## Answers

## Fundamentals Level - Skills Module, Paper F5 <br> Performance Management

1 (a) (i) Sales price variance and sales volume variance
Sales price variance $=$ (actual price - standard price $) \times$ actual volume
$\left.\begin{array}{lccccc} & \begin{array}{c}\text { Actual } \\ \text { price }\end{array} & \begin{array}{c}\text { Standard } \\ \text { price }\end{array} & \text { Difference } & \begin{array}{c}\text { Actual } \\ \text { volume }\end{array} & \begin{array}{c}\text { Sales } \\ \text { price } \\ \text { Variance }\end{array} \\ & \$ & \$ & \$ & & \begin{array}{c}\$\end{array} \\ \text { Plasma TVs } & 330 & 350 & -20 & 750 & 15,000\end{array}\right]$

Sales volume contribution variance $=$ (actual sales volume - budgeted sales volume) $\times$ standard margin

|  | Actual <br> sales <br> volume | Budgeted <br> sales <br> volume | Difference | Standard <br> margin | Sales <br> volume <br> variance |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Plasma TVs | 750 | 590 | 160 | $\$$ <br> $\$$ | $\$ 0$ |
| LCD TVs | $\underline{650}$ | $\underline{590}$ | 60 | 180 | $\underline{10,800}$ |
|  | $\underline{1,400}$ | $\underline{1,180}$ |  |  | $\underline{41,200}$ |

(ii) Material price planning and purchasing operational variances

Material planning variance $=$ (original target price - general market price at time of purchase) $\times$ quantity purchased $(\$ 60-\$ 85) \times 1,400=\$ 35,000 \mathrm{~A}$.

Material price operational variance $=$ (general market price at time of purchase - actual price paid) $\times$ quantity purchased.
$(\$ 85-\$ 80) \times 1,400=\$ 7,000$ F.
(iii) Labour rate and labour efficiency variances

Labour rate variance $=($ standard labour rate per hour - actual labour rate per hour $) \times$ actual hours worked.
Actual hours worked by temporary workers:
Total hours needed if staff were fully efficient $=(750 \times 2)+(650 \times 1 \cdot 5)=2,475$.
Permanent staff provide 2,200 hours therefore excess $=2,475-2,200=275$.
However, temporary workers take twice as long, therefore hours worked $=275 \times 2=550$
Labour rate variance relates solely to temporary workers, therefore ignore permanent staff in the calculation.
Labour rate variance $=(\$ 14-\$ 18) \times 550=\$ 2,200 \mathrm{~A}$.
Labour efficiency variance $=$ (standard labour hours for actual production - actual labour hours worked) $\times$ standard rate.

$$
(275-550) \times \$ 14=\$ 3,850 \mathrm{~A} .
$$

(b) Explanation of planning and operational variances

Before the material price planning and operational variances were calculated, the only information available as regards material purchasing was that there was an adverse material price variance of $\$ 28,000$. The purchasing department will be assessed on the basis of this variance, yet, on its own, it is not a reliable indicator of the purchasing department's efficiency. The reason it is not a reliable indicator is because market conditions can change, leading to an increase in price, and this change in market conditions is not within the control of the purchasing department.

By analysing the materials price variance further and breaking it down into its two components - planning and operational the variance actually becomes a more useful assessment tool. The planning variance represents the uncontrollable element and the operational variance represents the controllable element.
The planning variance is a really useful for providing feedback on just how skilled management are in estimating future prices. This can be very easy in some businesses and very difficult in others.
The operational variance is more meaningful in that it measures the purchasing department's efficiency given the market conditions that prevailed at the time. It therefore ignores factors that the purchasing department cannot control, which in turn, stops staff from becoming demotivated.

## 2 Turnover

Turnover has decreased from $\$ 72.025$ million in 2009 to $\$ 66.028$ million in 2010 , a fall of $8 \cdot 3 \%$. However, this must be assessed by taking into account the change in market conditions, since there has been a $20 \%$ decline in demand for accountancy training. Given this $20 \%$ decline in the market place, AT Co's turnover would have been expected to fall to $\$ 57.62 \mathrm{~m}$ if it had kept in line with market conditions. Comparing AT Co's actual turnover to this, it's actual turnover is $14.6 \%$ higher than expected. As such, AT Co has performed fairly well, given market conditions.
It can also be seen from the non-financial performance indicators that $20 \%$ of students in 2010 are students who have transferred over from alternative training providers. It is likely that they have transferred over because they have heard about the improved service that AT Co is providing. Hence, they are most likely the reason for the increased market share that AT Co has managed to secure in 2010.

