**CI*m*A**

November 2008 Examinations

Managerial Level

Paper P1 – Management Accounting – Performance Evaluation

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**CIMA**

Management Accounting Pillar

Managerial Level Paper

# P1 – Management Accounting – Performance Evaluation

18 November 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 15 sub-questions and is on pages 3 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 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.

**P1 – Performance Evaluation**

*Instructions for answering Section A:*

The answers to the fifteen 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 **1.14** you should show your workings as marks are available for the method you use to answer these sub-questions.

**Question One**

**1.1**  What is the name given to a budget that has been prepared by re-evaluating activities and comparing the incremental costs of those activities with their incremental benefits?

**A**  Incremental budget

**B**  Rolling budget

**C**  Zero base budget

**D**  Flexible budget

*(2 marks)*

**1.2**  Which ONE of the following would **NOT** explain a favourable direct materials usage variance?

**A**  Using a higher quality of materials than that specified in the standard.

**B**  A reduction in materials wastage rates.

**C**  An increase in suppliers' quality control checks.

**D**  Achieving a lower output volume than budgeted.

*(2 marks)*

**1.3** A manufacturing company pays its employees a constant salary for working 35 hours each week. The production process is highly specialised and the quality of output is a critical factor. All completed units are inspected. Currently about 10% of output fails to meet the expected specification.

The Managing Director has forecast increasing sales and is keen to reduce the labour cost per unit of production. He has suggested three possible ways of achieving this:

     1.     Improve direct labour productivity
     2.     Increase the number of hours worked
     3.     Reduce the rate of rejections

Which of the above suggestions would enable the company to reduce the labour cost per unit?

**A**     Suggestion 2 only

**B**     Suggestions 1 and 2 only

**C**     Suggestions 1 and 3 only

**D**     Suggestions 2 and 3 only

*(2 marks)*

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**1.4** The following table shows the number of patients treated and the total costs for a hospital for each of the past four months:

| Month | Patients | Total Cost $ |
|---|---|---|
| 1 | 5,000 | 37,500 |
| 2 | 8,400 | 45,660 |
| 3 | 8,300 | 45,050 |
| 4 | 5,900 | 39,420 |

Applying the high low method to the above information, an equation that could be used to forecast total cost ($) from the number of patients to be treated (where x = number of patients to be treated) is:

**A**     22,900 + 2·40x

**B**     24,300 + 2·50x

**C**     25,000 + 2·50x

**D**     25,500 + 2·40x

*(2 marks)*

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*Section A continues on the next page*

**1.5** Which of the following is the best description of "management by exception"?

**A** Using management reports to highlight exceptionally good performance, so that favourable results can be built upon to improve future outcomes.

**B** Sending management reports only to those managers who are able to act on the information contained within the reports.

**C** Focusing management reports on areas which require attention and ignoring those which appear to be performing within acceptable limits.

**D** Appointing and promoting only exceptional managers to areas of responsibility within the organisation.

*(2 marks)*

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**1.6** Which of the following would be the most appropriate measure to monitor the performance of the manager of a profit centre?

**A** Gross profit margin

**B** Revenue minus all costs

**C** Revenue minus controllable costs

**D** Return on capital employed

*(2 marks)*

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**1.7** The sales volume profit variance is defined as the difference between the

**A** actual and budgeted sales volumes valued at the actual profit per unit.

**B** actual and budgeted sales volumes valued at the standard profit per unit.

**C** actual and budgeted sales volumes valued at the difference between the actual and standard profit margins.

**D** actual and standard profit per unit multiplied by the budgeted sales volume.

*(2 marks)*

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**1.8** A company operates a standard absorption costing system and absorbs fixed production overheads based on machine hours. The budgeted fixed production overheads for the company for the previous year were £660,000 and budgeted output was 220,000 units using 44,000 machine hours. During that year, the total of the fixed production overheads debited to the Fixed Production Overhead Control Account was £590,000, and the actual output of 200,000 units used 38,000 machine hours.

Fixed production overheads for that year were:

**A** £90,000 under absorbed

**B** £60,000 under absorbed

**C** £20,000 under absorbed

**D** £10,000 over absorbed

*(2 marks)*

*The following information is for sub-questions 1.9 and 1.10*

A company manufactures a fruit flavoured drink concentrate by mixing two liquids (X and Y). The standard cost card for ten litres of the drink concentrate is:

|  |  | $ |
|---|---|---|
| Liquid X | 5 litres @ $16 per litre | 80 |
| Liquid Y | 6 litres @ $25 per litre | 150 |
|  | 11 litres | 230 |

The company does not hold any inventory. During the last period the company produced 4,800 litres of the drink concentrate. This was 200 litres below the budgeted output. The company purchased 2,200 litres of X for $18 per litre and 2,750 litres of Y for $21 per litre.

