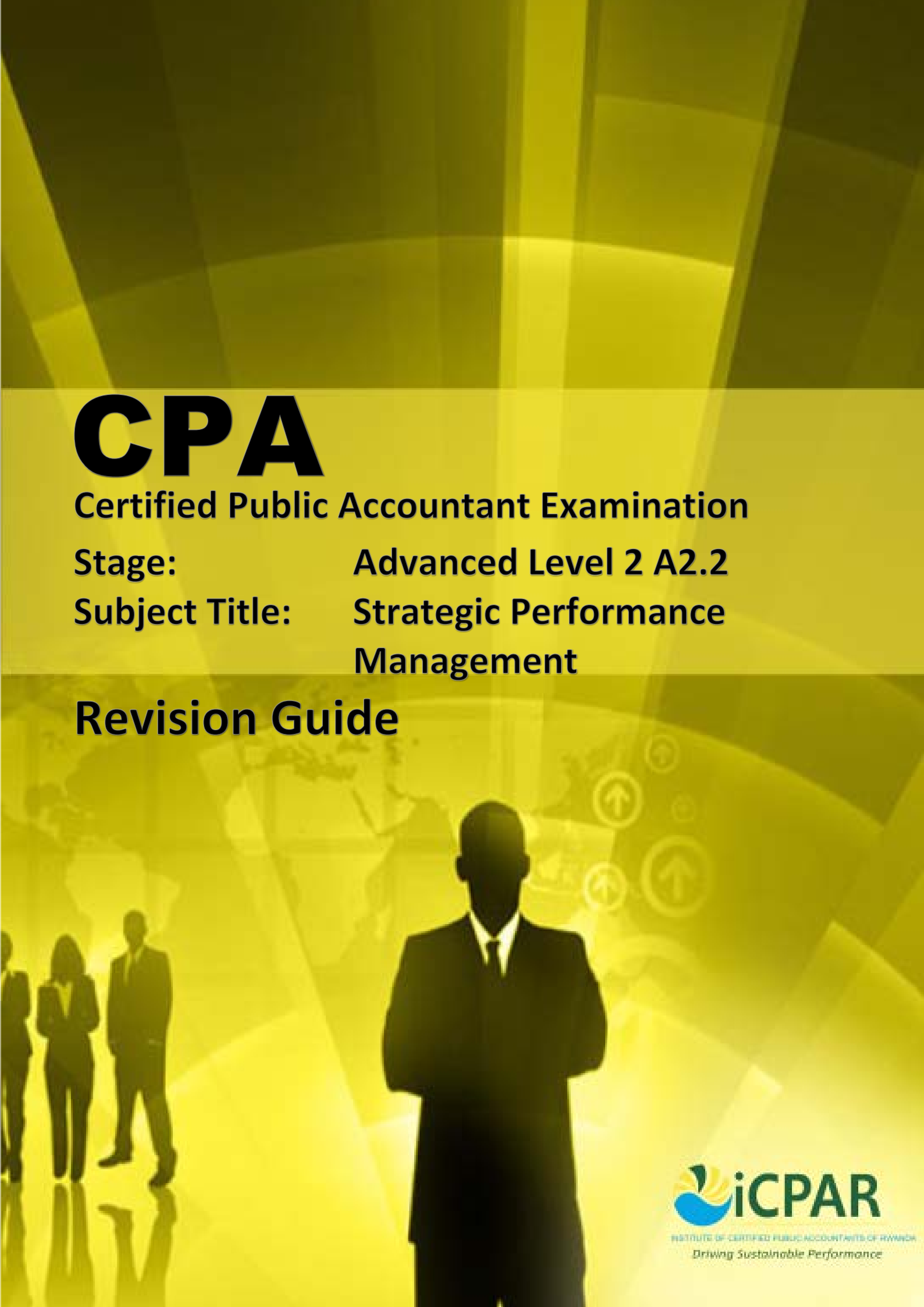
CPA

Certified Public Accountant Examination

Stage: Advanced Level 2 A2.2

Subject Title: Strategic Performance Management

Revision Guide



ICPAR

INSTITUTE OF CERTIFIED PUBLIC ACCOUNTANTS OF RWANDA

Driving Sustainable Performance

BLANK

CONTENTS

BLANK

STUDY TECHNIQUE

What is the best way to manage my time?

