



May 2008 Examinations

Managerial Level

Paper P1 – Management Accounting – Performance Evaluation

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The answers published here have been written by the Examiner and should provide a helpful guide for both tutors and students.

Published separately on the CIMA website (www.cimaglobal.com/students) from mid-September is a Post Examination Guide for the paper which provides much valuable and complementary material including indicative mark information.

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Management Accounting Pillar

Managerial Level Paper

**P1 – Management Accounting –
Performance Evaluation**

20 May 2008 – Tuesday 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 Section 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 17 sub-questions and is on pages 2 to 8.

Answer ALL SIX compulsory sub-questions in Section B on pages 9 and 10.

Answer ONE of the two questions in Section C on pages 11 to 14.

Maths Tables and Formulae are provided on pages 15 to 19.

The list of verbs as published in the syllabus is given for reference on the page 20.

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.

P1 – Performance Evaluation

SECTION A – 40 MARKS

[the indicative time for answering this section is 72 minutes]

ANSWER ALL SEVENTEEN SUB-QUESTIONS

Instructions for answering Section A:

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

Your answers should be clearly numbered with the sub-question number 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-questions **1.11** to **1.17** you should show your workings as marks are available for the method you use to answer these sub-questions.

Question One

- 1.1 If inventory levels have increased during the period, the profit calculated using marginal costing when compared with that calculated using absorption costing will be
- A higher.
 - B lower.
 - C equal.
 - D impossible to answer without further information.

(2 marks)

- 1.2 Fixed production overheads will always be under-absorbed when
- A actual output is lower than budgeted output.
 - B actual overheads incurred are lower than budgeted overheads.
 - C overheads absorbed are lower than those budgeted.
 - D overheads absorbed are lower than those incurred.

(2 marks)

The following scenario is to be used for questions 1.3 and 1.4

A company manufactures three products: W, X and Y. The products use a series of different machines, but there is a common machine that is a bottleneck.

The standard selling price and standard cost per unit for each product for the next period are as follows:

	W	X	Y
	£	£	£
Selling price	180	150	150
Cost:			
Direct material	41	20	30
Direct labour	30	20	50
Variable production overheads	24	16	20
Fixed production overheads	<u>36</u>	<u>24</u>	<u>30</u>
Profit	<u>49</u>	<u>70</u>	<u>20</u>
Time (minutes) on bottleneck machine	7	10	7

The company is trying to plan the best use of its resources.

1.3 Using a traditional limiting factor approach, the rank order (best first) of the products would be

- A** W, X, Y
- B** W, Y, X
- C** X, W, Y
- D** Y, X, W

(2 marks)

1.4 Using a throughput accounting approach, the rank order (best first) of the products would be

- A** W, X, Y
- B** W, Y, X
- C** X, W, Y
- D** Y, X, W

(2 marks)

Section A continues on the next page

1.5 A company's summary budgeted operating statement is as follows:

	\$000
Revenue	400
Variable costs	240
Fixed costs	<u>100</u>
Profit	<u>60</u>

Assuming that the sales mix does not change, the percentage increase in sales volume that would be needed to increase the profit to \$100,000 is

- A 10%
- B 15%
- C 25%
- D 40%

(2 marks)

1.6 Which of the following statements are true?

- (i) Enterprise Resource Planning (ERP) systems are accounting oriented information systems which aid in identifying and planning the enterprise wide resources needed to resource, make, account for and deliver customer orders.
- (ii) Flexible Manufacturing Systems (FMS) are integrated, computer-controlled production systems, capable of producing any of a range of parts and of switching quickly and economically between them.
- (iii) Just-In-Time (JIT) is a system whose objective is to produce, or to procure, products or components as they are required.

- A (i) and (ii) only
- B (i) and (iii) only
- C (ii) and (iii) only
- D (i), (ii) and (iii)

(2 marks)

1.7 Flexed budgets for the cost of medical supplies in a hospital, based on a percentage of maximum bed occupancy, are shown below:

Bed occupancy	82%	94%
Medical supplies cost	\$410,000	\$429,200

During the period, the actual bed occupancy was 87% and the total cost of the medical supplies was \$430,000.

The medical supplies expenditure variance was

- A \$5,000 adverse
- B \$12,000 adverse
- C \$5,000 favourable
- D \$12,000 favourable

(2 marks)

- 1.8** A company uses a standard absorption costing system. The fixed overhead absorption rate is based on labour hours.

Extracts from the company's records for last year were as follows:

	<i>Budget</i>	<i>Actual</i>
Fixed production overhead	\$450,000	\$475,000
Output	50,000 units	60,000 units
Labour hours	900,000	930,000

The under- or over-absorbed fixed production overheads for the year were

- A** \$10,000 under-absorbed
- B** \$10,000 over-absorbed
- C** \$15,000 over-absorbed
- D** \$65,000 over-absorbed

(2 marks)

- 1.9** A flexible budget is a budget that

- A** is changed during the budget period according to changed circumstances.
- B** is continuously updated by adding a further accounting period when the earliest accounting period has expired.
- C** results from the participation of budget holders.
- D** recognises different cost behaviour patterns and is designed to change as the volume of activity changes.

(2 marks)

- 1.10** A company will forecast its quarterly sales units for a new product by using a formula to predict the base sales units and then adjusting the figure by a seasonal index.