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**1.9** The materials mix variance for the period was:

**A** $150 adverse

**B** $450 adverse

**C** $6,480 favourable

**D** $6,900 favourable

*(2 marks)*

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**1.10** The materials yield variance for the period was:

**A** $150 adverse

**B** $450 adverse

**C** $6,480 favourable

**D** $6,900 favourable

*(2 marks)*

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**1.11** A company has the following total cost data available for two levels of production of one type of product:

|  | 4,000 units | 8,000 units |
|---|---|---|
| Purchasing costs | £112,000 | £140,000 |
| Supervision | £25,000 | £41,000 |
| Power | £12,000 | £15,500 |

The current supervisor can cover production levels up to and including 5,000 units. For higher levels of production, an assistant supervisor costing £16,000 is also required.

For power, a flat fee is payable that will cover all power costs sufficient to produce up to and including 6,000 units. For production above this level there is an additional variable charge per unit.

Calculate the total flexed budget cost allowance for the production of 7,500 units.

*(4 marks)*

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*Section A continues on the next page*

**1.12** Extracts from the draft budgets of a company are listed below:

|  | $m |
|---|---|
| Operating profit | 43·7 |
| Sales revenue | 910·4 |
| Share capital and reserves | 182·3 |
| Long-term borrowing | 77·9 |
| Inventory | 46·2 |
| Receivables | 97·8 |
| Payables | 51·3 |

Calculate the following:

(i)    Return on Capital Employed
(ii)   Asset turnover
(iii)  Current ratio
(iv)  Acid test (quick) ratio

*(4 marks)*

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**1.13** A company manufactures paint from two sequential processes (P1 and P2). Details for P1 for a period were as follows:

| | |
|---|---|
| Input materials | 20,000 litres costing £114,000 |
| Conversion costs | £176,000 |
| Opening work in progress | nil |
| Transferred to P2 | 15,000 litres |
| Normal loss | 5% of input |
| Abnormal loss | 500 litres |
| Closing work in progress | 3,500 litres (complete in respect of materials, 60% converted) |

The company uses the weighted average method of process costing. All losses occur at the end of the process.

Prepare the P1 Process Account for the period.

*(4 marks)*

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*Section A continues on the next page*

**1.14** A company produces and sells one type of product.  The details for last year were as follows:

**Production and Sales**

|                      | Budget  | Actual  |
|----------------------|---------|---------|
| Production (units)   | 25,000  | 22,000  |
| Sales (units)        | 23,000  | 20,000  |

There was no inventory at the start of the year.

**Selling price and costs**

|                          | Budget $ | Actual $ |
|--------------------------|----------|----------|
| Selling price per unit   | 70       | 70       |
| Variable costs per unit  | 55       | 55       |
| Fixed production overhead| 130,000  | 118,000  |
| Fixed selling costs      | 75,000   | 75,000   |

Calculate the actual profit for the year that would be reported using:

(i)   marginal costing;
(ii)  absorption costing.

*(4 marks)*

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**1.15** State **four** factors that should be considered before the cause of a variance is investigated.

*(4 marks)*

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*(Total for Section A = 40 marks)*

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*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)* The following information relates to the budget for the year ahead.

*Production overhead cost budget*

| | £ |
|---|---|
| Machinery costs | 285,000 |
| Set-up costs | 235,000 |
| Purchasing costs | 300,000 |
| Total production overheads | 820,000 |

The following table shows the total budgeted activities of the company (it manufactures many different types of products) and the details relating to the manufacture of two product lines: S and T.

| Data | Total | Product S | Product T |
|---|---|---|---|
| Machine hours | 95,000 | 2 per unit | 1 per unit |
| Number of production runs | 235 | 20 | 5 |
| Purchase orders | 5,000 | 100 | 100 |
| Production quantities of S & T | | 5,000 units | 20,000 units |

Calculate, using activity based costing, the production overhead costs that would be attributed to one unit of Product S and one unit of Product T.

*(5 marks)*

*(b)* Explain how "backflush accounting" differs from a traditional absorption costing system.

*(5 marks)*

*(c)* "Not for profit" organisations do not have the objective of profit as a means of measuring performance and therefore many choose to pursue "value for money" by managing "efficiency" and "effectiveness".

Explain, using an example of your choice, how "Not for profit" organisations may have difficulties in managing "efficiency" and "effectiveness".

