Intermediate Level

## Management Accounting Performance Management

IMPM

21 May 2003
Wednesday afternoon

## INSTRUCTIONS TO CANDIDATES

Read this page before you look at the questions

You are allowed three hours to answer this question paper.
Answer the ONE question in section $A$ (this has 10 sub-questions).
Answer the ONE question in section $B$.
Answer ONE question ONLY from section C.
Answer ONE question ONLY from section D.
Maths Tables and Formulae were provided at the end of the questions and are available elsewhere on the website.

Write your examination number in the boxes provided on the front of the answer book.
Write IMPM on the line marked "Subject" on the front of the answer book.
Write your examination number on the special answer sheet for section $A$ which is on page 3 of this question paper booklet.
Detach the sheet from the booklet and insert it into your answer book before you hand this in.
Do NOT write your name or your student registration number anywhere on your answer book.
Tick the appropriate boxes on the front of the answer book to indicate which questions you have answered.

Each of the sub-questions numbered from 1.1 to 1.10 inclusive, given below, has only ONE correct answer.

## Required:

On the SPECIAL ANSWER SHEET opposite, place a circle "O" around the letter that gives the correct answer to each sub-question.

If you wish to change your mind about an answer, block out your first answer completely and then circle another letter. You will not receive marks if more than one letter is circled.

Please note that you will not receive marks for any workings to these sub-questions.
You must detach the special answer sheet from the question paper and attach it to the inside front cover of your answer book before you hand it to the invigilators at the end of the examination.

## Question One

1.1 AW plc is preparing its maintenance budget. The number of machine hours and maintenance costs for the past six months have been as follows:

| Month | Machine hours | $£$ |
| :---: | :---: | :---: |
| 1 | 10,364 | 35,319 |
| 2 | 12,212 | 39,477 |
| 3 | 8,631 | 31,420 |
| 4 | 9,460 | 33,285 |
| 5 | 8,480 | 31,080 |
| 6 | 10,126 | 34,784 |

The budget cost allowance for an activity level of 9,340 machine hours, before any adjustment for price changes, is nearest to
A £21,000
B $£ 30,200$
C $£ 33,000$
D $£ 34,300$
1.2 M plc uses time series analysis and regression techniques to estimate future sales demand. Using these techniques, it has derived the following trend equation:

$$
y=10,000+4,200 x
$$

where $\quad y$ is the total sales units; and
$x$ is the time period
It has also derived the following seasonal variation index values for each of the quarters using the multiplicative (proportional) seasonal variation model:

| Quarter | Index value |
| :---: | :---: |
| 1 | 120 |
| 2 | 80 |
| 3 | 95 |
| 4 | 105 |

The total sales units that will be forecast for time period 33, which is the first quarter of year 9 , are
A 138,720
B 148,720
C 176,320
D 178,320
1.3 Q Limited used an incremental budgeting approach to setting its budgets for the year ending 30 June 2003.
The budget for the company's power costs was determined by analysing the past relationship between costs and activity levels and then adjusting for inflation of $6 \%$.
The relationship between monthly cost and activity levels, before adjusting for the 6\% inflation, was found to be:

$$
\begin{aligned}
& y=£\left(14,000+0.0025 x^{2}\right) \\
& \text { where } \quad y=\text { total cost; and } \\
& x=\text { machine hours }
\end{aligned}
$$

In April 2003, the number of machine hours was 1,525 and the actual cost incurred was $£ 16,423$. The total power cost variance to be reported is nearest to
A $£ 3,391$ (A)
B $£ 3,391$ (F)
C $£ 3,740(\mathrm{~F})$
D $£ 4,580$ (F)

## The following data is to be used to answer questions 1.4 and 1.5 below

W plc uses a standard absorption costing system. The absorption rate is based on labour hours. The following data relates to April 2003:

|  | Budget | Actual |
| :--- | ---: | ---: |
| Labour hours worked | 10,000 | 11,135 |
| Standard hours produced | 10,000 | 10,960 |
| Fixed overhead cost | $£ 45,000$ | $£ 46,200$ |

1.4 The fixed overhead capacity variance to be reported for April 2003 is nearest to
A $£ 5,110$ (A)
B $£ 4,710$ (A)
C $£ 4,710(\mathrm{~F})$
D $£ 5,110$ (F)
1.5 The fixed overhead efficiency variance to be reported for April 2003 is nearest to
A $£ 710$ (A)
B $£ 730(\mathrm{~A})$
C $\quad £ 740$ (A)
D $\quad £ 790$ (A)
1.6 A company is considering the costs for a special order. The order would require $1,250 \mathrm{kgs}$ of material D. This material is readily available and regularly used by the company. There are 265 kgs of material D in stock which cost $£ 795$ last week. The current market price is $£ 3.24$ per kg.