## Cost of sales

Cost of sales has decreased by $19 \cdot 2 \%$ in 2010. This must be considered in relation to the decrease in turnover as well. In 2009, cost of sales represented $72 \cdot 3 \%$ of turnover and in 2010 this figure was $63 \cdot 7 \%$. This is quite a substantial decrease. The reasons for it can be ascertained by, firstly, looking at the freelance staff costs.
In 2009, the freelance costs were $\$ 14.582 \mathrm{~m}$. Given that a minimum $10 \%$ reduction in fees had been requested to freelance lecturers and the number of courses run by them was the same year on year, the expected cost for freelance lecturers in 2010 was $\$ 13 \cdot 124 \mathrm{~m}$. The actual costs were $\$ 12 \cdot 394 \mathrm{~m}$. These show that a fee reduction of $15 \%$ was actually achieved. This can be seen as a successful reduction in costs.

The expected cost of sales for 2010 before any cost cuts, was $\$ 47 \cdot 738 \mathrm{~m}$ assuming a consistent ratio of cost of sales to turnover. The actual cost of sales was only $\$ 42 \cdot 056 \mathrm{~m}, \$ 5 \cdot 682 \mathrm{~m}$ lower. Since freelance lecturer costs fell by $\$ 2 \cdot 188 \mathrm{~m}$, this means that other costs of sale fell by the remaining $\$ 3.494 \mathrm{~m}$. Staff costs are a substantial amount of this balance but since there was a pay freeze and the average number of employees hardly changed from year to year, the decreased costs are unlikely to be related to staff costs. The decrease is therefore most probably attributable to the introduction of online marking. AT Co expected the online marking system to cut costs by $\$ 4 \mathrm{~m}$, but it is probable that the online marking did not save as much as possible, hence the $\$ 3.494 \mathrm{~m}$ fall. Alternatively, the saved marking costs may have been partially counteracted by an increase in some other cost included in cost of sales.

## Gross profit

As a result of the above, the gross profit margin has increased in 2010 from $27 \cdot 7 \%$ to $36 \cdot 3 \%$. This is a big increase and reflects very well on management.

## Indirect expenses

- Marketing costs: These have increased by $42 \cdot 1 \%$ in 2010 . Although this is quite significant, given all the improvements that AT Co has made to the service it is providing, it is very important that potential students are made aware of exactly what the company now offers. The increase in marketing costs has been rewarded with higher student numbers relative to the competition in 2010 and these will hopefully continue increasing next year, since many of the benefits of marketing won't be felt until the next year anyway. The increase should therefore be viewed as essential expenditure rather than a cost that needs to be reduced.
- Property costs: These have largely stayed the same in both years.
- Staff training: These costs have increased dramatically by over $\$ 2$ million, a $163 \cdot 9 \%$ increase. However, AT Co had identified that it had a problem with staff retention, which was leading to a lower quality service being provided to students. Also, due to the introduction of the interactive website, the electronic enrolment system and the online marking system, staff would have needed training on these areas. If AT Co had not spent this money on essential training, the quality of service would have deteriorated further and more staff would have left as they became increasingly dissatisfied with their jobs. Again, therefore, this should be seen as essential expenditure.
Given that the number of student complaints has fallen dramatically in 2010 to 84 from 315 , the staff training appears to have improved the quality of service being provided to students.
- Interactive website and the student helpline: These costs are all new this year and result from an attempt to improve the quality of service being provided and, presumably, improve pass rates. Therefore, given the increase in the pass rate for first time passes from $48 \%$ to $66 \%$ it can be said that these developments have probably contributed to this. Also, they have probably played a part in attracting new students, hence improving turnover.
- Enrolment costs have fallen dramatically by $80.9 \%$. This huge reduction is a result of the new electronic system being introduced. This system can certainly be seen as a success, as not only has it dramatically reduced costs but it has also reduced the number of late enrolments from 297 to 106.


