

Professional Level – Options Module

Advanced Performance Management

Thursday 4 December 2014



Time allowed

Reading and planning: 15 minutes

Writing: 3 hours

This paper is divided into two sections:

Section A – This ONE question is compulsory and MUST be attempted

Section B – TWO questions ONLY to be attempted

Present Value and Annuity Tables are on pages 11 and 12.

Do NOT open this paper until instructed by the supervisor.

During reading and planning time only the question paper may be annotated. You must NOT write in your answer booklet until instructed by the supervisor.

This question paper must not be removed from the examination hall.

The Association of Chartered Certified Accountants

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Paper

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The question paper begins on page 3.**

Section A – This ONE question is compulsory and MUST be attempted

1 Boltzman Machines (Boltzman) is a listed, multinational engineering business. It has two divisions, one manufacturing aerospace parts and the other automotive parts. The company is known for innovation and it allows its managers much autonomy to run their own divisions and projects. There has been recent criticism at a shareholders' meeting of the executive management for not listening to shareholders' concerns and allowing this autonomy to run out of control. Therefore, the board at Boltzman have decided to create a framework which brings together all of the initiatives described below.

The chief executive officer (CEO) feels that the performance prism may be a suitable model and has asked you to draft a report to the board to explain the model and how Boltzman's existing initiatives fit within it.

The initiatives which are running at present are:

1. An analysis of stakeholder influence at Boltzman leading to suitable strategic performance measures.
2. A benchmarking exercise of the performance measures from initiative 1 with Boltzman's main competitor, General Machines.
3. The introduction of quality initiatives bringing lean production methods to Boltzman.

The CEO also requires your input on each of these initiatives as they are all at various stages of progress:

First, a stakeholder analysis has been completed by one of Boltzman's managers (in Appendix 1) but she has gone on holiday and has not written up a commentary of her results. Therefore, the CEO wants you to take the information in Appendix 1 and explain the results and evaluate the suggested performance measures. The CEO has asked that you do not, at this stage, suggest long lists of additional indicators.

Second, the CEO wants you to use these suggested measures to benchmark the performance of Boltzman against General Machines. The CEO stated, 'Make sure that you calculate the measures given in Appendix 1. You should also add two justified measures of your own using the data provided. However, restrict yourself to these seven measures and don't drown us with detail about individual business units.' A junior analyst has gathered data to use in the benchmarking exercise in Appendix 2.

Third, the company has stated that one of its strategic aims is to be the highest quality supplier in the market place. In order to achieve this, the head of the aerospace division has already started a project to implement just-in-time (JIT) manufacturing. An extract of his email proposing this change is given in Appendix 3. The CEO feels that there are some important elements hinted at but not developed in this email. In particular, the CEO wants you to explain the problems of moving to JIT manufacturing.

Required:

Prepare a report to the board of Boltzman to:

- (i) **Explain the facets of the performance prism and discuss how the three initiatives relate to the facets.** (9 marks)
- (ii) **Briefly justify appropriate management approaches to each of the stakeholders and, based on this analysis, evaluate the appropriateness of the performance measures suggested in Appendix 1.** (14 marks)
- (iii) **Benchmark Boltzman against General Machines as suggested by the CEO, evaluating the approach to benchmarking used.** (16 marks)
- (iv) **Explain the problems which will accompany a move towards just-in-time manufacturing at Boltzman.** (7 marks)

Professional marks will be awarded for the format, style and structure of the discussion of your answer.

(4 marks)

(50 marks)

Appendix 1

Key stakeholders

Key stakeholders	Level of interest	Level of power
Shareholders	Low – institutions have delegated management to the board and are only interested in financial returns	High – ability to vote out existing management
Employees	Medium – in a high skill industry employees are interested in the new opportunities which the market can present	Low – although there is a group of key employees in product development whose skills must not be lost
Customers	Medium – some of the parts supplied by Boltzman are unique and specifically designed for the customer	High – as there are few major players in the aerospace and automotive businesses, the loss of a customer would have a significant impact on Boltzman
Suppliers	Medium – Boltzman is one of the large customers to many of the company's suppliers	Low – the suppliers are generally bulk component producers and there is significant competition for Boltzman's business

Suggested performance measures:

- Return on capital employed
- Economic value added
- Revenue growth
- Average pay per employee
- Net profit margin

Appendix 2

The figures are drawn from the financial statements for the year to September 2014.