Material $D$ is normally used to make product $X$. Each unit of $X$ requires 3 kgs of material $D$ and, if material $D$ is costed at $£ 3$ per kg, each unit of $X$ yields a contribution of $£ 15$.

The cost of material $D$ to be included in the costing of the special order is nearest to
A $£ 3,990$
B $£ 4,050$
C $£ 10,000$
D £10,300
1.7 The following details have been extracted from the budget papers of LK plc for June 2003:
Selling price per unit £124

Variable production costs per unit £54
Fixed production costs per unit £36
Other variable costs per unit £12

| Sales volume | 12,500 units |
| :--- | ---: |
| Production volume | 13,250 units |
| Opening stock of finished items | 980 units |

If budgeted profit statements were prepared by using absorption costing and then by using marginal costing,
A marginal costing profits would be higher by $£ 27,000$.
B absorption costing profits would be higher by $£ 27,000$.
C absorption costing profits would be higher by $£ 35,000$.
D absorption costing profits would be higher by $£ 62,000$.

## The following data is to be used to answer questions 1.8, 1.9 and 1.10 below

HG plc manufactures four products. The unit cost, selling price and bottleneck resource details per unit are as follows:

|  | Product $W$ | Product $X$ | Product $Y$ | Product Z |
| :--- | :---: | :---: | :---: | :---: |
|  | $£$ | $£$ | $£$ | $£$ |
| Selling price | 56 | 67 | 89 | 96 |
| Material | 22 | 31 | 38 | 46 |
| Labour | 15 | 20 | 18 | 24 |
| Variable overhead | 12 | 15 | 18 | 15 |
| Fixed overhead | 4 | 2 | 8 | 7 |
|  | Minutes | Minutes | Minutes | Minutes |
| Bottleneck resource time | 10 | 10 | 15 | 15 |

1.8 Assuming that labour is a unit variable cost, if the products are ranked according to their contribution to sales ratios, the most profitable product is
A W
B $X$
C Y
D Z
1.9 Assuming that labour is a unit variable cost, if budgeted unit sales are in the ratio W : 2; X:3; Y:3; Z: 4 and monthly fixed costs are budgeted to be $£ 15,000$, the number of units of $W$ that would be sold at the budgeted breakeven point is nearest to
A 106 units.
B 142 units.
C $\quad 212$ units.
D 283 units.
1.10 If the company adopted throughput accounting and the products were ranked according to "product return per minute", the highest ranked product would be
A W
B X
C Y
D Z
(Total = 20 marks)

## SECTION B - 30 MARKS

## ANSWER THIS QUESTION, showing supporting calculations where appropriate

## Question Two

PQR plc is a chemical processing company. The company produces a range of solvents by passing materials through a series of processes. The company uses the First In First Out (FIFO) valuation method.

In Process 2, the output from Process 1 (XP1) is blended with two other materials (P2A and P 2 B ) to form XP2. It is expected that $10 \%$ of any new input to Process 2 (that is, transfers from Process 1 plus Process 2 materials added) will be immediately lost and that this loss will have no resale value. It is also expected that in addition to the loss, $5 \%$ of any new input will form a by-product, $Z$, which can be sold without additional processing for $\$ 2.00$ per litre.

Data from Process 2 for April 2003 was as follows:

## Opening work in process

Process 2 had 1,200 litres of opening work in process. The value and degree of completion of this was as follows:

|  | $\$$ | \% degree of completion |
| :--- | ---: | :---: |
| XP1 | 1,560 | 100 |
| P2A | 1,540 | 100 |
| P2B | 750 | 100 |
| Conversion costs | $\underline{3,790}$ | 40 |

Input
During April, the inputs to Process 2 were:

$$
\$
$$

| XP1 | 5,000 litres | 15,679 |
| :--- | :--- | ---: |
| P2A | 1,200 litres | 6,000 |
| P2B | 3,000 litres | 4,500 |
| Conversion costs | 22,800 |  |

## Closing work in process

At the end of April, the work in process was 1,450 litres. This was fully complete in respect of all materials but only $30 \%$ complete for conversion costs.