- **Identify all available free time between now and the examinations.**
- **Prepare a revision timetable with a list of "*must do*" activities.**
- **Remember to take a break (approx 10 minutes) after periods of intense study.**

What areas should I revise?

- **Rank your competence from Low to Medium to High for each topic.**
- **Allocate the least amount of time to topics ranked as high.**
- **Allocate between 25% - 50% of time for medium competence.**
- **Allocate up to 50% of time for low competence.**

How do I prevent myself veering off-track?

- **Introduce variety to your revision schedule.**
- **Change from one subject to another during the course of the day.**
- **Stick to your revision timetable to avoid spending too much time on one topic.**

Are study groups a good idea?

- **Yes, great learning happens in groups.**
- **Organise a study group with 4 – 6 people.**
- **Invite classmates of different strengths so that you can learn from one another.**
- **Share your notes to identify any gaps.**

BLANK

EXAMINATION TECHNIQUES

INTRODUCTION

Solving and dealing with problems is an essential part of learning, thinking and intelligence. A career in accounting will require you to deal with many problems.

In order to prepare you for this important task, professional accounting bodies are placing greater emphasis on problem solving as part of their examination process.

In exams, some problems we face are relatively straightforward, and you will be able to deal with them directly and quickly. However, some issues are more complex and you will need to work around the problem before you can either solve it or deal with it in some other way.

The purpose of this article is to help students to deal with problems in an exam setting. To achieve this, the remaining parts of the article contain the following sections:

- Preliminary issues
- An approach to dealing with and solving problems
- Conclusion.

Preliminaries

The first problem that you must deal with is your reaction to exam questions.

When presented with an exam paper, most students will quickly read through the questions and then many will … **PANIC!**

Assuming that you have done a reasonable amount of work beforehand, you shouldn't be overly concerned about this reaction. It is both natural and essential. It is natural to panic in stressful situations because that is how the brain is programmed.

Archaeologists have estimated that humans have inhabited earth for over 200,000 years. For most of this time, we have been hunters, gatherers and protectors.

In order to survive on this planet we had to be good at spotting unusual items, because any strange occurrence in our immediate vicinity probably meant the presence of danger. The brain's natural reaction to sensing any extraordinary item is to prepare the body for 'fight or flight'. Unfortunately, neither reaction is appropriate in an exam setting.

The good news is that if you have spotted something unusual in the exam question, you have completed the first step in dealing with the problem: its identification. Students may wish to use various relaxation techniques in order to control the effects of the brain's extreme reaction to the unforeseen items that will occur in all examination questions.

However, you should also be reassured that once you have identified the unusual item, you can now prepare yourself for dealing with this, and other problems, contained in the exam paper.

A Suggested Approach for Solving and Dealing with Problems in Exams.

The main stages in the suggested approach are:

1. Identify the Problem
2. Define the Problem
3. Find and Implement a Solution
4. Review

1. Identify the Problem

As discussed in the previous section, there is a natural tendency to panic when faced with unusual items. We suggest the following approach for the preliminary stage of solving and dealing with problems in exams:

Scan through the exam question

You should expect to find problem areas and that your body will react to these items.

PANIC!!

Remember that this is both natural and essential.

Pause

Take deep breaths or whatever it takes to help your mind and body to calm down.

Try not to exhale too loudly – you will only distract other students!

Do something practical

Look at the question requirements.

Note the items that are essential and are worth the most marks.

Start your solution by neatly putting in the question number and labelling each part of your answer in accordance with the stated requirements.

Actively reread the question

Underline (or highlight) important items that refer to the question requirements. Tick or otherwise indicate the issues that you are familiar with. Put a circle around unusual items that will require further consideration.

2. Define the Problem

Having dealt with the preliminary issues outlined above, you have already made a good start by identifying the problem areas. Before you attempt to solve the problem, you should make sure that the problem is properly defined. This may take only a few seconds, but will be time well spent. In order to make sure that the problem is properly defined you should refer back to the question requirements. This is worth repeating: Every year, Examiner Reports note that students fail to pass exams because they do not answer the question asked. Examiners have a marking scheme and they can only award marks for solutions that deal with the issues as stipulated in the question requirements. Anything else is a waste of time. After you have re-read the question requirements ask yourself these questions in relation to the problem areas that you have identified:

Is this item essential in order to answer the question?