## Net operating profit

This has fallen from $\$ 3 \cdot 635 \mathrm{~m}$ to $\$ 2 \cdot 106 \mathrm{~m}$. On the face of it, this looks disappointing but it has to be remembered that AT Co has been operating in a difficult market in 2010. It could easily have been looking at a large loss. Going forward, staff training costs will hopefully decrease. Also, market share may increase further as word of mouth spreads about improved results and service at AT Co. This may, in turn, lead to a need for less advertising and therefore lower marketing costs.

It is also apparent that AT Co has provided the student website free of charge when really, it should have been charging a fee for this. The costs of running it are too high for the service to be provided free of charge and this has had a negative impact on net operating profit.
Note: Students would not have been expected to write all this in the time available.
Workings (Note: All workings are in $\$^{\prime} 000$ )

1. Turnover

Decrease in turnover $=\$ 72,025-\$ 66,028 / \$ 72,025=8 \cdot 3 \%$
Expected 2010 turnover given 20\% decline in market $=\$ 72,025 \times 80 \%=\$ 57,620$
Actual 2010 turnover CF expected $=\$ 66,028-\$ 57,620 / \$ 57,620=14 \cdot 6 \%$ higher
2. Cost of sales

Decrease in cost of sales $=\$ 42,056-\$ 52,078 / \$ 52,078=19 \cdot 2 \%$
Cost of sales as percentage of turnover: $2009=\$ 52,078 / \$ 72,025=72 \cdot 3 \%$
$2010=\$ 42,056 / \$ 66,028=63 \cdot 7 \%$
Freelance staff costs: in $2009=\$ 41,663 \times 35 \%=\$ 14,582$
Expected cost for $2010=\$ 14,582 \times 90 \%=\$ 13,124$
Actual 2010 cost $=\$ 12,394$
\$12,394-\$14,582 = \$2,188 decrease
$\$ 2,188 / \$ 14,582=15 \%$ decrease in freelancer costs
Expected cost of sales for 2010, before costs cuts, $=\$ 66,028 \times 72 \cdot 3 \%=\$ 47,738$.
Actual cost of sales $=\$ 42,056$.
Difference $=\$ 5,682$, of which $\$ 2,188$ relates to freelancer savings and $\$ 3,494$ relates to other savings.
3. Gross profit margin

2009: $\$ 19,947 / \$ 72,025=27 \cdot 7 \%$
2010: $\$ 23,972 / \$ 66,028=36 \cdot 3 \%$
4. Increase in marketing costs $=\$ 4,678-\$ 3,291 / \$ 3,291=42 \cdot 1 \%$
5. Increase in staff training costs $=\$ 3,396-\$ 1,287 / \$ 1,287=163 \cdot 9 \%$
6. Decrease in enrolment costs $=\$ 960-5,032 / 5,032=80 \cdot 9 \%$
7. Net operating profit

Decreased from $\$ 3,635$ to $\$ 2,106$. This is fall of $1,529 / 3,635=42 \cdot 1 \%$
(a) Optimum production plan

## Define the variables

Let $x=$ no. of jars of face cream to be produced Let $y=$ no. of bottles of body lotion to be produced
Let $\mathrm{C}=$ contribution
State the objective function
The objective is to maximise contribution, C
$C=9 x+8 y$
State the constraints
Silk powder $\quad 3 x+2 y \leq 5,000$
Silk amino acids $\quad 1 x+0.5 y \leq 1,600$
Skilled labour $\quad 4 x+5 y \leq 9,600$
Non-negativity constraints:
$x, y \geq 0$
Sales constraint:
$y \leq 2,000$
Draw the graph
Silk powder $\quad 3 x+2 y=5,000$
If $x=0$, then $2 y=5,000$, therefore $y=2,500$
If $y=0$, then $3 x=5,000$, therefore $x=1,666 \cdot 7$
Silk amino acids
$1 x+0 \cdot 5 y=1,600$
If $x=0$, then $0 \cdot 5 y=1,600$, therefore $y=3,200$
If $y=0$, then $x=1,600$
Skilled labour $\quad 4 x+5 y=9,600$
If $x=0$, then $5 y=9,600$, therefore $y=1,920$
If $y=0$, then $4 x=9,600$, therefore $x=2,400$