## Output

The output from Process 2 during April was:

| $Z$ | 460 litres |
| :--- | ---: |
| XP2 | 7,850 litres |

## Required:

(a) Prepare the Process 2 account for April 2003.
(16 marks)

The output from Process 2 (XP2) is readily identifiable as three different grades of solvent (P, Q and R). For reporting purposes, the costs of Process 2 are apportioned to the three products in the ratio of their output volumes. The output volumes for April were:

| Product P | 2,700 litres |
| :--- | :--- |
| Product Q | 3,300 litres |
| Product R | 1,850 litres |

The Managers of PQR plc are currently deciding, for each individual product, whether they should sell it at the end of Process 2 or refine it further. The respective selling prices and further processing costs per litre are as follows:
Product \(\left.$$
\begin{array}{cccc}\text { Selling price per } \\
\text { litre at the end of } \\
\text { Process 2 }\end{array}
$$ \quad \begin{array}{c}Selling price per litre <br>

after further processing\end{array}\right]\)| Further processing |
| :---: |
| costs per litre |

The further processing costs are purely variable and they vary directly with the input volume. They are stated before any adjustment for revenue from further processing losses.

## Further processing losses

When product $P$ is processed further, there is an expected loss of $15 \%$ of input. This loss can be sold for $\$ 8.00$ per litre.

When product Q is processed further, there is an expected loss of $20 \%$ of input. This loss has no scrap value.

There is no loss expected when product R is processed further.

## Required:

(b) Prepare a numerical statement that shows whether each of the products should be further processed. State clearly your conclusion in respect of each product.
(10 marks)

The standard input mix of materials XP1, P2A and P2B and their standard costs per litre are as follows:

|  | \% mix | Cost per litre |
| :---: | :---: | :---: |
| XP1 | 50 | $\$ 2.75$ |
| P2A | 20 | $\$ 6.00$ |
| P2B | 30 | $\$ 1.40$ |

## Required:

(c) Calculate the total material mix variance for April.

## SECTION C - 25 MARKS

## ANSWER ONE QUESTION ONLY, showing supporting calculations where appropriate

## Question Three

JK plc operates a chain of fast-food restaurants. The company uses a standard marginal costing system to monitor the costs incurred in its outlets. The standard cost of one of its most popular meals is as follows:

|  |  | $£$ per meal |
| :--- | :--- | :---: |
| Ingredients | $(1.08$ units $)$ | 1.18 |
| Labour | $(1.5$ minutes $)$ | 0.15 |
| Variable conversion costs | $(1.5$ minutes $)$ | 0.06 |
| The standard selling price of this meal is | 1.99 |  |

In one of its outlets, which has budgeted sales and production activity level of 50,000 such meals, the number of such meals that were produced and sold during April 2003 was 49,700. The actual cost data was as follows:

|  | $£$ |  |
| :--- | :---: | ---: |
| Ingredients | $(55,000$ units $)$ | 58,450 |
| Labour | $(1,200$ hours $)$ | 6,800 |
| Variable conversion costs | $(1,200$ hours $)$ | 3,250 |
|  |  |  |
| The actual revenue from the sale of the meals was | 96,480 |  |

## Required:

(a) Calculate
(i) the total budgeted contribution for April 2003;
(ii) the total actual contribution for April 2003.
(b) Present a statement that reconciles the budgeted and actual contribution for April 2003. Show all variances to the nearest $£ 1$ and in as much detail as possible.
(c) Explain why a marginal costing approach to variance analysis is more appropriate in environments such as that of JK plc, where there are a number of different items being produced and sold.

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\text { (Total = } 25 \text { marks) }
$$

## Question Four

The management team at MN Limited is considering the budgets it prepared for the year ending 31 December 2003. It has now been revealed that in June 2003 the company will be able to purchase only 10,000 litres of material $Q$ (all other resources will be fully available). In the light of this new information, the management team wants to revise its plans for June to ensure that profits are maximised for that month.
MN Limited can produce three products from the same labour and main raw material Q, though different amounts are required for each product. The standard resource requirements, costs and selling prices, and the customer demand for delivery in June (including those orders already accepted) for each of its finished products are as follows:

