416	0.350	0.296	0.250	0.212	0.180
19	0.828	0.686	0.570	0.475	0.396	0.331	0.277	0.232	0.194	0.164
20	0.820	0.673	0.554	0.456	0.377	0.312	0.258	0.215	0.178	0.149

Periods (n)	Interest rates (r)									
	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	0.812	0.797	0.783	0.769	0.756	0.743	0.731	0.718	0.706	0.694
3	0.731	0.712	0.693	0.675	0.658	0.641	0.624	0.609	0.593	0.579
4	0.659	0.636	0.613	0.592	0.572	0.552	0.534	0.516	0.499	0.482
5	0.593	0.567	0.543	0.519	0.497	0.476	0.456	0.437	0.419	0.402
6	0.535	0.507	0.480	0.456	0.432	0.410	0.390	0.370	0.352	0.335
7	0.482	0.452	0.425	0.400	0.376	0.354	0.333	0.314	0.296	0.279
8	0.434	0.404	0.376	0.351	0.327	0.305	0.285	0.266	0.249	0.233
9	0.391	0.361	0.333	0.308	0.284	0.263	0.243	0.225	0.209	0.194
10	0.352	0.322	0.295	0.270	0.247	0.227	0.208	0.191	0.176	0.162
11	0.317	0.287	0.261	0.237	0.215	0.195	0.178	0.162	0.148	0.135
12	0.286	0.257	0.231	0.208	0.187	0.168	0.152	0.137	0.124	0.112
13	0.258	0.229	0.204	0.182	0.163	0.145	0.130	0.116	0.104	0.093
14	0.232	0.205	0.181	0.160	0.141	0.125	0.111	0.099	0.088	0.078
15	0.209	0.183	0.160	0.140	0.123	0.108	0.095	0.084	0.079	0.065
16	0.188	0.163	0.141	0.123	0.107	0.093	0.081	0.071	0.062	0.054
17	0.170	0.146	0.125	0.108	0.093	0.080	0.069	0.060	0.052	0.045
18	0.153	0.130	0.111	0.095	0.081	0.069	0.059	0.051	0.044	0.038
19	0.138	0.116	0.098	0.083	0.070	0.060	0.051	0.043	0.037	0.031
20	0.124	0.104	0.087	0.073	0.061	0.051	0.043	0.037	0.031	0.026

Cumulative present value of \$1 per annum, Receivable or Payable at the end of each year for n years $\frac{1-(1+r)^{-n}}{r}$

Periods (n)	Interest rates (r)									
	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909
2	1.970	1.942	1.913	1.886	1.859	1.833	1.808	1.783	1.759	1.736
3	2.941	2.884	2.829	2.775	2.723	2.673	2.624	2.577	2.531	2.487
4	3.902	3.808	3.717	3.630	3.546	3.465	3.387	3.312	3.240	3.170
5	4.853	4.713	4.580	4.452	4.329	4.212	4.100	3.993	3.890	3.791
6	5.795	5.601	5.417	5.242	5.076	4.917	4.767	4.623	4.486	4.355
7	6.728	6.472	6.230	6.002	5.786	5.582	5.389	5.206	5.033	4.868
8	7.652	7.325	7.020	6.733	6.463	6.210	5.971	5.747	5.535	5.335
9	8.566	8.162	7.786	7.435	7.108	6.802	6.515	6.247	5.995	5.759
10	9.471	8.983	8.530	8.111	7.722	7.360	7.024	6.710	6.418	6.145
11	10.368	9.787	9.253	8.760	8.306	7.887	7.499	7.139	6.805	6.495
12	11.255	10.575	9.954	9.385	8.863	8.384	7.943	7.536	7.161	6.814
13	12.134	11.348	10.635	9.986	9.394	8.853	8.358	7.904	7.487	7.103
14	13.004	12.106	11.296	10.563	9.899	9.295	8.745	8.244	7.786	7.367
15	13.865	12.849	11.938	11.118	10.380	9.712	9.108	8.559	8.061	7.606
16	14.718	13.578	12.561	11.652	10.838	10.106	9.447	8.851	8.313	7.824
17	15.562	14.292	13.166	12.166	11.274	10.477	9.763	9.122	8.544	8.022
18	16.398	14.992	13.754	12.659	11.690	10.828	10.059	9.372	8.756	8.201
19	17.226	15.679	14.324	13.134	12.085	11.158	10.336	9.604	8.950	8.365
20	18.046	16.351	14.878	13.590	12.462	11.470	10.594	9.818	9.129	8.514