	Boltzman		General Machines	
	\$m		\$m	
	2014		2014	
Revenue	23,943		25,695	
Cost of sales	18,078		20,605	
Other costs	2,958		3,208	
Operating profit	2,907		1,882	
Financing costs	291		316	
Tax	663		718	
Net income	1,953		848	
	Boltzman		General Machines	
	\$m		\$m	
	2013	2014	2013	2014
Non-current assets	16,335	16,988	17,716	17,893
Current assets	10,618	11,043	11,515	11,630
	26,953	28,031	29,231	29,523
Equity	8,984	9,961	9,744	10,083
Non-current liabilities	9,801	9,739	10,629	10,405
Current liabilities	8,168	8,331	8,858	9,035
	26,953	28,031	29,231	29,523

		Boltzman 2014	General Machines 2014
Notes:			
No of employees		86,620	93,940
Staff costs	(\$m)	4,731	4,913
Revenue for 2013	(\$m)	22,506	25,438
Product development costs	(\$m)	2,684	2,630
No. of top 10 biggest potential customers where the business has top tier supplier status			
Aerospace		6	6
Automotive		7	8

A suitable cost of capital for both companies is 11%.

The tax rate is 28%.

Appendix 3

Extract of Head of Aerospace's email on his quality initiative:

In order to improve the quality and profitability of our products, we intend to begin by introducing a lean approach to manufacturing.

The first step in our move to lean manufacturing will be the introduction of JIT manufacturing. Although this will be a difficult process, the financial rewards in reduced working capital required and a decluttering of the workplace should be significant. We will have to consider how this change impacts up and down our supply chain with customers and suppliers.

Section B – TWO questions ONLY to be attempted

2 Beeshire Local Authority (BLA) is a local government body which provides a range of services for the area of Beeshire within the country of Seeland. Beeshire is a wealthy area within the country with many tourist attractions. One of BLA's tasks is to ensure that waste is collected from the homes and businesses in Beeshire. The goal for BLA's waste management department is 'to maintain Beeshire as a safe, clean and environmentally friendly place where people and businesses want to both stay in and return to.' The need for waste collection is linked to public health concerns, the desire to keep the streets clean and attractive and the desire to increase the amount of rubbish which is recycled. BLA is funded through a single local tax and does not charge its residents or businesses separately for most of its services, including waste collection. There is no public or political appetite for outsourcing services such as waste management.

Waste collection is performed by the workforce using a fleet of vehicles. The waste is either taken to recycling plants or else to landfill sites for burying. BLA obtains revenues from all the recycled waste but this only just covers the cost of running the recycling facilities.

Against a background estimate that waste will increase by 1% p.a. in the future, the national government has ordered local authorities, such as BLA, to promote the recycling of waste and has set a target of 40% of all waste to be recycled by 2015. In order to discourage the creation of non-recyclable waste, the government has imposed a levy per tonne of waste buried in landfill sites and has stated that this levy will rise over the next five years in order to encourage continuing improvement in the amount of recycled waste.

Currently, Seeland is in a long recession and so local authority revenues have fallen as tax revenues reflect the poor state of the economy. Along with other local authorities, BLA has tried to cut costs and so has focused on financial measures of performance. In a recent, private meeting, the chief executive of BLA was heard to say 'keep costs under control and we will worry about quality of service only when complaint levels build to an unacceptable level.' As one of the area's largest employers, cutting staff numbers has been very difficult for BLA due to the impact on the local economy and the reaction of the residents.

The current performance indicators used at BLA are drawn from the existing information systems with national figures given for comparison. Those relating to waste collection for the year ending 31 March 2014 are:

		BLA	National total
Total cost	(\$m)	250	2,850
Volume of waste			
	landfilled (tonnes)	1,250,000	13,750,000
	recycled (tonnes)	950,000	9,500,000
	total (tonnes)	2,200,000	23,250,000
No. of staff		3,500	39,900
Staff cost	(\$m)	110	1,190
No. of households		2,380,952	26,190,476
No. of complaints about waste uncollected		18,250	200,750
		BLA	National average
Frequency of waste collections (days)		14	12

Notes on BLA data:

1. Cost data and no. of households comes from BLA's financial systems.
2. Waste data comes from weighing lorries at the landfill sites and recycling facilities.
3. Staff data is collected from BLA's HR system.
4. Complaints data is based on numbers of letters and phone calls to the waste management department.
5. Frequency of collection data is obtained from the department's vehicle schedules.