Remember that occasionally, examiners will put 'red herrings' (irrelevant issues) into the question in order to test your knowledge of a topic.

What's it worth?

Figure out approximately how many marks the problem item is worth. This will help you to allocate the appropriate amount of time to this issue.

Can I break it down into smaller parts?

In many cases, significant problems can be broken down into its component parts. Some parts of the problem might be easy to solve.

Can I ignore this item (at least temporarily)?

Obviously, you don't want to do this very often, but it can be a useful strategy for problems that cannot be solved immediately.

Note that if you leave something out, you should leave space in the solution to put in the answer at a later stage. There are a number of possible advantages to be gained from this approach:

1) It will allow you to make progress and complete other parts of the question that you are familiar with. This means that you will gain marks rather than fretting over something that your mind is not ready to deal with yet.

2) As you are working on the tasks that you are familiar with, your mind will relax and you may remember how to deal with the problem area.

3) When you complete parts of the answer, it may become apparent how to fill in the missing pieces of information. Many accounting questions are like jigsaw puzzles: when you put in some of the parts that fit together, it is easier to see where the missing pieces should go and what they look like.

3. Find and Implement a Solution

In many cases, after identifying and defining the problem, it will be easy to deal with the issue and to move on to the next part of the question. However, for complex problems that are worth significant marks, you will have to spend more time working on the issue in order to deal with the problem. When this happens, you should follow these steps:

Map out the problem

Depending on your preferred learning style, you can do this in a variety of ways including diagrams, tables, pictures, sentences, bullet points or any combination of methods. It is best to do this in a working on a separate page (not on the exam paper) because some of this work will earn marks. Neat and clearly referenced workings will illustrate to the examiner that you have a systematic approach to answering the question.

Summarise what you know about the problem

Make sure that this is brief and that it relates to the question requirements. Put this information into the working where you have mapped out the problem. Be succinct and relevant. The information can be based on data contained in the question and your own knowledge and experience. Don’t spend too long at this stage, but complete your workings as neatly as possible because this will maximise the marks you will be awarded.

Consider alternative solutions

Review your workings and compare this information to the question requirements. Complete as much of the solution as you can. Make sure it is in the format as stipulated in the question requirements. Consider different ways of solving the problem and try to eliminate at least one alternative.

Implement a solution

Go with your instinct and write in your solution. Leave extra space on the page for a change of mind and/or supplementary information. Make sure the solution refers to your workings that have been numbered.

4. Review

After dealing with each problem and question, you should spend a short while reviewing your solution. The temptation is to rush onto the next question, but a few moments spent in reviewing your solution can help you to gain many marks. There are three questions to ask yourself here:

Have I met the question requirements?

Yes, we have mentioned this already. Examiner Reports over the years advise that failure to follow the instructions provided in the question requirements is a significant factor in causing students to lose marks. For instance, easy marks can be gained by putting your answer in the correct format. This could be in the form of a report or memo or whatever is asked in the question. Likewise, look carefully at the time period requested. The standard accounting period is 12 months, but occasionally examiners will specify a different accounting period.

Is my solution reasonable?

Look at the figures in your solution. How do they compare relative to the size of the figures provided in the question?

For example, if Revenue were 750,000 and your Net Profit figure was more than 1 million, then clearly this is worth checking.

If there were some extraordinary events it is possible for this to be correct, but more than likely, you have misread a figure from your calculator. Likewise, the depreciation expense should be a fraction of the value of the fixed assets.

What have I learned?

Very often in exams, different parts of the solution are interlinked. An answer from one of your workings can frequently be used in another part of the solution. The method used to figure out an answer may also be applicable to other parts of your solution.

Conclusion

In order to pass your exams you will have to solve many problems. The first problem to overcome is your reaction to unusual items. You must expect problems to arise in exams and be prepared to deal with them in a systematic manner. John Foster Dulles, a former US Secretary of State noted that: *The measure of success is not whether you have a tough problem to deal with, but whether it is the same problem you had last year.* We hope that, by applying the principles outlined in this article, you will be successful in your examinations and that you can move on to solve and deal with new problems.