*(5 marks)*

*(d)* Compare and contrast "Economic Value Added®" and "Residual Income", and briefly discuss their merits as divisional performance measures.

*(5 marks)*

Two of the products that are manufactured by a company use the same machines. The products (P1 and P2) are manufactured using two machines (M1 and M2). During the next period the time available on the machines are 126 hours for M1 and 195 hours for M2.

The company uses throughput accounting.

Unit details of the two products are:

|  | P1 | P2 |
|---|---|---|
|  | $ | $ |
| Selling price | 36·00 | 39·00 |
| Materials | 14·20 | 16·75 |
| Labour | 6·00 | 7·50 |
| Variable production overheads | 1·00 | 1·25 |
| Fixed production overheads | 2·00 | 2·50 |
| Profit | 12·80 | 11·00 |

Any mix of output can be sold at the above prices and there is unlimited demand for each of the products.

The machine time needed to make one unit of the products is:

|  | P1 | P2 |
|---|---|---|
| M1 | 0·35 hours | 0·40 hours |
| M2 | 0·60 hours | 0·65 hours |

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(e)

    (i)    Calculate the maximum production that is possible from each machine for each of the two products and state the bottleneck.

    (ii)    Calculate the throughput accounting ratio for each product.

*(5 marks)*

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(f)    Identify, using a throughput approach, the production plan for the next period that would result in the most profitable use of the machines. (All workings must be shown).

*(5 marks)*

*(Total for Question Two = 30 marks)*

*(Total for Section B = 30 marks)*

## End of Section B

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**Question Three**

The G Group has a divisionalised structure. One of the divisions manufactures engines and one of the other divisions assembles motor cycles. The performance of the Divisional Managers, and consequently their bonuses, is based on the return on capital employed (ROCE) of their individual divisions. Both of these divisions operate in highly competitive markets.

**Motor Cycle Division**
A key component in a motor cycle is the engine. Engines are readily available on the open market but the division currently buys 3,600 engines each year internally from the Engines Division for £1,375 per engine. The Manager has just received the following message from the Manager of the Engines Division.

*Engine Prices: due to recent cost increases the price per engine will now be £1,600.*

On receiving the message the Manager of the Motor Cycle division contacted several external manufacturers and found one that would supply the required engines at £1,375 per engine. However she has since received a directive from the Managing Director of the Group that states that she must buy the engines internally.

**Engines Division**
Following the recent cost increases, the full absorption cost of a motor cycle engine is £1,450. This includes £400 for fixed production overheads. This type of motor cycle engine is one of many different engines produced by the division.

The Manager of the Engines Division is aware of the competitive external market that he faces and knows that it will be difficult for him to charge external customers more than £1,375 per engine. However, he is also aware that the rising costs will have an impact on his bonus. He is trying to protect his bonus by passing these costs on to the Motor Cycle Division. He is keen to make as much profit as he can from these internal sales because the division is currently working below capacity.

*Required:*

*(a)* Calculate the impact on the annual profits of each of the two divisions and the G Group as a whole, of the directive that the engines must be purchased internally for £1,600 per engine instead of from the external supplier.

*(6 marks)*

*(b)* Write a report to the Managing Director of the Group that explains the disadvantages and behavioural implications of using ROCE as a divisional performance measure. Your answer must be based on the above scenario and include an explanation of "responsibility accounting".

*(12 marks)*

*(c)*     The Engines Division has now developed a new 'lean burn' car engine that is sold exclusively to external customers.  The production of this engine will utilise the spare capacity of the division and will earn the division a contribution of £40 per machine hour.  The demand is so high for the car engines that their production could also use 9,000 machine hours that are currently used to make 1,000 of the motor cycle engines that are transferred to the Motor Cycle Division.

*Required:*

Explain, with supporting calculations, the minimum and maximum transfer prices that could now be charged for the motor cycle engines.

*(7 marks)*

*(d)*     Briefly explain three aims of a transfer pricing system.

*(5 marks)*

*(Total for Question Three = 30 marks)*

*Section C continues on the next page*

### Question Four

A company manufactures two types of fertilizer (FA and FB). The company uses a standard costing system for planning and control purposes. Standards are set annually but budgets and variance reports are prepared each period.

### Chemicals

Three chemicals (C1, C2 and C3) are used to make the fertilizers. C2 and C3 can be input directly to the manufacturing process but C1 has to be treated before it can be used. The treatment results in a loss of 30% of the chemicals treated. There are no further losses in the manufacturing process.