The formula is $BU = 4000 + 80Q$

Where BU = Base sales units and Q is the quarterly period number

The seasonal index values are:

Quarter 1	105%
Quarter 2	80%
Quarter 3	95%
Quarter 4	120%

The forecast increase in sales units from Quarter 3 to Quarter 4 is

- A** 25%
- B** 80 units
- C** 100 units
- D** 1,156 units

(2 marks)

Section A continues on the next page

- 1.11 Product XYZ is made by mixing three materials (X, Y and Z). There is an expected loss of 20% of the total input.

The budgeted and actual results for Period 1 are shown below. There were no opening or closing inventories of any materials or of the finished product.

	<i>Budget</i>		<i>Actual</i>	
Output of XYZ	800 kg		960 kg	
Material				
X	500 kg	@ \$5.00 per kg	600 kg	@ \$4.70 per kg
Y	300 kg	@ \$6.00 per kg	380 kg	@ \$6.50 per kg
Z	<u>200 kg</u>	@ \$7.00 per kg	<u>300 kg</u>	@ \$7.10 per kg
Total input	1,000 kg		1,280 kg	

Calculate for Period 1:

- (i) the total materials mix variance; (2 marks)
- (ii) the total materials yield variance. (2 marks)

(Total for sub-question 1.11 = 4 marks)

- 1.12 Extracts from a company's year-end accounts are shown below:

	\$000
Revenue	9,456
Gross profit	5,872
Operating profit	2,981
Non-current assets	17,850
Inventory	950
Cash at bank	1,750
Short-term borrowings	1,225
Trade receivables	731
Trade payables	813

Calculate the following performance measures:

- (i) Operating profit margin;
- (ii) Return on capital employed;
- (iii) Trade receivable days (debtors days);
- (iv) Current ratio. (4 marks)

The following data are given for sub questions 1.13, 1.14 and 1.15

Premier Cycles has two divisions: the Frame Division and the Assembly Division. The Frame Division produces bike frames. The frames can be sold directly to external customers as “frame only” or the frames can be transferred to the Assembly Division where they are built up into complete bikes by adding other components, such as wheels and handlebars.

Frame Division

Budgeted details for the forthcoming year for the Frame Division are:

Selling price per frame	\$852
Variable cost per frame	\$420
Annual fixed cost	\$4,000,000
Annual capacity	12,000 frames

The Division has orders for 5,000 frames from external customers for the forthcoming year.

Assembly Division

The Manager of the Assembly Division has just signed a contract to supply 8,000 bikes to a sporting goods retailer next year. This will mean that the Division will be operating at full capacity. Budgeted details are as follows:

Selling price per bike	\$1,600
Variable cost of assembly and components	\$500 (excluding frame)
Annual fixed cost	\$2,400,000
Annual capacity	8,000 bikes

Company Policy

It has been announced that Premier Cycles will be introducing a new performance appraisal system. The Divisional Managers' bonuses will only be payable if they earn a minimum annual contribution of 108% of fixed costs.

1.13 Calculate the minimum number of frames the Frame Division must sell next year in order for the Divisional Manager to earn a bonus if frames are sold for \$852 each. *(2 marks)*

1.14 Calculate the maximum price per frame that the Manager of the Assembly Division could pay and still earn a bonus next year. *(2 marks)*

1.15 Ignoring Premier Cycles' performance appraisal system, explain how the Manager of the Frame Division should calculate the transfer price of frames it supplies to the Assembly division in order to maximise profits for Premier Cycles.

Note: NO calculations are required. *(2 marks)*

Section A continues on the next page

1.16 State FOUR aims of a transfer-pricing system.

(2 marks)

1.17 Product GH passes through two consecutive processes: the output from Process 1 is transferred to Process 2. Details of Process 1 for Period 3 were as follows:

There were 5,000 units of opening work-in-progress, which were valued as follows:

Materials	\$77,080
Labour	\$33,480
Production overheads	\$8,825

During the period, 14,000 units were added to the process and the following costs were incurred:

Materials	\$230,000
Labour	\$101,000
Production overheads	\$40,000

At the end of Period 3, there were 6,000 units of closing work-in-progress. The degree of completion for these units was:

Materials	100%
Labour	80%
Production overheads	65%

The expected normal loss is 10% of new units added to the process during the period. These units and any other losses can be sold for \$5 per unit.

11,000 units were transferred to Process 2 and there were losses of 2,000 units.

All losses occur at the end of the process.

Weighted average costing is used.

Calculate the total cost of the 11,000 units that were transferred to Process 2.

(4 marks)

(Total for Section A = 40 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.

SECTION B – 30 MARKS

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

ANSWER ALL SIX SUB-QUESTIONS. EACH SUB-QUESTION IS WORTH 5 MARKS

Question Two

- (a) Describe THREE key features that are present in any organisation that is successfully focused on Total Quality Management (TQM). *(5 marks)*
-

- (b) Explain THREE behavioural consequences that may result after the introduction of participative budgeting. *(5 marks)*
-

- (c) Discuss the advantages and disadvantages of rolling budgets. *(5 marks)*
-

The following data relate to sub-questions (d), (e) and (f)

A multi-national company manufactures and sells a wide range of digital equipment. The company is structured into three Divisions: Computers, Audio-visual and Photographic. The Divisions operate as investment centres and the performance of the Divisional Managers is evaluated by using Return on Investment (ROI).

The Manager of the Photographic Division was concerned that the Division was falling behind its competitors in terms of financial returns and market share, and has implemented strategies to improve the situation. An external benchmarking exercise was undertaken to try to establish the position of the Division in relation to its competitors in a number of key areas. It has now been suggested that the Division should also carry out an internal benchmarking exercise.