BLANK

Stage: Advanced Level 2

Subject Title:A2.2 Strategic Performance Management
Examination Duration: 3.5 hours (Open Book)

Assessment Strategy

Examination Approach
Students should approach the examination of this subject in the knowledge that it requires an ability to demonstrate a high level of intellectual, technical, organisational, managerial and communication skills. A single case-study scenario is presented to students. Skills assessed include the ability to perform critical analysis of relatively unstructured problems, to analyse available qualitative and quantitative information, to think strategically, and to exercise professional judgement, including appropriate professional scepticism and consideration of ethical issues in arriving at recommended solutions to business problems.

Students are expected to select and integrate relevant syllabus material from Strategic Performance Management and other subjects where this is appropriate to the analysis and solution to the case-study. The case-study questions will indicate, in broad terms, what issues need to be addressed and analysed, but in many instances students will be expected to determine for themselves what specific form that analysis should take and to justify their chosen form of analysis in the specific case.

Examination Format
Assessment is by an open-book examination of 3.5 hours' duration based on a single case-study scenario, on which students are required to answer a number of questions. The number of questions will not be exactly the same every year, because it is important that the examiner should have the flexibility to ask questions in the manner most appropriate to the case.

Marks Allocation
The total for the paper is 100 marks.

Case-study - A number of questions up to a maximum of: 100

Learning Resources

Core Texts

W. Seal, R. H. Garrison & E. W. Noreen / Management Accounting / McGraw-Hill (3rd edition) 2008 / ISBN 0077121643

Bohill / Business Planning and Control : Integrating Accounting, Strategy, and People / Wiley 2008 / ISBN 9780470061770

C. Drury / Management and Cost Accounting (7th edition) / Cengage 2008 / ISBN 139781844805662 / ISBN10-1844805662.

C. T. Horngren / A. Bhimani, S. M. Datar & G. Foster / Management and Costing Accounting / 4th edition 2008 / ISBN 9780273711490

Manuals

A2.2 Strategic Performance Management – Institute of Certified Public Accountants of Rwanda

Supplementary Texts and Journals

Z. Hoque / Strategic Management Accounting / Pearson 2nd Edition 2006 / ISBN 9780733984457

R. N. Anthony & V. Govindarajan / Management Control Systems / McGraw Hill / 12th edition 2006 / ISBN 0071254102

F. R. David / Strategic Management: Concepts and Cases Pearson 12th edition (2008) / ISBN 0135013208

A. A. De Waal / Strategic Performance Management: A Managerial and Behavioural Approach / Palgrave 2006 / ISBN 1403998841.

Stevenson / Operations Management / McGraw Hill 2011 / ISBN 9780073525259.

Useful Websites
(as of date of publication)
www.icparwanda.com
http://www.rse.rw/
www.ifac.org/ - International Federation of Accountants.
www.investmentinternational.com - Investor International. www.accountingeducation.com Accounting Education.com.
www.hoovers.com - Hoovers.com.
Companion websites to core and supplementary texts – see texts for addresses and passwords.

BLANK

REVISION QUESTIONS AND SOLUTIONS

Stage: **Advanced Level A2.2**

Subject Title: **Strategic Performance Management**

BLANK

Short questions

1) Traditional Cost versus ABC

A company manufactures two products, L and M, using the same equipment and similar processes. An extract of the production data for these products in one period is shown below.

	L	*M*
Quantity produced (units)	5,000	7,000
Direct labour hours per unit	1	2
Machine hours per unit	3	1
Set‑ups in the period	10	40
Orders handled in the period	15	60
Overhead costs		*Rwf '000*
Relating to machine activity		220,000
Relating to production run set‑ups		20,000
Relating to handling of orders		45,000
		285,000

Required

Calculate the production overheads to be absorbed by one unit of each of the products using the following costing methods.

a) A traditional costing approach using a direct labour hour rate to absorb overheads
b) An activity based costing approach, using suitable cost drivers to trace overheads to products

2) Explain how customer profitability analysis can enhance an organisation's competitive advantage.

3) Customer profitability

BB manufactures components for the heavy goods vehicle industry. The following annual information regarding three of its key customers is available.