Periods (n)	Interest rates (r)									
	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833
2	1.713	1.690	1.668	1.647	1.626	1.605	1.585	1.566	1.547	1.528
3	2.444	2.402	2.361	2.322	2.283	2.246	2.210	2.174	2.140	2.106
4	3.102	3.037	2.974	2.914	2.855	2.798	2.743	2.690	2.639	2.589
5	3.696	3.605	3.517	3.433	3.352	3.274	3.199	3.127	3.058	2.991
6	4.231	4.111	3.998	3.889	3.784	3.685	3.589	3.498	3.410	3.326
7	4.712	4.564	4.423	4.288	4.160	4.039	3.922	3.812	3.706	3.605
8	5.146	4.968	4.799	4.639	4.487	4.344	4.207	4.078	3.954	3.837
9	5.537	5.328	5.132	4.946	4.772	4.607	4.451	4.303	4.163	4.031
10	5.889	5.650	5.426	5.216	5.019	4.833	4.659	4.494	4.339	4.192
11	6.207	5.938	5.687	5.453	5.234	5.029	4.836	4.656	4.486	4.327
12	6.492	6.194	5.918	5.660	5.421	5.197	4.988	4.793	4.611	4.439
13	6.750	6.424	6.122	5.842	5.583	5.342	5.118	4.910	4.715	4.533
14	6.982	6.628	6.302	6.002	5.724	5.468	5.229	5.008	4.802	4.611
15	7.191	6.811	6.462	6.142	5.847	5.575	5.324	5.092	4.876	4.675
16	7.379	6.974	6.604	6.265	5.954	5.668	5.405	5.162	4.938	4.730
17	7.549	7.120	6.729	6.373	6.047	5.749	5.475	5.222	4.990	4.775
18	7.702	7.250	6.840	6.467	6.128	5.818	5.534	5.273	5.033	4.812
19	7.839	7.366	6.938	6.550	6.198	5.877	5.584	5.316	5.070	4.843
20	7.963	7.469	7.025	6.623	6.259	5.929	5.628	5.353	5.101	4.870

FORMULAE

Time series

Additive model:

$$\text{Series} = \text{Trend} + \text{Seasonal} + \text{Random}$$

Multiplicative model:

$$\text{Series} = \text{Trend} * \text{Seasonal} * \text{Random}$$

Regression analysis

The linear regression equation of Y on X is given by:

$$Y = a + bX \quad \text{or} \quad Y - \bar{Y} = b(X - \bar{X}),$$

where:

$$b = \frac{\text{Covariance}(XY)}{\text{Variance}(X)} = \frac{n \sum XY - (\sum X)(\sum Y)}{n \sum X^2 - (\sum X)^2}$$

and
or solve

$$a = \bar{Y} - b\bar{X}$$

$$\sum Y = na + b \sum X$$

$$\sum XY = a \sum X + b \sum X^2$$

Exponential

$$Y = ab^x$$

Geometric

$$Y = aX^b$$

Learning curve

$$Y_x = aX^b$$

where:

Y_x = the cumulative average time per unit to produce X units;

a = the time required to produce the first unit of output;

X = the cumulative number of units;

b = the index of learning.

The exponent b is defined as the log of the learning curve improvement rate divided by log 2.

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LIST OF VERBS USED IN THE QUESTION REQUIREMENTS

A list of the learning objectives and verbs that appear in the syllabus and in the question requirements for each question in this paper.

It is important that you answer the question according to the definition of the verb.

LEARNING OBJECTIVE	VERBS USED	DEFINITION
1 KNOWLEDGE What you are expected to know.	List State Define	Make a list of Express, fully or clearly, the details of/facts of Give the exact meaning of
2 COMPREHENSION What you are expected to understand.	Describe Distinguish Explain Identify Illustrate	Communicate the key features Highlight the differences between Make clear or intelligible/State the meaning of Recognise, establish or select after consideration Use an example to describe or explain something
3 APPLICATION How you are expected to apply your knowledge.	Apply Calculate/compute Demonstrate Prepare Reconcile Solve Tabulate	To put to practical use To ascertain or reckon mathematically To prove with certainty or to exhibit by practical means To make or get ready for use To make or prove consistent/compatible Find an answer to Arrange in a table
4 ANALYSIS How you are expected to analyse the detail of what you have learned.	Analyse Categorise Compare and contrast Construct Discuss Interpret Produce	Examine in detail the structure of Place into a defined class or division Show the similarities and/or differences between To build up or compile To examine in detail by argument To translate into intelligible or familiar terms To create or bring into existence
5 EVALUATION How you are expected to use your learning to evaluate, make decisions or recommendations.	Advise Evaluate Recommend	To counsel, inform or notify To appraise or assess the value of To advise on a course of action

Management Accounting Pillar

Managerial Level

P2 – Management Accounting – Decision Management

May 2008

Wednesday Morning Session