-
- (d) The manager of the Photographic Division is considering introducing a Balanced Scorecard to measure the success of the strategies. He has identified two perspectives and two associated goals. They are:

Perspective	Goal
Innovation	Technology Leadership
Customer	Support

- (i) For the "Innovation Perspective" of the Division, recommend a performance measure and briefly explain how the measure will reflect the achievement of the stated goal. *(3 marks)*
- (ii) For the "Customer Perspective" of the Division, state which data should be collected and explain how this could be used to ensure the goal of "support" is met. *(2 marks)*

(Total for (d) = 5 marks)

-
- (e) Explain THREE reasons why internal benchmarking may provide information that is more useful to the Manager of the Photographic Division, in terms of monitoring and improving performance, than that provided by external benchmarking. *(5 marks)*

-
- (f) Explain THREE reasons why ROI may not be a good performance measure. *(5 marks)*

(Total for Question Two = 30 marks)

(Total for Section B = 30 marks)

End of Section B

Section C starts on the next page

SECTION C – 30 MARKS

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

ANSWER ONE OF THE TWO QUESTIONS

Question Three

The newly-appointed Managing Director of FX has received the variance report for Month 6, which is shown below:

Month 6 Variance Report

Output and Sales for Month 6. Budget: 1,000 units. Actual: 1,200 units.

	£	£	£
Budgeted contribution			90,000
Budgeted fixed costs			<u>70,000</u>
Budgeted profit			20,000
Volume variance			<u>18,000</u>
Expected profit on actual sales			38,000
Sales price variance			12,000
Production variances	Favourable	Adverse	
Materials price		6,300	
Materials usage		6,000	
Labour rate	5,040		
Labour efficiency		2,400	
Variable overhead expenditure	-	-	
Variable overhead efficiency		1,200	
Fixed overhead		<u>4,000</u>	
	<u>5,040</u>	<u>19,900</u>	<u>14,860</u>
Actual profit			11,140

Background information (not seen by the Managing Director)

The report did not include any other information. Details relating to the company and the product that it makes are given below:

FX produces one type of product. It operates a standard marginal costing system.

The standard unit cost and price of the product is as follows:

	£	£
Selling price		250
Direct material (5 kg at £20)	100	
Direct labour (4 hours at £10)	40	
Variable overheads (4 hours at £5)	<u>20</u>	<u>160</u>
Contribution		<u>90</u>

The variable overhead absorption rate is based on direct labour hours.

The company has budgeted fixed overheads of £70,000 per month.

Budgeted sales and production levels are 1,000 units per month.

Month 6

The company has just completed Month 6 of its operations. Extracts from its records show:

1. 1,200 units were produced and sold.
2. The actual direct materials purchased and used was 6,300 kg costing £132,300
3. The actual direct labour hours worked were 5,040 hours.

Required:

- (a) Prepare a report for the Managing Director of FX that explains and interprets the Month 6 variance report. The Managing Director has recently joined the company and has very little previous financial experience.

(17 marks)

The Managing Director was concerned about the Material Price variance and its cause. He discovered that a shortage of materials had caused the market price to rise to £23 per kg.

Required:

- (b) In view of this additional information, calculate for Direct Materials:

- The total variance;
- The planning variance;
- The two operational variances.

(7 marks)

- (c) Discuss the advantages and disadvantages of reporting planning and operational variances. Your answer should refer, where appropriate, to the variances you calculated in (b) above.

(6 marks)

(Total for Question Three = 30 marks)

Section C continues on the next page

Question Four

Q, a new company, is being established to manufacture and sell an electronic tracking device: the Trackit. The owners are excited about the future profits that the business will generate. They have forecast that sales will grow to 2,600 Trackits per month within five months and will be at that level for the remainder of the first year.

The owners will invest a total of \$250,000 in cash on the first day of operations (that is the first day of Month 1). They will also transfer non-current assets into the company.

Extracts from the company's business plan are shown below.

Sales

The forecast sales for the first five months are:

Month	Trackits (units)
1	1,000
2	1,500
3	2,000
4	2,400
5	2,600

The selling price has been set at \$140 per Trackit.

Sales receipts

Sales will be mainly through large retail outlets. The pattern for the receipt of payment is expected to be as follows:

Time of payment	% of sales value
Immediately	15 *
One month later	25
Two months later	40
Three months later	15

The balance represents anticipated bad debts.

* A 4% discount will be given for immediate payment.

Production

The budget production volumes in units are:

Month 1	Month 2	Month 3	Month 4
1,450	1,650	2,120	2,460

Variable production cost

The budgeted variable production cost is \$90 per unit, comprising:

	\$
Direct materials	60
Direct wages	10
Variable production overheads	<u>20</u>
Total variable cost	<u>90</u>

Direct materials: Payment for purchases will be made in the month following receipt. There will be no opening inventory of materials in Month 1. It will be company policy to hold inventory at the end of each month equal to 20% at of the following month's production requirements. The direct materials cost includes the cost of an essential component that will be bought in from a specialist manufacturer.

Direct wages will be paid in the month in which the production occurs.

Variable production overheads: 65% will be paid in the month in which production occurs and the remainder will be paid one month later.

Fixed overhead costs

Fixed overheads are estimated at \$840,000 per annum and are expected to be incurred in equal amounts each month. 60% of the fixed overhead costs will be paid in the month in which they are incurred and 15% in the following month. The balance represents depreciation of non-current assets.

Ignore VAT and Tax

Required

- (a) Prepare a cash budget for each of the first three months and for that three-month period in total. *(14 marks)*

- (b) There is some uncertainty about the cost of the specialist component (this is included in the direct material cost). It is thought that the cost of the component could range between \$32 and \$50 per Trackit. It is currently included in the cost estimates at \$40 per Trackit.