		P	*Q*	*R*
Gross margin	*Rwf*	897,000	1,070,000	1,056,000
General administration costs	*Rwf*	35,000	67,000	56,000
Units sold	*No.*	4,600	5,800	3,800
Orders placed	*No.*	300	320	480
Sales visits	*No.*	80	50	100
Invoices raised	*No.*	310	390	1,050

The company uses an activity based costing system and the analysis of customer-related costs is as follows.

Sales visits	Rwf420 per visit
Order processing	Rwf190 per order placed
Despatch costs	Rwf350 per order placed
Billing and collections	Rwf97 per invoice raised

Using customer profitability analysis, what is the ranking of the customers?

4) Demand curves

Learning outcome:

The current price of a product is Rwf30 and the producers sell 100 items a week at this price. One week the price is dropped by Rwf3 as a special offer and the producers sell 150 items.

Required

An expression for the demand curve is .P= ???..... .

5) Demand curve

AB has used market research to determine that if a price of Rwf250 is charged for product G, demand will be 12,000 units. It has also been established that demand will rise or fall by 5 units for every Rwf1 fall/rise in the selling price. The marginal cost of product G is Rwf80.

Required

If marginal revenue = a –2bx when the selling price (P) = a – bx, calculate the profit-maximising selling price for product G.

6) Marginal pricing and Demand

An organisation operates in a market where there is imperfect competition, so that to sell more units of output, it must reduce the sales price of all the units it sells. The following data is available for prices and costs.

Total output	*Sales price per unit (AR)*	*Average cost of output (AC)*
Units	Rwf	Rwf per unit
0	–	–
1	504	720
2	471	402
3	439	288
4	407	231
5	377	201
6	346	189
7	317	182
8	288	180
9	259	186
10	232	198

The total cost of zero output is Rwf600.

Required

Complete the table below to determine the output level and price at which the organisation would maximise its profits, assuming that fractions of units cannot be made.

7) Break-even point

A product has the following costs.

	Rwf
Direct materials	5
Direct labour	3
Variable overheads	7

Fixed overheads are Rwf10,000 per month. Budgeted sales per month are 400 units to allow the product to break even.

Required

What mark-up needs to be added to marginal cost to allow the product to break?.

8) Contribution

DDD has decided to price its jobs as follows.

a) It calculates the minimum price for the job using relevant costs.
b) It adds Rwf5,000 to cover fixed costs.
c) It adds a 10% profit margin to the total cost.

A customer who has work to be performed in May says he will award the contract to DDD if its bid is reduced by Rwf5,000.

Required

Should the contract be accepted ?

9) Maximizing contribution

JPM is just about to launch a new product.

Production capacity means that a maximum of 120 units can be manufactured each week and manufacture must be in batches of ten. The marketing department estimates that at a price of Rwf120 no units will be sold but, for each Rwf3 reduction in prices, ten additional units per week will be sold.

Fixed costs associated with manufacturing the product are expected to be Rwf6,000 per week. Variable costs are expected to be Rwf40 per unit for the first eight batches, but after that the unit variable cost of the products in the batch will be Rwf2 more than those in the preceding batch.

Required

What is the most profitable level of output per week?

10) Limited resources

Growler manufactures computer components. Health and safety regulations mean that one of its processes can only be operated 8 hours a day. The hourly capacity of this process is 500 units per hour. The selling price of each component is Rwf100 and the unit material cost is Rwf40. The daily total of all factory costs (conversion costs) is Rwf144,000, excluding materials. Expected production is 3,600 units per day.

Required

Calculate

a) Total profit per day
b) Return per factory hour
c) Throughput accounting ratio

11) Limited resources

JJ makes two products, the K and the L. The K sells for Rwf50 per unit, the L for Rwf70 per unit. The variable cost per unit of the K is Rwf35, that of the L Rwf40. Each unit of K uses 2 kgs of raw material. Each unit of L uses 3 kg of material.

In the forthcoming period the availability of raw material is limited to 2,000 kgs. JJ is contracted to supply 500 units of K. Maximum demand for the L is 250 units. Demand for the K is unlimited.

What is the profit-maximising product mix?

12) Limited resources

TW manufactures two products, the D and the E, using the same material for each. Annual demand for the D is 9,000 units, while demand for the E is 12,000 units. The variable production cost per unit of the D is Rwf10, that of the E Rwf15. The D requires 3.5 kgs of raw material per unit, the E requires 8 kg of raw material per unit. Supply of raw material will be limited to 87,500 kgs during the year.