Required:

- (a) Explain why non-financial indicators are particularly useful for public sector organisations, illustrating your answer with brief examples relevant to BLA. (6 marks)
- (b) Explain how the value for money provision of waste services by BLA should be assessed by suggesting and calculating justified performance indicators using the information in the scenario. (12 marks)
- (c) Discuss the difficulties of measuring qualitative factors of performance, suggesting appropriate solutions for BLA. (7 marks)

(25 marks)

3 Maxwell Electricity Generation (Maxwell) is an electricity-generating firm producing power for industry and the general public in the country of Deeland. In the past, the company has been dominated by the need to make suitable returns on capital for its shareholders.

All power stations work in broadly the same way by taking in fuel (coal, gas or nuclear) and producing electricity and waste products.

Maxwell has the following mix of power stations:

Power station type	Details for each type of station			Totals for Maxwell			
	Maximum generating power (MW)	Operating cost of electricity (\$/MWh)	Capital cost (\$m)	Number of stations	Total capital invested (\$m)	Total CO ₂ emissions (million tonnes)	
Coal	(small)	300	25	1,320	4	5,280	3.15
	(large)	600	25	2,640	4	10,560	12.61
Gas	(small)	300	50	300	8	2,400	3.15
	(large)	900	50	900	2	1,800	7.10
Nuclear	1,200	20	6,000	2	12,000	0.50	
						32,040	26.51

Notes:

1. Maximum generating power is the output of the station measured in megawatts (MW) at 100% operating capacity. The electricity produced by a station is measured in megawatt hours (MWh).
2. It is assumed that the same load factor applies across all the different types of station, i.e. they are working at the same percentage of capacity throughout the year.
3. Operating cost of electricity is the cost before the cost of financing the capital invested in a station.
4. The CO₂ (carbon dioxide) emissions are estimated based on industry standard figures for similar stations.
5. Capital costs and CO₂ emission figures are current best estimates.

The business has two alternative plans (plans 1a and 1b) to maintain current generating capacity while plan 2 will grow the business.

Plan 1a

Build a new nuclear power station (the same as the existing nuclear type) to replace one of the 300 MW coal stations, one of the 600 MW coal stations and, also, one of the 300 MW gas stations. The stations being replaced are all reaching the end of their useful lives.

Plan 1b

Replace the gas and coal stations mentioned in plan 1a with equivalent gas and coal stations, thus maintaining the current generating mix.

Plan 2

In order to grow the business, a new nuclear station is being considered in combination with one of plan 1a or 1b. This new nuclear station would be the same as the existing stations.

Maxwell is trying to raise finance for either plan 1a or plan 1b and, in addition to one of these plans, plan 2. A nuclear plant takes about five years to build (assuming no regulatory difficulties or problems over the design choice). It has a working life of 40 years and costs about \$1bn at current prices to decommission although this estimate is uncertain as each site is unique in the decommissioning difficulties which it presents.

The government of Deeland has joined the international community in pledging to have greater concern for the environment. Initially, it has stated that there is a national goal to reduce carbon dioxide emissions by 20% in the next five years. The government is aware that electricity demand is estimated to rise by around 10% over the next five years, nevertheless, it is strongly encouraging businesses to help achieve this reduction in CO₂ emissions. There is a proposal to raise a carbon tax on CO₂ emissions in order to encourage reductions. The government is also concerned that there are other pollutants emitted by power stations but has decided to focus efforts on CO₂ initially, as it is a key cause of climate change.

In order to join the wider community in achieving these aims and as one of the major electricity generators in Deeland, Maxwell has stated its own environmental goal as:

‘to help reach national targets for reduction in CO₂ emissions while maintaining our ability to contribute to the electricity needs of the people of Deeland.’