Details of the standards for the chemicals are as follows:

|  | C1 | C2 | C3 |
|---|---|---|---|
| Price per kg | $8 | $15 | $12 |
| Treatment loss | 30% | | |
| Content of finished product: | | | |
| per unit of FA | 0·20kg | 0·15kg | Nil |
| per unit of FB | 0·20kg | Nil | 0·25kg |

### Inventory Policies

Chemicals: end of period holdings must be equal to 50% of the following period's requirements.

Treated C1 is used immediately. There are never any inventories of treated C1 at the start or end of any period.

Fertilizers: no finished products are to be held.

### Period 1 Output and Sales

|  | Budget | Actual |
|---|---|---|
| FA | 40,000 units | 38,000 units |
| FB | 24,000 units | 25,000 units |

### Periods 2 and 3 Sales Budgets

|  | Period 2 | Period 3 |
|---|---|---|
| FA | 40,000 units | 44,000 units |
| FB | 24,000 units | 33,000 units |

*Required*

(a)     During Period 1, the quantity of C1 used was 17,740 kg.  Calculate for Period 1
        for C1:

                (i)     the materials usage variance for the whole process
                (ii)    the treatment loss percentage

                                                                        *(6 marks)*

(b)     In Period 1, the company purchased and used 6,450 kg of C3.  The cost of this
        purchase was $94,000.  It has now been realised that the standard price of C3
        should have been $14·50 per kg for Period 1.

        (i)     Calculate the planning variance, and the operational price and usage
                variances for C3 for Period 1.

                                                                        *(7 marks)*

        (ii)    Explain two problems associated with the reporting of planning variances.

                                                                        *(3 marks)*

(c)     Prepare the Purchases Budget for C2 for Period 2.

                                                                        *(5 marks)*

(d)     "Variance analysis presents results after the actual events have taken place and
        therefore it is of little use to management for planning and control purposes,
        particularly in a modern manufacturing environment".

        Discuss the above statement.

                                                                        *(9 marks)*

                                            *(Total for Question Four = 30 marks)*

                                                      *(Total for Section C = 30 marks)*

*End of question paper*

## 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.
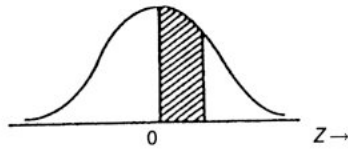


| $Z = \dfrac{(x - \mu)}{\sigma}$ | 0.00 | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | .0000 | .0040 | .0080 | .0120 | .0159 | .0199 | .0239 | .0279 | .0319 | .0359 |
| 0.1 | .0398 | .0438 | .0478 | .0517 | .0557 | .0596 | .0636 | .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 | Interest rates ($r$) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| ($n$) | 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 |
| 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 | 0705 | 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 | Interest rates ($r$) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| ($n$) | 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 |
| 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 | Interest rates (*r*) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| (*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 |
| 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 | Interest rates (*r*) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| (*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 |
| 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 | 7.793 | 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
$A \cup B = \mathbf{A}$ **or** $\mathbf{B}$.        $A \cap B = \mathbf{A}$ **and** $\mathbf{B}$ (overlap).

$P(B \mid A) =$ 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*: $P(A \cap B) = P(A) * P(B \mid A)$

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

### 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

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

Standard Deviation

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

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

Price:
$$\frac{\sum w * \left( \dfrac{P_1}{P_o} \right)}{\sum w} \times 100$$

Quantity:
$$\frac{\sum w * \left( \dfrac{Q_1}{Q_o} \right)}{\sum w} \times 100$$

## TIME SERIES
Additive Model
$$\text{Series} = \text{Trend} + \text{Seasonal} + \text{Random}$$

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

## LINEAR REGRESSION AND CORRELATION

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

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

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

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

or solve

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

Coefficient of correlation

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

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

## 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 | Make a list of |
| | State | Express, fully or clearly, the details of/facts of |
| | Define | Give the exact meaning of |
| **2 COMPREHENSION** | | |
| What you are expected to understand. | Describe | Communicate the key features |
| | Distinguish | Highlight the differences between |
| | Explain | Make clear or intelligible/State the meaning of |
| | Identify | Recognise, establish or select after consideration |
| | Illustrate | Use an example to describe or explain something |
| **3 APPLICATION** | | |
| How you are expected to apply your knowledge. | Apply | To put to practical use |
| | Calculate/compute | To ascertain or reckon mathematically |
| | Demonstrate | To prove with certainty or to exhibit by practical means |
| | Prepare | To make or get ready for use |
| | Reconcile | To make or prove consistent/compatible |
| | Solve | Find an answer to |
| | Tabulate | Arrange in a table |
| **4 ANALYSIS** | | |
| How you are expected to analyse the detail of what you have learned. | Analyse | Examine in detail the structure of |
| | Categorise | Place into a defined class or division |
| | Compare and contrast | Show the similarities and/or differences between |
| | Construct | To build up or compile |
| | Discuss | To examine in detail by argument |
| | Interpret | To translate into intelligible or familiar terms |
| | Produce | To create or bring into existence |
| **5 EVALUATION** | | |
| How you are expected to use your learning to evaluate, make decisions or recommendations. | Advise | To counsel, inform or notify |
| | Evaluate | To appraise or assess the value of |
| | Recommend | 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 15 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(vi): Compare activity-based costing with traditional marginal and absorption costing methods and evaluate its potential as a system of cost accounting.