Calculate the budgeted total net cash flow for the three-month period in total if the cost of the component was

(i) \$32

(ii) \$50

(6 marks)

- (c) Prepare a report for the owners of Q that offers advice about the profitability of their business and the situation revealed by the extracts from the business plan and your answers to (a) and (b) above.

(10 marks)

Total for Question Four = 30 marks

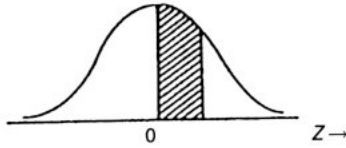
(Total for Section C = 30 marks)

End of question paper

Maths Tables and Formulae are on pages 15 to 21

AREA UNDER THE NORMAL CURVE

This table gives the area under the normal curve between the mean and a point Z standard deviations above the mean. The corresponding area for deviations below the mean can be found by symmetry.



$Z = \frac{(x - \mu)}{\sigma}$	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	.0000	.0040	.0080	.0120	.0159	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2518	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4430	.4441
1.6	.4452	.4463	.4474	.4485	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4762	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4865	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4980	.4980	.4981
2.9	.4981	.4982	.4983	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.49865	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
3.1	.49903	.4991	.4991	.4991	.4992	.4992	.4992	.4992	.4993	.4993
3.2	.49931	.4993	.4994	.4994	.4994	.4994	.4994	.4995	.4995	.4995
3.3	.49952	.4995	.4995	.4996	.4996	.4996	.4996	.4996	.4996	.4997
3.4	.49966	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4998
3.5	.49977									

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

PROBABILITY

$A \cup B = \mathbf{A \text{ or } B}$. $A \cap B = \mathbf{A \text{ and } B}$ (overlap).

$P(B | A)$ = probability of B , **given** A .

Rules of Addition

If A and B are mutually exclusive: $P(A \cup B) = P(A) + P(B)$

If A and B are **not** mutually exclusive: $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

Rules of Multiplication

If A and B are *independent*: $P(A \cap B) = P(A) * P(B)$

If A and B are **not independent**: $P(A \cap B) = P(A) * P(B | A)$

$E(X) = \Sigma (\text{probability} * \text{payoff})$

Quadratic Equations

If $aX^2 + bX + c = 0$ is the general quadratic equation, the two solutions (roots) are given by:

$$X = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

DESCRIPTIVE STATISTICS

Arithmetic Mean

$$\bar{x} = \frac{\Sigma x}{n} \quad \bar{x} = \frac{\Sigma fx}{\Sigma f} \quad (\text{frequency distribution})$$

Standard Deviation

$$SD = \sqrt{\frac{\Sigma(x - \bar{x})^2}{n}} \quad SD = \sqrt{\frac{\Sigma fx^2}{\Sigma f} - \bar{x}^2} \quad (\text{frequency distribution})$$

INDEX NUMBERS

Price relative = $100 * P_1/P_0$ Quantity relative = $100 * Q_1/Q_0$

Price:
$$\frac{\Sigma w * \left(\frac{P_1}{P_0}\right)}{\Sigma w} * 100$$

Quantity:
$$\frac{\Sigma w * \left(\frac{Q_1}{Q_0}\right)}{\Sigma w} * 100$$

TIME SERIES

Additive Model

Series = Trend + Seasonal + Random

Multiplicative Model

Series = Trend * Seasonal * Random

LINEAR REGRESSION AND CORRELATION

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

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

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

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

or solve

$$\begin{aligned} \sum Y &= na + b \sum X \\ \sum XY &= a \sum X + b \sum X^2 \end{aligned}$$

Coefficient of correlation

$$r = \frac{\text{Covariance}(XY)}{\sqrt{\text{Var}(X) \cdot \text{Var}(Y)}} = \frac{n \sum XY - (\sum X)(\sum Y)}{\sqrt{\{n \sum X^2 - (\sum X)^2\} \{n \sum Y^2 - (\sum Y)^2\}}}$$

$$R(\text{rank}) = 1 - \frac{6 \sum d^2}{n(n^2 - 1)}$$

FINANCIAL MATHEMATICS

Compound Interest (Values and Sums)

Future Value S , of a sum of X , invested for n periods, compounded at $r\%$ interest

$$S = X[1 + r]^n$$

Annuity

Present value of an annuity of £1 per annum receivable or payable for n years, commencing in one year, discounted at $r\%$ per annum:

$$PV = \frac{1}{r} \left[1 - \frac{1}{[1 + r]^n} \right]$$

Perpetuity

Present value of £1 per annum, payable or receivable in perpetuity, commencing in one year, discounted at $r\%$ per annum:

$$PV = \frac{1}{r}$$

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

The Examiner for Management Accounting – Performance Evaluation offers to future candidates and to tutors using this booklet for study purposes, the following background and guidance on the questions included in this examination paper.

Section A – Question One – Compulsory

Question One consists of 17 objective test sub-questions. These are drawn from all sections of the syllabus. They are designed to examine breadth across the syllabus and thus cover many learning outcomes.

Section B – Question Two – Compulsory

Question Two has six sub-questions.