The finance director is interested in broadening environmental reporting within the company and has asked you as his performance measurement expert to explain how input/output analysis would help. He needs to know how this will broaden performance measurement at Maxwell. Lastly, he wants to understand the impact of this analysis on the management information systems which are currently set up for periodic financial reporting purposes.

Required:

- (a) Using Maxwell’s stated environmental goal, assess the proposed investment plans 1a and 2.** (10 marks)
- (b) Discuss the lifecycle costing issues associated with Plan 2.** (6 marks)
- (c) Explain how the introduction of input/output analysis will affect environmental performance measurement and information systems at Maxwell.** (9 marks)

(25 marks)

- 4 Culam Mining (Culam) is a mineral ore mining business in the country of Teeland. It owns and operates four mines. A mine takes on average two years to develop before it can produce ore and the revenue from the mine is split (25:75) between selling the ore under fixed price contracts over five years and selling on the spot market. The bulk of the business's production is exported. A mine has an average working life of about 20 years before all the profitable ore is extracted. It then takes a year to decommission the site and return the land to a useable form for agriculture or other developments.

Recently, one of Culam's foreign competitors surprised the market by becoming insolvent as a result of paying too much to acquire a competitor when the selling price of their minerals dipped as the world economy went into recession. As a result, the chief executive officer (CEO) wanted to know if this was likely to happen to Culam. She had read about the Altman Z-score as a way of predicting corporate failure and had a business analyst prepare a report calculating the Z-score for Culam. The report is summarised below:

Analyst's Report (extract)

The Altman Z-score model is:

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + X_5$$

Another quantitative model (Q-score model) has been produced by academics working at Teeland's main university based on recent data from listed companies on the small Teeland stock exchange. It is:

$$Q = 1.4X_1 + 3.3X_3 + 0.5X_4 + 1.1X_5 + 1.7X_6$$

Where for both models:

X1 is working capital/total assets;

X2 is retained earnings reserve/total assets;

X3 is profit before interest and tax/total assets;

X4 is market value of equity/total long-term debt (MVe/total long-term debt);

X5 is revenue/total assets;

and

X6 is current assets/current liabilities.

Using the most recent figures from Culam's financial statements (year ending September 2014), Culam's Altman Z-score is 3.5 and its score from the other model (Q) is 3.1.

For both models, a score of more than 3 (for Z or Q) is considered safe and at below 1.8, the company is at risk of failure in the next two years.

The analyst had done what was asked and calculated the score but had not explained what it meant or what action should be taken as a result. Therefore, the CEO has turned to you to help her to make sense of this work and for advice about how to use the information and how Culam should proceed into the future.

Required:

- (a) Evaluate both the result of the analyst's calculations and the appropriateness of these two models for Culam.** (10 marks)

- (b) Explain the potential effects of a mine's lifecycle on Culam's Z-score and the company's probability of failure.** (7 marks)
Note: You should ignore its effect on the Q-score.

- (c) Give four detailed recommendations to reduce the probability of failure of Culam, providing suitable justifications for your advice.** (8 marks)

(25 marks)

Present Value Table

Present value of 1 i.e. $(1 + r)^{-n}$

Where r = discount rate
 n = number of periods until payment

<i>Discount rate (r)</i>											
<i>Periods</i>											
(n)	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	1
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826	2
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751	3
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683	4
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621	5
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564	6
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513	7
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467	8
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424	9
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386	10
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350	11
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319	12
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290	13
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263	14
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239	15
(n)	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	1
2	0.812	0.797	0.783	0.769	0.756	0.743	0.731	0.718	0.706	0.694	2
3	0.731	0.712	0.693	0.675	0.658	0.641	0.624	0.609	0.593	0.579	3
4	0.659	0.636	0.613	0.592	0.572	0.552	0.534	0.516	0.499	0.482	4
5	0.593	0.567	0.543	0.519	0.497	0.476	0.456	0.437	0.419	0.402	5
6	0.535	0.507	0.480	0.456	0.432	0.410	0.390	0.370	0.352	0.335	6
7	0.482	0.452	0.425	0.400	0.376	0.354	0.333	0.314	0.296	0.279	7
8	0.434	0.404	0.376	0.351	0.327	0.305	0.285	0.266	0.249	0.233	8
9	0.391	0.361	0.333	0.308	0.284	0.263	0.243	0.225	0.209	0.194	9
10	0.352	0.322	0.295	0.270	0.247	0.227	0.208	0.191	0.176	0.162	10
11	0.317	0.287	0.261	0.237	0.215	0.195	0.178	0.162	0.148	0.135	11
12	0.286	0.257	0.231	0.208	0.187	0.168	0.152	0.137	0.124	0.112	12
13	0.258	0.229	0.204	0.182	0.163	0.145	0.130	0.116	0.104	0.093	13
14	0.232	0.205	0.181	0.160	0.141	0.125	0.111	0.099	0.088	0.078	14
15	0.209	0.183	0.160	0.140	0.123	0.108	0.095	0.084	0.074	0.065	15