*(b)*    covers learning outcome A(viii) Evaluate the impact of just-in-time manufacturing methods on cost accounting and the use of 'back-flush accounting' when work-in-progress stock is minimal.

*(c)*    covers learning outcome D(iv): Calculate and apply measures of performance for investment centres (often 'strategic business units' or divisions of larger groups).

*(d)*    covers learning outcome D(iv): Calculate and apply measures of performance for investment centres (often 'strategic business units' or divisions of larger groups).

*(e)*    covers learning outcome  A(iv): Explain the origins of throughput accounting as 'super variable costing' and its application as a variant of marginal or variable cost accounting.

*(f)*    covers learning outcome A(iv): Explain the origins of throughput accounting as 'super variable costing' and its application as a variant of marginal or variable cost accounting.

### Section C – answer one of two questions

**Question Three** has four 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(viii): Explain the concept of responsibility accounting and its importance in the construction of functional budgets that support the overall master budget.

*(c)*    covers learning outcome D(vii): Identify the likely consequences of different approaches to transfer pricing for divisional decision making, divisional and group profitability, the motivation of divisional management and the autonomy of individual divisions.

*(d)*    covers learning outcome D(vii): Identify the likely consequences of different approaches to transfer pricing for divisional decision making, divisional and group profitability, the motivation of divisional management and the autonomy of individual divisions.

**Question Four** has four parts.

*(a)*    covers learning outcome B(ii): Calculate and interpret material, labour, variable overhead, fixed overhead and sales variances.

*(b)*    covers learning outcome B(iv): Calculate and explain planning and operational variances.

*(c)*    covers learning outcome B(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.

## Managerial Level Paper

# P1 – Management Accounting – Performance Evaluation

## Examiner's Answers

### SECTION A

**Answer to Question One**

**1.1** **C**

**1.2** **D**

**1.3** **C**

**1.4** **D**

($45,660 - $37,500)/(8,400 - 5,000) = $2·40 variable cost

Fixed cost: $45,660 - (8,400 x $2·40) = $25,500

**25,500 + 2·40x**

**1.5** **C**

**1.6** **C**

**1.7** **B**

**1.8    D**

Overheads are absorbed by the standard content of the actual production.

Overhead absorption rate = £660,000/44,000 = £15 per machine hour.

The standard is 0·2 hours per unit.

Overheads absorbed = 200,000 x 0·2 x 15 = £600,000

The actual overheads were £590,000 and therefore were over-absorbed by £10,000

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**Workings for 1.9 and 1.10**

|  | litres |  | $ |
|---|---|---|---|
|  | 2,200 | @$16 | 35,200 |
|  | 2,750 | @$25 | 68,750 |
| Actual quantity input at the actual mix | 4,950 |  | 103,950 |
|  |  |  |  |
|  | 2,250 | @$16 | 36,000 |
|  | 2,700 | @$25 | 67,500 |
| Actual quantity input in standard proportion | 4,950 |  | 103,500 |
|  |  |  |  |
|  | 2,400 | @$16 | 38,400 |
|  | 2,880 | @$25 | 72,000 |
| Standard mix needed for the actual output | 5,280 |  | 110,400 |

---

**1.9    B**

Mix variance = $103,500 - $103,950 = $450 adverse

---

**1.10   D**

Yield variance = $110,400 - $103,500 = $6,900 favourable

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**1.11**

|  | Fixed | Variable | Total |
|---|---|---|---|
|  | £ |  | £ |
| Purchasing costs | 84,000 | (7,500 x £7) | 136,500 |
| Supervision | 41,000 |  | 41,000 |
| Power | 12,000 | (1,500 x £1·75) | 14,625 |
| Total |  |  | 192,125 |

---

**1.12**

| | | |
|---|---|---|
| (i) | Return on capital employed | 16·8% [(43·7 × 100) ÷ (182·3 + 77·9)] |
| (ii) | Asset turnover | 3·5 times [910·4 ÷ (182·3 + 77·9)] |
| (iii) | Current ratio | 2·8 : 1 [(46·2 + 97·8) ÷ 51·3] |
| (iv) | Acid test | 1·9 : 1 (97·8 ÷ 51·3) |