- (a) covers learning outcome A(vii) - Explain the role of MRP and ERP systems in supporting standard costing systems, calculating variances and facilitating the posting of ledger entries.
- (b) covers learning outcome C(xiii) - Evaluate the impact of budgetary control systems on human behaviour.
- (c) covers learning outcome C(vi) - Evaluate and apply alternative approaches to budgeting
- (d) covers learning outcome B(v) – Prepare reports using a range of internal and external benchmarks and interpret the results
- (e) covers learning outcome D(iv) - Calculate and apply measures of performance for investment centres (often ‘strategic business units’ or divisions of larger groups).
- (f) covers learning outcome D(iv) - Calculate and apply measures of performance for investment centres (often ‘strategic business units’ or divisions of larger groups).

Section C – answer one of two questions

Question Three has three parts.

- (a) covers learning outcome B(iiii) - *Prepare and discuss a report which reconciles budget and actual profit using absorption and/or marginal costing principles*
- (b) covers learning outcome B(iv) - Calculate and explain planning and operational variances.
- (c) covers learning outcome B(iv) - Calculate and explain planning and operational variances.

Question Four has three parts.

- (a) covers learning outcome C(iii) - Calculate projected revenues and costs based on product/service volumes, pricing strategies and cost structures.
 - (b) covers learning outcome C(vii) - Calculate the consequences of “what if” scenarios and evaluate their impact on master profit and loss account and balance sheet.
 - (c) covers learning outcome C(iv) - Evaluate projected performance by calculating key metrics including profitability, liquidity and asset turnover ratios.
-

Managerial Level Paper

P1 – Management Accounting – Performance Evaluation

Examiner's Answers

SECTION A

Answer to Question One

1.1 The correct answer is B

1.2 The correct answer is D

1.3 The traditional limiting factor approach would view contribution per unit as the selling price minus all variable costs

	W	X	Y
Contribution per unit £	85	94	50
Bottleneck minutes	7	10	7
Contribution per minute	12.1	9.4	7.1
Rank	1	2	3

The correct answer is A

1.4 A throughput accounting approach assumes that materials are the only variable costs. Consequently the contribution is different to that calculated using the traditional method.

	W	X	Y
Contribution per unit £	139	130	120
Bottleneck minutes	7	10	7
Contribution per minute	19.9	13	17.1
Rank	1	3	2

The correct answer is B

1.5 Contribution to sales ratio = $160/400 = 40\%$

Extra profit required = \$40,000. Fixed costs are constant and therefore extra contribution will generate extra profit.

The revenue needed to generate contribution of \$40,000 is $\$40,000/40\% = \$100,000$.

The current revenue is \$400,000 and therefore \$100,000 is 25% of this.

The correct answer is C

1.6 **The correct answer is D**

1.7

	%	\$
High	94	429,000
Low	82	410,000
Difference	12	19,200

Variable cost per % = $\$19,200/12 = \$1,600$

87% is 5% more than 82% and therefore the total cost for the flexed budget for a bed occupancy of 87% is $\$410,000 + (1,600 * 5) = \$418,000$

The expenditure variance is $\$418,000 - \$430,000 = \$12,000$ adverse

The correct answer is B

1.8 The under or over absorbed overhead is the difference between the actual overhead spent and the overheads absorbed. Overheads are absorbed based on the standard content of the actual output. Here we are told that the absorption rate is based on labour hours.

The overhead absorption rate is $\$450,000/900,000\text{hours} = \0.50 per labour hour

Standard labour hours per unit = $900,000/50,000 = 18$ hours per unit

The output was 60,000 units. This is $60,000 * 18 = 1,080,000$ standard hours.

Overhead absorbed = $\$1,080,000 * 0.50 = \$540,000$

The actual overheads were \$475,000 and therefore overheads were over absorbed by \$65,000.

The correct answer is D

1.9 **The correct answer is D**

1.10 Forecast for Q3 = $\{4,000 + (80 * 3)\} * 95\% = 4,028$
Forecast for Q4 = $\{4,000 + (80 * 4)\} * 120\% = 5,184$

This is an increase of 1,156 units.

The correct answer is D

1.11

- (i) Mix variance = (actual inputs in the actual mix at standard prices) v (actual inputs in standardised mix at standard prices)

	Actual mix			Standard mix		
	kg	\$ per kg	\$	kg	\$ per kg	\$
X	600	5	3,000	640	5	3,200
Y	380	6	2,280	384	6	2,304
Z	<u>300</u>	7	<u>2,100</u>	<u>256</u>	7	<u>1,792</u>
	1,280		7,380	1,280		7,296

Mix variance = \$7,380 v \$7,296 = **\$84 adverse**

- (ii) Yield variance = (actual inputs in standardised mix at standard prices) v (standard input in standardised mix at standard prices for the actual output).

The actual output of XYZ was 960 kg. The input required to achieve an output of 960 kg is 1,200 kg (there is a 20% loss, therefore the input = $960/0.8$).

	Standardised input			Standard input needed		
	kg	\$ per kg	\$	kg	\$ per kg	\$
X	640	5	3,200	600	5	3,000
Y	384	6	2,304	360	6	2,160
Z	<u>256</u>	7	<u>1,792</u>	<u>240</u>	7	<u>1,680</u>
	1,280		7,296	1,200		6,840

Yield variance = \$7,296 v \$6,840 = **\$456 adverse**

1.12

- (i) Operating profit margin = $2,981,000/9,456,000 = 31.53\%$
- (ii) Return on capital employed = $2,981 / (17,850 + 950 + 1,750 - 1,225 + 731 - 813) = 15.49\%$
- (iii) Trade receivable days = $(731,000/9,456,000) \times 365 = 28.22$ days
- (iv) Current ratio = $(950 + 1,750 + 731)/(1,225 + 813) = 1.68$

1.13 Contribution per frame = \$432

Return required = \$4m x 1.08 = \$4.32m

Minimum number of frames = \$4.32m/\$432 = 10,000 frames

1.14 Return required = \$2.4m x 1.08 = \$2.592m

Minimum contribution per frame = \$2.592m/8,000 = \$324

Contribution before charging for frame = \$1,600 - \$500 = \$1,100

Therefore the maximum payment would be \$1,100 - \$324 = \$776

1.15 The transfer price should be based on opportunity cost. If there is an external market for the frames then the market price should be used. If there is not an external market, the transfer price should be the marginal cost incurred.