Solve using iso-contribution line
If $y=800$ and $x=0$, then if $C=9 x+8 y$
$C=(8 \times 800)=6,400$
Therefore, if $y=0,9 x=6,400$
Therefore $\mathrm{x}=711 \cdot 11$
Using the iso-contribution line, the furthest vertex from the origin is point c , the intersection of the constraints for skilled labour and silk powder.
Solving the simultaneous equations for these constraints:

| $4 x+5 y=9,600$ | $x 3$ |
| :--- | :--- |
| $3 x+2 y=5,000$ | $\times 4$ |
| $12 x+15 y=28,800$ |  |
| $12 x+8 y=20,000$ |  |

Subtract the second one from the first one
$7 y=8,800$, therefore $\mathrm{y}=1,257 \cdot 14$.
If $y=1,257 \cdot 14$ and:
$4 x+5 y=9,600$
Then $5 \times 1,257 \cdot 14+4 x=9,600$
Therefore $x=828 \cdot 58$
If $C=9 x+8 y$
$C=\$ 7,457 \cdot 22+\$ 10,057 \cdot 12=\$ 17,514 \cdot 34$
(b) Shadow prices and slack

The shadow price for silk powder can be found by solving the two simultaneous equations intersecting at point c , whilst adding one more hour to the equation for silk powder.

$$
\begin{array}{ll}
4 x+5 y=9,600 & x 3 \\
3 x+2 y=5,001 & x 4 \\
12 x+15 y=28,800 & \\
12 x+8 y=20,004 &
\end{array}
$$

Subtract the second one from the first one
$7 y=8,796$, therefore $y=1,256 \cdot 57$
$3 x+(2 \times 1,256 \cdot 57)=5,001$.
Therefore $x=829 \cdot 29$
$C=(9 \times 829 \cdot 29)+(8 \times 1,256 \cdot 57)=\$ 17,516 \cdot 17$
Original contribution $=\$ 17,514 \cdot 34$
Therefore shadow price for silk powder is $\$ 1.83$ per gram.
The slack for amino acids can be calculated as follows:
$(828.58 \times 1)+(0.5 \times 1,257 \cdot 14)=1,457 \cdot 15$ grams used.
Available $=1,600$ grams.
Therefore slack $=142 \cdot 85$ grams.

4 (a) Cost per unit under full absorption costing

| Total annual overhead costs: | $\$$ |
| :--- | :---: |
| Machine set up costs | 26,550 |
| Machine running costs | 66,400 |
| Procurement costs | 48,000 |
| Delivery costs | 54,320 |
|  | $\underline{195,270}$ |

## Overhead absorption rate:

|  | A | B | C | Total |
| :--- | ---: | ---: | ---: | ---: |
| Production volumes | 15,000 | 12,000 | 18,000 |  |
| Labour hours per unit | $0 \cdot 1$ | $0 \cdot 15$ | $0 \cdot 2$ |  |
| Total labour hours | 1,500 | 1,800 | 3,600 | 6,900 |

Therefore, overhead absorption rate $=\$ 195,270 / 6,900=\$ 28 \cdot 30$ per hour
Cost per unit:

|  | A | B | C |
| :--- | :---: | ---: | ---: |
|  | $\$$ | $\$$ | $\$$ |
| Raw materials $(\$ 1.20 \times 2 / 3 / 4 \mathrm{~kg})$ | $2 \cdot 4$ | 3.6 | 4.8 |
| Direct labour $(\$ 14.80 \times 0 \cdot 1 / 0 \cdot 15 / 0 \cdot 2 \mathrm{hrs})$ | $1 \cdot 48$ | 2.22 | 2.96 |
| Overhead ( $28.30 \times 0 \cdot 1 / 0 \cdot 15 / 0 \cdot 2 \mathrm{hrs})$ | $\underline{2.83}$ | $\underline{4.25}$ | $\underline{5.66}$ |
| Full cost per unit | $\underline{6.71}$ | $\underline{10.07}$ | $\underline{13.42}$ |