---

**1.13**

| Cost element | £ | Transfer out | Close WIP | Abnormal loss | Units Total E.U. | Cost per E.U. £ |
|---|---|---|---|---|---|---|
| Input materials | 114,000 | 15,000 | 3,500 | 500 | 19,000 | 6.00 |
| Conversion | 176,000 | 15,000 | 2,100 | 500 | 17,600 | 10.00 |

*Process 1*

| | Litres | £ | | Litres | £ |
|---|---|---|---|---|---|
| Input materials | 20,000 | 114,000 | Process 2 | 15,000 | 240,000 |
| Conversion costs | | 176,000 | Normal loss | 1,000 | |
| | | | Abnormal loss | 500 | 8,000 |
| | | | WIP | 3,500 | 42,000 |
| | 20,000 | 290,000 | | 20,000 | 290,000 |

---

**1.14**

Marginal costing
Contribution per unit = $70 - $55 = $15

| | $ |
|---|---|
| Total contribution 20,000 x $15 | 300,000 |
| Fixed production overheads | 118,000 |
| Fixed selling costs | 75,000 |
| Profit (by Marginal costing) | 107,000 |

Inventory has increased during the period and therefore the profit calculated using absorption costing will be higher than the marginal costing profit by the amount of overheads absorbed by the closing inventory.

Fixed production overhead absorption rate = $130,000/25,000 = $5·20 per unit
Fixed production overhead absorbed by increased inventory = 2,000 x $5·20 = $10,400

Absorption costing profit = $107,000 + $10,400 = $117,400

---

**1.15**

Factors to be considered include:

- Size;

- The possibility of the variance being uncontrollable;

- The cost of the investigation;

- The interrelationship with other variances;

- The relevance of the standard used.

(Note: Candidates were required to state **four** factors)

## SECTION B

**Answer to Question Two**

*(a)*

|  | *Indirect production cost budget* | *Driver volume* | *Driver rate* |
|---|---|---|---|
| Machinery costs | £285,000 | 95,000 | £3 per hour |
| Set-up cost | £235,000 | 235 | £1,000 per production run |
| Purchasing | £300,000 | 5,000 | £60 per order |
| Total production overheads | £820,000 | | |

Illustrative workings (S only):

| | |
|---|---|
| Machine costs: | £3 x 2 hours = £6 |
| Set up: | £1,000 x 20/5,000 = £4 |
| Purchasing costs: | £60 x 100/5,000 = £1·20 |

| *Product Unit costs* | S | T |
|---|---|---|
| | £ | £ |
| Machine costs | 6·00 | 3·00 |
| Set up | 4·00 | 0·25 |
| Purchasing cost | 1·20 | 0·30 |
| Total cost | 11·20 | 3·55 |

*(b)*

The concept of backflush accounting is that by delaying the recording of costs until after production has been completed or even sold, standard costs can be used to work backwards to "flush" out the manufacturing costs. However, for a backflush system to operate effectively, little or no inventory, and thus a just-in-time system, is required and thus the rapid conversion of direct material into cost of goods sold.

Cost accounting is simplified in a backflush system. For example, inventory valuation is avoided. Also, all production labour is treated as an indirect cost and is included with the other overheads in conversion costs. This is because supplies of raw material and production activity are only required when there is sales demand and so production labour will be paid regardless of activity.

In contrast, traditional cost accounting systems track the sequence of raw materials and components moving through production. Such systems, in comparison to backflush accounting, are more time-consuming and expensive to operate as they require considerably more documentation, such as material requisitions and time sheets, and more detailed accounting in order to maintain the job cards and inventory records.

*(c)*

Not for profit organisations include central government, local authorities, hospital trusts and charities. Their objectives may be determined by legislation, constitution or even by politics amongst other things. Objectives may be given, but the means by which they are to be achieved may not be. The organisations will be required to show that they have used resources efficiently and effectively.

Efficiency relates to making the best possible use of resources and as such it compares "output" to "input". Efficiency measures for a local authority could include "cost per pupil in school" or for a hospital, "cost per patient". However these measures can cause difficulties. For example, a hospital's costs may be low, but how successful were the patients' treatments?

Effectiveness is concerned with using resources to achieve an objective. Local government may choose to increase the number of police patrols with the objective of reducing crime. This might lead to the arrest of more criminals which in turn would lead to the need for more prison facilities and therefore the need for more resources in that area. Consequently, the local government needs to think very carefully about the most effective way to achieve one particular objective because of the knock-on effect in other areas/departments and their call for resources.