1.16

The aims of a transfer-pricing system include:

- Promote goal congruence;
- Motivate managers;
- Facilitate performance evaluation;
- Retain divisional autonomy;
- Ensure optimal allocation of resources.

(Candidates only needed to state four aims)

1.17

	<i>Units</i>		<i>Units</i>
Opening W-i-P	5,000	Closing W-i-P	6,000
Input	<u>14,000</u>	Output	11,000
	<u>19,000</u>	Normal loss	1,400
		Abnormal loss	<u>600</u>
		Total	<u>19,000</u>

The income from the sale of the normal loss (1,400 x \$5) is used to reduce the cost of materials.

	Costs			Equivalent units				<i>Cost per EU</i>
	<i>Opening W-i-P</i>	<i>Period</i>	<i>Total</i>	<i>Output</i>	<i>Closing W-i-P</i>	<i>Abn Loss</i>	<i>Total</i>	
	\$	\$	\$					\$
Materials	77,080	223,000	300,080	11,000	6,000	600	17,600	17.05
Labour	33,480	101,000	134,480	11,000	4,800	600	16,400	8.20
Prod o/h	8,825	40,000	48,825	11,000	3,900	600	15,500	<u>3.15</u>
								<u>28.40</u>

Value of output = 11,000 units x \$28.40 = \$312,400

SECTION B

Answer to Question Two (a)

Three key features that can be found in any organisation that is focussed on Total Quality Management include:

- Top priority is given to satisfying customers. The organisation will be structured in a way to allow managers to facilitate this.
- People are considered to be the route to success. Management is visible and accessible, and the decision making process is participative. There is only a short span of control.
- Team working is encouraged to improve co-ordination through the organisation and the development of skills.
- Change is embraced and the organisation is structured to allow change to happen.
- The organisation pursues continuous improvement with the aim of eliminating all defects. Performance is measured against new benchmarks rather than against a historic standard.
- The emphasis is on the prevention of problems rather than detection by inspection.

Answer to Question Two (b)

Three possible behavioural consequences that may result from the introduction of participative budgeting include:

- greater acceptance of targets and thus improved motivation to achieve them;
- the attitude to the accounting system itself may improve, reducing the potential for dysfunctional behaviour;
- improved communication within an organisation leading to better understanding and resolution of issues, trade-offs and so on.

Against this:

- pseudo-participation (or only limited participation), with subsequent imposition of more difficult targets in order to achieve the desired corporate budget, is likely to be counter-productive;
- participation may result in budget “slack” – the understatement of budgeted revenues and overstatement of budgeted costs with no incentive to improve on slack targets.

Answer to Question Two (c)

The advantages of rolling budgets include:

- rolling budgets are particularly useful when the environment is uncertain. This is because the remainder of the current budget is reviewed when a new period is added;
- there is a focus on consistently planning twelve months ahead and consequently a constant focus on any changes to the business outlook. This necessitates a continuous review of the organisation’s strategy and tactical operations.
- control is likely to be more effective because budgets are less likely to be out-of-date;

The disadvantages of rolling budgets include:

- the continuous cycle of budgeting can be time-consuming and costly;
 - managers may doubt the value of preparing frequent budgets at regular intervals and might not take the planning process seriously.
-

Answer to Question Two (d)

- (i) A performance measure for "Technology Leadership" could be the number of patents registered each year. This would show how inventive the team had been. In a technology-driven market it is essential for the Division to be constantly developing new ideas and products. Alternative measures could be: time to develop new products; time to introduce updates to products; new technologies introduced and so on.
- (ii) A successful outcome for "Support" would be that customers are satisfied with the support that they are given. One way of measuring this would be to log the number of support requests received and the percentage of these requests that are closed to the satisfaction of the customer. This should be easy to administer given a web-based approach to product/customer support.

Note: Other answers to these questions were equally acceptable.

Answer to Question Two (e)

Three reasons why internal benchmarking might provide information that is more useful than external benchmarking, to the manager of the Photographic Division, include:

- Competitive data is not readily available for external benchmarking whereas it should be easier to gather internal data;
 - Comparisons are more relevant with internal benchmarking since they relate specifically to the business;
 - Allows the setting of acceptable targets that are already being achieved by a part of the organisation;
 - Enables continuous improvement through the sharing of best practices between managers;
 - External data does not explain how performance could be improved. More details can be obtained about the reasons for the differences between internal business units and this enables improvements to be made;
 - An external benchmarking system can be resource intensive in terms of time and money;
 - Available data for external benchmarking may be inaccurate and out of date.
-

Answer to Question Two (f)

Three reasons why Return on Investment (ROI) might not be a good performance measure include:

- Short term v long-term conflict: ROI can encourage managers not to invest in new projects;
 - Problems of comparison: differing business profiles and risk will merit a different return;
 - Reliance on a single measure: no one measure can be suitable. It is preferable to use a portfolio of measures to reflect the organisation's strategy;
 - ROI does not reflect the "size" of the organisation/project: it is a relative measure. Some investors and managers will prefer an absolute measure (they want to know the monetary size);
 - ROI will be determined by asset values. There are many concerns in this area: current value of assets as opposed to historical, comparison between divisions, easier to earn a high return from aged (and therefore depreciated) assets and so on.
 - Transfer pricing systems will affect the individual profits of any divisions and therefore will also affect their ROI.
-

Answer to Question Three

(a)

Report

To: Managing Director, FX
From: Management Accountant
Date: 20 May 2008
Subject: Interpretation of Month 6 Variance Report

Overview

The company produced and sold 1,200 units. This was 200 units more than budgeted for and should have resulted in additional profits of £18,000, and therefore total profits of £38,000. However, a reduction in the selling price of £10 per unit and over-spending on materials and fixed overheads resulted in an actual profit of £11,140.