(b) Cost per unit using full absorption costing

Cost drivers:

Cost pools
Machine set up costs
Machine running costs
Procurement costs
Delivery costs

Cost per machine set up
Cost per machine hour
Cost per order
Cost per delivery
\$
26,550
$66,400 \quad 32,100$ machine hours $(7,500+8,400+16,200)$
$48,000 \quad 94$ purchase orders $(24+28+42)$
54,320 140 deliveries $(48+30+62)$
195,270
\$26,550/36 = \$737.50
$\$ 66,400 / 32,100=\$ 2 \cdot 0685$
$\$ 48,000 / 94=\$ 510 \cdot 6383$
$\$ 54,320 / 140=\$ 388$

## Allocation of overheads to each product:

|  | A | B | C | Total |
| :---: | :---: | :---: | :---: | :---: |
|  | \$ | \$ | \$ | \$ |
| Machine set up costs | 11,800 | 8,850 | 5,900 | 26,550 |
| Machine running costs | 15,514 | 17,375 | 33,510 | 66,400 |
| Procurement costs | 12,255 | 14,298 | 21,447 | 48,000 |
| Delivery costs | 18,624 | 11,640 | 24,056 | 54,320 |
|  | 58,193 | 52,163 | 84,913 | 195,270 |
| Number of units produced | 15,000 | 12,000 | 18,000 |  |
|  | \$ | \$ | \$ |  |
| Overhead cost per unit | 3.88 | $4 \cdot 35$ | $4 \cdot 72$ |  |
| Total cost per unit | A | B | C |  |
|  | \$ | \$ | \$ |  |
| Materials | $2 \cdot 4$ | $3 \cdot 6$ | $4 \cdot 8$ |  |
| Labour | 1.48 | $2 \cdot 22$ | $2 \cdot 96$ |  |
| Overheads | 3.88 | $4 \cdot 35$ | $4 \cdot 72$ |  |
|  | $7 \cdot 76$ | 10.17 | $12 \cdot 48$ |  |

## (c) Using activity-based costing

When comparing the full unit costs for each of the products under absorption costing as compared to $A B C$, the following observations can be made:

## Product A

The unit cost for product A is $16 \%$ higher under ABC as opposed to traditional absorption costing. Under ABC, it is $\$ 7.76$ per unit compared to $\$ 6.71$ under traditional costing. This is particularly significant given that the selling price for product A is $\$ 7.50$ per unit. This means that when the activities that give rise to the overhead costs for product A are taken into account, product A is actually making a loss. If the company wants to improve profitability it should look to either increase the selling price of product A or somehow reduce the costs. Delivery costs are also high, with 48 deliveries a year being made for product A. Maybe the company could seek further efficiencies here. Also, machine set up costs are higher for product A than for any of the other products, due to the larger number of production runs. The reason for this needs to be identified and, if possible, the number of production runs needs to be reduced.

## Product B

The difference between the activity based cost for $B$ as opposed to the traditional cost is quite small, being only $\$ 0 \cdot 10$. Since the selling price for $B$ is $\$ 12$, product $B$ is clearly profitable whichever method of overhead allocation is used. $A B C$ does not really identify any areas for concern here.

## Product C

The unit cost for C is $7 \%$ lower under ABC when compared to traditional costing. More importantly, while C looks like it is making a loss under traditional costing, ABS tells a different story. The selling price for C is $\$ 13$ per unit and, under ABC, it costs $\$ 12.48$ per unit. Under traditional absorption costing, C is making a loss of $\$ 0.42$ per unit. Identifying the reason for the differences in C , it is apparent that the number of production runs required to produce C is relatively low compared to the volumes produced. This leads to a lower apportionment of the machine set up costs to C than would be given under traditional absorption costing. Similarly, the number of product tests carried out on C is low relative to its volume.
$A B C$ is therefore very useful in identifying that $C$ is actually more profitable than $A$, because of the reasons identified above. The company needs to look at the efficiency that seems to be achieved with C (low number of production runs less testing) and see whether any changes can be made to $A$, to bring it more in line with $C$. Of course, this may not be possible, in which case the company may consider whether it wishes to continue to produce $A$ and whether it could sell higher volumes of $C$.