Annuity Table

Present value of an annuity of 1 i.e. $\frac{1 - (1 + r)^{-n}}{r}$

Where r = discount rate
 n = number of periods

		<i>Discount rate (r)</i>									
<i>Periods</i>											
(n)	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	1
2	1.970	1.942	1.913	1.886	1.859	1.833	1.808	1.783	1.759	1.736	2
3	2.941	2.884	2.829	2.775	2.723	2.673	2.624	2.577	2.531	2.487	3
4	3.902	3.808	3.717	3.630	3.546	3.465	3.387	3.312	3.240	3.170	4
5	4.853	4.713	4.580	4.452	4.329	4.212	4.100	3.993	3.890	3.791	5
6	5.795	5.601	5.417	5.242	5.076	4.917	4.767	4.623	4.486	4.355	6
7	6.728	6.472	6.230	6.002	5.786	5.582	5.389	5.206	5.033	4.868	7
8	7.652	7.325	7.020	6.733	6.463	6.210	5.971	5.747	5.535	5.335	8
9	8.566	8.162	7.786	7.435	7.108	6.802	6.515	6.247	5.995	5.759	9
10	9.471	8.983	8.530	8.111	7.722	7.360	7.024	6.710	6.418	6.145	10
11	10.368	9.787	9.253	8.760	8.306	7.887	7.499	7.139	6.805	6.495	11
12	11.255	10.575	9.954	9.385	8.863	8.384	7.943	7.536	7.161	6.814	12
13	12.134	11.348	10.635	9.986	9.394	8.853	8.358	7.904	7.487	7.103	13
14	13.004	12.106	11.296	10.563	9.899	9.295	8.745	8.244	7.786	7.367	14
15	13.865	12.849	11.938	11.118	10.380	9.712	9.108	8.559	8.061	7.606	15
(n)	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	1
2	1.713	1.690	1.668	1.647	1.626	1.605	1.585	1.566	1.547	1.528	2
3	2.444	2.402	2.361	2.322	2.283	2.246	2.210	2.174	2.140	2.106	3
4	3.102	3.037	2.974	2.914	2.855	2.798	2.743	2.690	2.639	2.589	4
5	3.696	3.605	3.517	3.433	3.352	3.274	3.199	3.127	3.058	2.991	5
6	4.231	4.111	3.998	3.889	3.784	3.685	3.589	3.498	3.410	3.326	6
7	4.712	4.564	4.423	4.288	4.160	4.039	3.922	3.812	3.706	3.605	7
8	5.146	4.968	4.799	4.639	4.487	4.344	4.207	4.078	3.954	3.837	8
9	5.537	5.328	5.132	4.946	4.772	4.607	4.451	4.303	4.163	4.031	9
10	5.889	5.650	5.426	5.216	5.019	4.833	4.659	4.494	4.339	4.192	10
11	6.207	5.938	5.687	5.453	5.234	5.029	4.836	4.656	4.486	4.327	11
12	6.492	6.194	5.918	5.660	5.421	5.197	4.988	4.793	4.611	4.439	12
13	6.750	6.424	6.122	5.842	5.583	5.342	5.118	4.910	4.715	4.533	13
14	6.982	6.628	6.302	6.002	5.724	5.468	5.229	5.008	4.802	4.611	14
15	7.191	6.811	6.462	6.142	5.847	5.575	5.324	5.092	4.876	4.675	15

End of Question Paper