*(d)*

The calculation of RI is based on Pre-tax operating profit less a charge for the capital invested in the division (required rate of return x investment).

The calculation of EVA is similar, but it reflects the "economics" of the business more than "accounting principles". The profit used may therefore differ from the accounting profit, for example Research and Development costs may be capitalised rather than expensed. Similarly, the capital base will also be different; for example assets will be included at their replacement cost.

The true test of any performance measure is that it promotes goal congruent behaviour. RI and EVA overcome many of the disadvantages of relative measures such as Return on Capital Employed and in the case of EVA ensure that any project that produces an economic absolute positive return above the company's cost of capital will be accepted. Both measures encourage long term decision making in agreement with maximising shareholder wealth.

*(e)*

|  | *P1* | *P2* |
|------|------|------|
| M1 | 360 units (126 hrs ÷ 0·35 hrs/unit) | 315 units (126 ÷ 0·40) |
| M2 | 325 units (195 hrs ÷ 0·60 hrs/unit) | 300 units (195 ÷ 0·65) |

The bottleneck is M2.

TA ratio = (selling price – material cost)/overheads

P1 TA ratio = $21·80/$9·00 = 2·42

P2 TA Ratio = $22·25/$11·25 = 1·98

*(f)*

The bottleneck is M2

|  | *P1* | *P2* |
|------|------|------|
| Throughput contribution ($) | 21·80 | 22·25 |
| Time on bottleneck (hours) | 0·60 | 0·65 |
| Contribution/bottleneck hour ($/hour) | 36·33 | 34·23 |
| Rank | 1st | 2nd |

Produce 195/0·60 = 325 units of P1

## Answer to Question Three

*(a)*

| *Engines Division* | *Motor Cycle Division* | *Group* |
|---|---|---|
| Extra contribution | Additional cost | |
| (£1,600 - £1,050 var. cost) | (£1,600 - £1,375 ext. supp.) | |
| x 3,600 | x 3,600 | |
| = £550 x 3,600 | = (£225 x 3,600) | |
| = +£1,980,000 | = -£810,000 | = +£1,170,000 |

*(b)*

To:        Managing Director
From:      Management Accountant
Date:      18 November 2008
Subject:   Responsibility Accounting and Divisional Performance Measure (ROCE)

**Introduction**

Devising divisional performance measures can be a tricky process. This is particularly so when the divisions trade with each other as the individual managers may be motivated by the measure to act in their own best interest instead of that of the whole group.

**Responsibility Accounting**

The concept of responsibility accounting is that a manager should only be held responsible for what he/she can control. Large organisations are broken up into smaller segments to facilitate better management. The segments could be cost, profit or investment centres. When choosing measures by which to judge the performance of the managers it is important to ensure that the managers are assessed on what they control. This is particularly difficult when divisions trade with each other as happens within the G Group when the Engines Division supplies engines to the Motor Cycle Division.

**Return on Capital Employed (ROCE)**

ROCE is defined as the profit before interest and tax divided by the capital employed. Given that ROCE is used to assess the performance of the managers it is assumed that the Divisions within G Group are investment centres that is the individual managers are responsible for costs, revenues and investments.

**ROCE issues:**

*1.* By imposing a purchasing policy/transfer price, the autonomy of the managers within G Group is undermined as they cannot totally control their costs and revenues, and therefore this is against the principles of responsibility accounting.

*2.* Other problems arise with the denominator: how are the divisional assets valued?

*3.* A divisional manager may reject a profitable investment opportunity because it reduces the ROCE of the division and consequently the manager's bonus would be reduced.

*4.* ROCE may motivate a manager to pursue a short-term reward at the expense of a longer term gain. For example, if a manager needed to replace an ageing machine the new machine would increase the asset base and therefore lower the ROCE in the short term. Consequently, the manager would be reluctant to do this. This could have an impact on the longer-term profits of the division.

*5.* The divisions may not face the same economic conditions and therefore using the same figure against which to benchmark their returns, might not be appropriate.

**Conclusion**

There are clearly potential problems that might arise as a result of using ROCE as a performance measure within G Group. Consideration should be given to using a portfolio of measures that encourage behaviour that is in line with the group's strategic aims.

**Note:** Other valid comments would be accepted.

*(c)*

The minimum transfer price that should be used is the marginal cost plus the opportunity cost.

There is no other use for the capacity that is used to make the first 2,600 engines and therefore the minimum transfer price would be £1,050.