## 5 (a) Difficulties in the public sector

In the public sector, the objectives of the organisation are more difficult to define in a quantifiable way than the objectives of a private company. For example, a private company's objectives may be to maximise profit. The meeting of this objective can then be set out in the budget by aiming for a percentage increase in sales and perhaps the cutting of various costs. If, on the other hand, the public sector organisation is a hospital, for example, then the objectives may be largely qualitative, such as ensuring that all outpatients are given an appointment within eight weeks of being referred to the hospital. This is difficult to define in a quantifiable way, and how it is actually achieved is even more difficult to define.
This leads onto the next reason why budgeting is so difficult in public sector organisations. Just as objectives are difficult to define quantifiably, so too are the organisation's outputs. In a private company the output can be measured in terms of sales revenue. There is a direct relationship between the expenditure that needs to be incurred i.e. needs to be input in order to achieve the desired level of output. In a hospital, on the other hand, it is difficult to define a quantifiable relationship between inputs and outputs. What is more easy to compare is the relationship between how much cash is available for a particular
area and how much cash is actually needed. Therefore, budgeting naturally focuses on inputs alone, rather than the relationship between inputs and outputs.
Finally, public sector organisations are always under pressure to show that they are offering good value for money, i.e. providing a service that is economical, efficient and effective. Therefore, they must achieve the desired results with the minimum use of resources. This, in itself, makes the budgeting process more difficult.

## (b) Incremental and zero-based budgeting

'Incremental budgeting' is the term used to describe the process whereby a budget is prepared using a previous period's budget or actual performance as a base, with incremental amounts then being added for the new budget period.
'Zero-based budgeting', on the other hand, refers to a budgeting process which starts from a base of zero, with no reference being made to the prior period's budget or performance. Every department function is reviewed comprehensively, with all expenditure requiring approval, rather than just the incremental expenditure requiring approval.
(c) Stages in zero-based budgeting

Zero-based budgeting involves three main stages:

1. Activities are identified by managers. These activities are then described in what is called a 'decision package'. This decision package is prepared at the base level, representing the minimum level of service or support needed to achieve the organisation's objectives. Further incremental packages may then be prepared to reflect a higher level of service or support.
2. Management will then rank all the packages in the order of decreasing benefits to the organisation. This will help management decide what to spend and where to spend it.
3. The resources are then allocated based on order of priority up to the spending level.

## (d) No longer a place for incremental budgeting

The view that there is no longer a place for incremental budgeting in any organisation is a rather extreme view. It is known for encouraging slack and wasteful spending, hence the comment that it is particularly unsuitable for public sector organisations, where cash cutbacks are being made. However, to say that there is no place for it at all is to ignore the drawbacks of zero-based budgeting. These should not be ignored as they can make ZBB implausible in some organisations or departments. They are as follows:

- Departmental managers will not have the skills necessary to construct decision packages. They will need training for this and training takes time and money.
- In a large organisation, the number of activities will be so large that the amount of paperwork generated from ZBB will be unmanageable.
- Ranking the packages can be difficult, since many activities cannot be compared on the basis of purely quantitative measures. Qualitative factors need to be incorporated but this is difficult.
- The process of identifying decision packages, determining their purpose, costs and benefits is massively time consuming and therefore costly.
- $\quad$ Since decisions are made at budget time, managers may feel unable to react to changes that occur during the year. This could have a detrimental effect on the business if it fails to react to emerging opportunities and threats.
It could be argued that ZBB is more suitable for public sector than for private sector organisations. This is because, firstly, it is far easier to put activities into decision packages in organisations which undertake set definable activities. Local government, for example, have set activities including the provision of housing, schools and local transport. Secondly, it is far more suited to costs that are discretionary in nature or for support activities. Such costs can be found mostly in not for profit organisations or the public sector, or in the service department of commercial operations.
Since ZBB requires all costs to be justified, it would seem inappropriate to use it for the entire budgeting process in a commercial organisation. Why take so much time and resources justifying costs that must be incurred in order to meet basic production needs? It makes no sense to use such a long-winded process for costs where no discretion can be exercised anyway. Incremental budgeting is, by its nature, quick and easy to do and easily understood. These factors should not be ignored.