Interpretation of the Month 6 Variance Report

The purpose of this report is to provide a commentary to accompany the Month 6 Variance Report.

The variance report reconciles the budget profit and the actual profit for the month by listing the financial deviation from standard (variances). The variances are shown individually so that specific points of concern can be seen and areas of responsibility highlighted. This report will provide a commentary on the variances and will follow the sequence of the variance statement.

Budgeted profit

This is the profit that would have been earned if the forecast level of sales and output had been achieved and is based on all costs and revenues being as planned.

Volume variance

Given that output and sales were higher than forecast by 200 units it is to be expected that the profits would be different from those stated in the budget. The company uses a marginal costing system and consequently each unit sold is deemed to earn a contribution of £90 towards fixed costs and profit. Fixed costs are not accounted for on a unit basis; they are charged to the profit statement as a total figure.

Given that sales were 200 units higher than budget, it would be expected that profit would be £18,000 higher (200 x £90).

This level of sales and output (1,200 units) then provides the level of performance that other variances should be measured against.

Sales price variance

This is the difference due to selling the units at a price that is different from the standard (expected) selling price. It can be worked out from the statement that the variance is adverse (I appreciate that the statement would be more user-friendly if this was explicitly shown on the statement). This means that we sold the units at a lower price than standard. Given that the variance is £12,000, we must have sold each of the units for £10 less (on average) than the standard price.

Materials price variance

The materials price variance relates to the actual quantity of materials that were purchased. We purchased 6,300 kg for £132,300. The standard price of the materials was £20 per kg and therefore we should have paid £126,000.

Materials usage variance

Each unit produced should have used 5 kg of material. We used 6,300 kg instead of 6,000 kg. This over-usage of 300 kg is valued at the standard price of £20 per kg. The standard price is used to quantify the variance in monetary terms because the price is not under the control of the Production Manager. It is the responsibility of the Purchasing Department.

Labour rate variance

The labour force worked 5,040 hours and we have paid them £5,040 less than we expected to do. We have paid them £1 per hour below the standard rate.

Labour efficiency variance

The adverse efficiency variance indicates that the labour force took longer to produce 1,200 units that they should have done. They should have taken 4,800 hours and this would be valued at £48,000. The adverse variance of £2,400 shows that they have taken an additional 240 hours. (Check: £2,400 = 240 x £10).

Variable overhead expenditure variance

This variance indicates whether the spending on variable overheads is in line with standard levels. Labour hours are being used for the absorption rate: this means that it is thought that the variable overheads change proportionally with the labour hours worked. The rate of expenditure was thought to be £5 per labour hour. Given that there is no variance it would appear that the use of labour hours to predict the expenditure on these overheads is a good assumption.

Variable overhead efficiency variance

This is linked to the labour efficiency because labour hours are used as the base for the absorption rate. We used 240 hours too many for the production achieved and now we will cost them at £5 per hour. This gives the variance of £1,200 adverse.

Fixed overhead variance

The variance is the fixed overhead expenditure variance and shows by how much the expenditure on fixed overheads differed from that budgeted. The company uses marginal costing and therefore the fixed overheads are not attributed to individual units of production. Consequently there is no need for a fixed overhead absorption rate. The fixed production overheads are not broken down or absorbed into products or units under such a system.

The variance is £4,000 adverse and therefore we must have spent £74,000 on fixed overheads during Month 6.

If you require any further details please do not hesitate to contact me.

(b)

Direct Materials Variances

Total variance = standard cost of actual output v actual cost
= £120,000 v £132,300
= £12,300 adverse

Planning variance = revised standard cost of output v original standard cost of output
= (5 kg @ £23 x 1,200) v £120,000
= £138,000 v £120,000
= £18,000 adverse

Operational variances (now use the revised standard price of £23 per kg)

Material price variance = standard cost of actual amount purchased v actual cost
= (£23 x 6,300) v £132,300
= £144,900 v £132,300
= £12,600 favourable

Material usage variance
= (standard usage for actual output v actual usage) @ £23 per kg
= ((1,200 x 5) v 6,300) @ £23
= £6,900 adverse

Check: total variance = planning variance + operational variances
£12,300 adverse = £18,000 adverse + £12,600 favourable + £6,900 adverse

(c)

The revision of the standard provides a more up to date, and therefore realistic, benchmark against which to measure performance.

For example in the scenario above, it originally looked as if the Purchasing Department had paid far too much (£6,300) for the materials. However, it was then realised that the market price had increased. This is an uncontrollable factor and it would be unfair to judge the performance of the Purchasing Department against a standard that cannot be achieved. The uncontrollable element of the total variance is separated out into a "planning variance" and then appropriate control action can be taken based on a relevant standard. The variance that the Purchasing Department should be held responsible for is calculated using the revised standard. This now gives a price variance of £12,600 favourable. This gives an entirely different view of the work of the Purchasing Department.