There is an opportunity cost for the next 1,000 engines. This is £40 x 9 = £360. Therefore the transfer price of these engines should be £1,050 + £360 = £1,410. But engines are available on the market at £1,375 and this is what the maximum transfer price should be.

*(d)*

Aims of a transfer pricing systems are:

- Ensure optimal allocation of resources;

- Promote goal congruence;

- Motivate divisional managers;

- Facilitate performance management;

- Retain divisional autonomy.

**Note:** Candidates were asked to briefly explain **three** aims.

**Answer to Question Four**

*(a)*

(i)    Materials usage variance = (standard usage for actual output - actual usage) x standard price.

The actual output was 38,000 units of FA and 25,000 units of FB.
The standard input needed = (38,000 + 25,000) x 0·2/0·7 = 18,000 kg

Materials usage variance = (18,000 - 17,740) x $8 = $2,080 favourable

(ii)   Content of output = (38,000 + 25,000) x ·2 = 12,600 kg
Materials input = 17,740kg
Loss percentage = (17,740 – 12,600)/17,740 = 29%

*(b)*

(i)    C3 is used only in FB

Original standard: 0·25 kg @ $12 per kg
Revised standard: 0·25 kg @ $14·50 per kg

Output: 25,000 units of FB

Planning variance: standard content of actual output x difference in standard price
= (25,000 x .25) x (12 - 14·50) = $15,625 adverse.

The operational variances will be calculated using the revised standard.

Operational price variance = (6,450 x $14·50) - $94,000 = $475 adverse

Operational usage = ((25,000 x 0·25) - 6,450)) x 14·50 = $2,900 adverse

**Note:**
The sum of the planning and operational variances should equal the total variance.  The total variance is the difference between the actual cost and the original standard cost for the actual output.

Original standard cost = 25,000 x 25 x$12 = $75,000
Actual cost = $94,000
Total variance = $19,000 adverse
Check: all adverse: 15,625 + 475 + 2,900 = 19,000

**Note:** This reconciliation is provided for guidance: it was not asked for in the question

(ii)   Problems could be:

- How is the revised standard set?  Is the information correct?

- Responsibility: who is responsible for the planning variance?  If the changed standard was unpredictable at the start of the period, the variance should be classed as "uncontrollable".

- Cost: what is the cost of revising the standard and consequential calculations and reporting?  Is there are any benefit to be gained by the exercise?

**Note:** Candidates were asked to explain two problems.

*(c)*

C2 is used in FA only:

**C2 Purchases Budget**

|  |  | kg |
|---|---|---|
| Opening inventory | 40,000 x 0·15 x 50% | 3,000 |
| Closing inventory | 44,000 x 0·15 x 50% | 3,300 |
| Increased inventory |  | 300 |
| Production requirements | 40,000 x 0·15 | 6,000 |
| Purchases |  | 6,300 |

The budgeted purchase cost will be $94,500

*(d)*

Planning and control are essential elements of any budgeting system. Plans are made and then actual results are compared against the plan (that is the budget and standards). This is a feedback system. Deviations (variances) from the plan will usually prompt actions to bring results back in line with the plan. However, variances are reported after the event and therefore it is impossible to correct the problem that led to that specific occurrence.

If the recording of the variance over several periods highlights a trend it might be possible to take action that will prevent the deviation becoming material. This is feedforward control. This information can be used by management to set more realistic plans and/or change the method of operation to reduce the variances. Consequently, variance analysis is of use to management in planning operations.

The modern manufacturing environment has characteristics that can question the usefulness of variance analysis. Examples include:

- Under Total Quality Management (TQM), organisations aspire to "continuous improvement" and therefore measuring performance against a static standard would be inappropriate.

- The philosophy of a Just-in-Time (JIT) production system is that units should not be produced to be held as inventory. The fixed overhead volume variance encourages over-production and it clearly motivates managers to act against the principle of JIT.

- TQM focuses attention on quality, whereas variance analysis draws attention to costs.

- In the modern manufacturing environment, the majority of costs are "fixed" and it can be argued are therefore uncontrollable by operational managers. Volume-related costs could be a very small proportion of total costs and setting up a system to control them may not be cost-effective.

- Due to long-term contractual arrangements, for example with suppliers, many companies in the modern manufacturing environment operate under stable conditions and the calculation of variances is unnecessary. For example, if purchasing links are forged with a supplier, there should not be a price variance.

Control and performance measures are needed in the modern manufacturing environment but traditional variance analysis does not provide the "real time" information that is needed to manage the production process or the outward looking measures (for example customer satisfaction) that are compatible with the new environment.

Note: Other valid comments would be accepted.