In conclusion, whilst ZBB is more suited to public sector organisations, and is more likely to make cost savings in hard times such as these, its drawbacks should not be overlooked.

Fundamentals Level - Skills Module, Paper F5
Marks
1 (a) (i) Sales price variance ..... 3
Sales volume variance(ii) Purchasing planning variance1
Purchasing efficiency variance12
(iii) Actual hours worked ..... 3
Labour rate variance ..... 2
Labour efficiency variance ..... 27
(b) Each valid reason1

## Marks

2 Turnover
8.3\% decrease ..... 0.5
Actual t/o 14.6\% higher ..... 0.5
Performed well CF market conditions ..... 1
Max. turnover
Transfer of students3
Cost of sales
19.2\% decrease ..... 0.5
$63 \cdot 7 \%$ of turnover ..... 0.5
$15 \%$ fee reduction from freelance staff ..... 2
Other costs of sale fell by $\$ 3.555 \mathrm{~m}$ ..... 2
Online marking did not save as much as planned ..... 1
Max. COS
Gross profit - numbers and comment ..... 1
Indirect expenses:
Marketing costs
$42 \cdot 1 \%$ increase ..... 0.5
Increase necessary to reap benefits of developments ..... 1
Benefits may take more than one year to be felt ..... 0.5
Property costs - stayed the same ..... 0.5
Staff training
163.9\% increase ..... 0.5
Necessary for staff retention ..... 1
Necessary to train staff on new website etc ..... 1
Without training, staff would have left ..... 1
Less student complaints ..... 1
Interactive website and student helpline
Attracted new students ..... 1
Increase in pass rate ..... 1
Enrolment costs
Fall of 80.9\% ..... 0.5
Result of electronic system being introduced ..... 1
Max. Indirect expenses
Reduced number of late enrolments1
Net operating profit
Fallen to $\$ 2 \cdot 106$0.5
Difficult market ..... 1
Staff training costs should decrease in future ..... 1
Future increase in market share ..... 1
Lower advertising cost in future ..... 1
Charge for website1
Max. net operating profit ..... 3

## Marks

3 (a) Optimum production plan
Assigning letters for variables 0.5
Defining constraint for silk powder 0.5
Defining constraint for amino acids 0.5
Defining constraint for labour 0.5
Non-negativity constraint 0.5
Sales constraint: $\mathrm{x} \quad 0.5$
Sales constraint: y 0.5
Iso-contribution line worked out 1
The graph:
Labels 0.5
Silk powder 0.5
Amino acids 0.5
Labour line 0.5
Demand for $x$ line 0.5
Demand for y line 0.5
Iso-contribution line 0.5
Vertices a-e identified 0.5
Feasible region shaded 0.5
Optimum point identified 1
Equations solved at optimum point 3
Total contribution
(b) Shadow prices and slack

Shadow price
Slack

4 (a) Contribution per unit
Overhead absorption rate
Cost for A
Cost for B
Cost for C
(b) Cost under ABC

Correct cost driver rates
Correct overhead unit cost for A
Correct overhead unit cost for B
Correct overhead unit cost for C
Correct cost per unit under ABC
(c) Using ABC to improve profitability

One mark per point about the Gadget Co
(a) Explanation
Difficulty setting objectives quantifiably ..... 2
Difficulty in saying how to achieve them ..... 1
Outputs difficult to measure ..... 2
No relationship between inputs and outputs ..... 2
Value for money issue ..... 2
Maximum ..... 5
(b) Incremental and zero-based budgeting
Explaining 'incremental budgeting' ..... 2
Explaining 'zero-based budgeting' ..... 2
(c) Stages involved in zero-based budgeting Each stage
(d) Discussion
Any disadvantage of inc. that supports statement (max. 3) 1
Incremental budgeting is quick and easy
Any disadvantage of ZBB that refutes statement (max. 3) 1
Easier to define decision packages in public sector 2
more appropriate for discretionary costs 2
Conclusion
Maximum