The operational usage variance will now be valued at £23 per kg and thus reflects the current purchase price of the extra materials used.

A further advantage is that highlighting the planning variances helps to identify any errors in forecasts so that the planning process can be continually refined.

The disadvantages of calculating these variances are the often subjective way of determining the revised standard and the additional time and cost incurred.

Answer to Question Four

Sales receipts (\$)

	Month 1	Month 2	Month 3
Sales	140,000	210,000	280,000
Receipts			
15% less discount	20,160	30,240	40,320
+ 1 month, 25%		35,000	52,500
+ 2 months, 40%	-	-	56,000
Total	<u>20,160</u>	<u>65,240</u>	<u>148,820</u>

Material purchases (\$)

	Month 1	Month 2	Month 3	Month 4
Material used	87,000	99,000	127,200	147,600
Closing inventory +	19,800	25,440	29,520	
Opening inventory -	-	19,800	25,440	
Purchases	106,800	104,640	131,280	
Paid		106,800	104,640	

Cash budget

	Month 1	Month 2	Month 3	Total
	\$	\$	\$	\$
Material		106,800	104,640	211,440
Labour	14,500	16,500	21,200	52,200
Variable overheads	18,850	31,600	39,110	89,560
Fixed overheads	<u>42,000</u>	<u>52,500</u>	<u>52,500</u>	<u>147,000</u>
Total payments	75,350	207,400	217,450	500,200
Receipts	<u>20,160</u>	<u>65,240</u>	<u>148,820</u>	<u>234,220</u>
Net cash flow	-55,190	-142,160	-68,630	-265,980
Opening balance	250,000	194,810	52,650	250,000
Closing balance	194,810	52,650	-15,980	-15,980

(b)

Total cash outflow for materials during the period = \$211,440. This is based on a unit cost of \$60 of which \$40 is for the component. Therefore, the budgeted cash paid for the component is \$140,960.

- (i) If the price of the component falls to \$32 the total paid for components during the period will be \$112,768 (calculated as $\$140,960 \times 32/40$).

This will result in a cash saving of \$28,192 and, therefore, the total net cash flow over the three-month period will be an outflow of \$237,788.

- (ii) If the price of the component rises to \$50, the total cash paid for components will rise to \$176,200.

This will mean that the cash outflow will rise by \$35,240 and, therefore, the total net cash flow over the three-month period will be an outflow of \$301,220.

(c)

Workings:

Forecast sales for the first year = 27,700 units.

“What if” analysis:

Component price	\$32	\$40	\$50
Contribution per Trackit	\$58	\$50	\$40
Total contribution	\$1,606,600	\$1,385,000	\$1,108,000
Profit	\$766,600	\$545,000	\$268,000
Break-even (Trackits)	14,483	16,800	21,000
Margin of safety	47.7%	39.4%	24.2%

Report

To: Owners of Q

From: Management Accountant

Date: 20 May 2008

Review of business prospects

Terms of reference

This report will provide a brief review of the profitability and the prospects for the business as revealed by your business plan.

Profitability

Based on the original estimates of a sales volume of 27,700 Trackits and \$40 per component, the forecast profit for the year is \$545,000. Sales could fall by 39.4% before the business started to make losses – this is a good margin of safety. However, you have expressed uncertainty about the price of the component.

The best and worst case scenarios are as follows:

Best: component price falls to \$32. This gives a total profit of \$766,600 and a margin of safety of 47.7%.

Worst: component price rises to \$50. This gives a total profit of \$268,000 and a margin of safety of 24.2%.

However, even though the business is profitable, it does not generate net cash inflows in the short term.

Cash flow

Based on the original estimates and an opening cash balance of \$250,000, the company will need an overdraft of almost \$16,000 to cover the cash deficit that will arise in Month 3.

If the component cost falls to \$32 per unit, there will be sufficient funds available to cover the net outflow for the three month period of \$237,788.

However, if the component cost rises to \$50 per unit, the net cash outflow rises to \$301,220. The company will need an overdraft of \$51,220 to cover this, or there will be need to inject further cash into the business.

Component cost

It is appreciated that any business plan is an estimate, but you have expressed uncertainty about the cost of the outsourced component. The variability of the cost of this component has an impact on the profitability of the business but, even at the highest forecast price, the business is profitable.

A more critical impact of the price variability is on cash flow: you need to be aware of the possible need to invest more cash into the business or arrange for an overdraft. However, this will only be short-term; the business is profitable and will eventually generate net cash inflows.

The component is an essential part of the Trackit. Consequently, you should explore the possibilities of forging a close relationship with the supplier and entering into a mutually advantageous arrangement with them. You should try to secure a guaranteed supply at a guaranteed price.

Note: The answer is based on using the 'unadjusted' contribution. If allowances are made for the cash discount and bad debts the contribution per Trackit will be reduced by \$0.84 (calculated as $\$140 \times 15\% \times 4\%$) and \$7 (calculated as $\$140 \times 5\%$) respectively. The 'what if' analysis figures would then be:

"What if" analysis:

Component price	\$32	\$40	\$50
Contribution per Trackit	\$50.16	\$42.16	\$32.16
Total contribution	\$1,389,432	\$1,167,832	\$890,832
Profit	\$549,432	\$327,832	\$50,823
Break-even (Trackits)	16,746	19,924	26,119
Margin of safety	39.5%	28.1%	5.7%

Candidates would be rewarded for writing their report based on either of these two approaches.