Product V Product S Product T

| Resources per unit: |  |  |  |
| :--- | :---: | :---: | :---: |
| Material Q | 10 litres | 8 litres | 5 litres |
| Direct labour | 8 hours | 9 hours | 6 hours |
| Selling prices and costs: | $£$ per unit | $£$ per unit | $£$ per unit |
| Selling price | $\underline{145 \cdot 00}$ | $\underline{134 \cdot 00}$ | $\underline{99 \cdot 00}$ |
| Material Q | $25 \cdot 00$ | $20 \cdot 00$ | $12 \cdot 50$ |
| Other materials | $10 \cdot 00$ | $4 \cdot 00$ | $8 \cdot 50$ |
| Direct labour | $40 \cdot 00$ | $45 \cdot 00$ | $30 \cdot 00$ |
| Overheads: | $10 \cdot 00$ | $\underline{24 \cdot 00}$ | $\underline{30 \cdot 00}$ |
| Variable | $\underline{109 \cdot 00}$ | $\underline{110 \cdot 25}$ | $\underline{12 \cdot 00}$ |
| Fixed * |  |  |  |
|  | 1,100 units | 950 units | 1,450 units |
| Customer demand |  |  |  |
| * based on budgeted costs of $£ 95,000$ per month. |  |  |  |

MN Limited has already accepted customer orders for delivery in June 2003 as follows:

| Product V | 34 units |
| :--- | :--- |
| Product S | 75 units |
| Product T | 97 units |

The management team has decided that these customer orders must be satisfied as the financial and non-financial penalties that would otherwise arise are very significant.

Given the shortage of material Q, the management team has now set the following stock levels for June:

|  | Opening stock | Closing stock |
| :--- | :---: | :---: |
| Material Q ** | 621 litres | 225 litres |
| Product V | 20 units | 10 units |
| Product S | 33 units | 25 units |
| Product T | 46 units | 20 units |

** This would mean that 10,396 litres of material $Q$ would be available during the period.

## Required:

(a) Prepare a production budget for June 2003 that clearly shows the number of units of each product that should be produced to maximise the profits of MN Limited for June 2003.
(b) Using your answer to requirement (a) above, calculate the number of units of each product that will be sold in June 2003.
(c) Using your answer to requirement (b) above, calculate the profit for June 2003 using:
(i) marginal costing;
(ii) absorption costing.
(5 marks)

The Managing Director of MN Limited is concerned about the effect on cashflow caused by the scarcity of material Q during June 2003. She is aware that monthly profit and cashflow are often unequal and has heard that marginal costing profits more closely resemble cashflow than do absorption costing profits.

## Required:

(d) (i) Explain briefly why there is a difference between cashflow and profit.
(ii) Briefly discuss the assertion that marginal costing profits are a better indicator of cashflow than absorption costing profits.
(Total = 25 marks)

## ANSWER ONE QUESTION ONLY

## Question Five

W plc provides a range of standard products to the aircraft industry. The company has a number of sites throughout the country and some of them make identical products. The sites have differently aged machinery.

For a number of years, the company has used standard costing to control its production costs. The standard costs are set centrally at head office and are imposed on the managers of the sites.

At a recent meeting of the site managers, a number of them complained that the standards imposed upon them were unfair.

## Required:

(a) Explain the reasons for and against the imposition of centrally set standard costs on site managers.

The Managing Director of W plc recently attended a conference on "World Class Manufacturing" and was very interested in the developments in computer-controlled, robotic manufacturing processes.

He overheard some other delegates speaking about the relevance of standard costing in such an environment, particularly given the overriding influences of total quality management.

## Required:

(b) Briefly explain total quality management (TQM).
(c) Briefly discuss the relevance of standard costing techniques in a TQM environment that uses computer-controlled, robotic manufacturing processes.

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\text { (Total = } 25 \text { marks) }
$$

## Question Six

For a number of years, the research division of $Z$ plc has produced its annual budget (for new and continuing projects) using incremental budgeting techniques. The company is now under new management and the annual budget for 2004 is to be prepared using zero based budgeting techniques.

## Required:

(a) Explain the differences between incremental and zero based budgeting techniques.
(b) Explain how $Z$ plc could operate a zero based budgeting system for its research projects.
(8 marks)

The operating divisions of $Z$ plc have in the past always used a traditional approach to analysing costs into their fixed and variable components. A single measure of activity was used, which, for simplicity, was the number of units produced. The new management does not accept that such a simplistic approach is appropriate for budgeting in the modern environment and has requested that the managers adopt an activity-based approach to their budgets for 2004.

## Required:

(c) (i) Briefly explain activity-based budgeting (ABB).
(ii) Explain how activity-based budgeting would be implemented by the operating divisions of $Z$ plc.

$$
\text { (Total = } 25 \text { marks) }
$$