A subcontractor has quoted prices of Rwf17 per unit to make the D and Rwf25 per unit for the E .

Required

How many of each product should TW manufacture in order to maximise profits?

13) Limited resources & Linear programme model

An organisation makes two products, X and Y. Product X has a contribution of Rwf124 per unit and product Y Rwf80 per unit. Both products pass through two departments for processing and the times in minutes per unit are as follows.

	Product X	*Product Y*
Department 1	150	90
Department 2	100	120

Currently there is a maximum of 225 hours per week available in department 1 and 200 hours in department 2. The organisation can sell all it can produce of X but quotas restrict the sale of Y to a maximum of 75 units per week. The organisation, which wishes to maximise contribution, currently makes and sells 30 units of X and 75 units of Y per week.

Required

Assume x and y are the number of units of X and Y produced per week. Formulate a linear programming model of this problem, filling in the blanks in (a) and (b) below.

(a) The objective function is to maximise weekly contribution, given by C = ……..

(b) The constraints are:

Department 1 ……. Quota …….

Department 2 ……. Non-negativity …….

14) Shadow prices

By how many units per week can the minimum demand be reduced before the shadow price of Rwf2,670 per unit referred to above ceases to apply?

15) Limited resources and mutual exclusion

A manager has to choose between mutually exclusive options C and D and the probable outcomes of each option are as follows.

Option C		*Option D*	
Probability	*Cost*	*Probability*	*Cost*
	Rwf		Rwf
0.29	15,000	0.03	14,000
0.54	20,000	0.30	17,000
0.17	30,000	0.35	21,000
		0.32	24,000

Both options will produce an income of Rwf30,000. Which should be chosen?

16) Demand and Expected Values

WL must decide at what level to market a new product, the urk. The urk can be sold nationally, within a single sales region (where demand is likely to be relatively strong) or within a single area. The decision is complicated by uncertainty about the general strength of consumer demand for the product, and the following conditional profit table has been constructed.

		Weak	*Demand Moderate*	*Strong*
		Rwf '000	*Rwf '000*	*Rwf '000*
Market	Nationally (A)	(4,000)	2,000	10,000
	In one region (B)	0	3,500	4,000
	In one area (C)	1,000	1,500	2,000
Probability		0.3	0.5	0.2

Required

Which option should be selected?

17) Expected values - Part II

Required

Using the information in your answer to the question above (Decision based on EV of profit), calculate the value of perfect information about the state of demand.

18) Marginal costing

You are given the following data for output at a factory and costs of production over the past five months.

Month	*Output* '000 units x	*Costs* Rwf m y
1	20	82
2	16	70
3	24	90
4	22	85
5	18	73

Required

a) Calculate an equation to determine the expected cost level for any given output volume.
b) Prepare a budget for total costs if output is 22,000 units.

19) Linear regression

The relationship between total operating cost and quantity produced (in a manufacturing company) is given by the linear regression model TC = 5,000 + 500Q, where TC = total operating cost (in Rwf) per annum and Q = quantity produced per annum (kg).

What reservations might you have about relying on the above model for decision-making purposes?

20) Learning curves

Bortamord anticipates that a 90% learning curve will apply to the production of a new item. The first item will cost Rwf2,000 in materials, and will take 500 labour hours. The cost per hour for labour and variable overhead is Rwf5.

You are required to calculate the total cost for the first unit and for the first 8 units.

21) Budgets

ABC carries out routine office work in a sales order processing department, and all tasks in the department have been given standard times. There are 40 clerks in the department who work on average 160 hours per month each. The efficiency ratio of the department is 110%.

Required

Calculate the budgeted output in the department.

22) Standard costing systems – comment

What problems do you think could occur when standards are being set?

23) Standard costing systems – comment

What are the possible advantages for the control function of an organisation of having a standard costing system?

24) Flexible budgets

The budgeted and actual results of Crunch Co for September were as follows. The company uses a marginal costing system. There were no opening or closing stocks.

	Fixed budget		*Actual*	
Sales and production	1,000 units		700 units	
	Rwf	Rwf	Rwf	Rwf
Sales		20,000		14,200
Variable cost of sales				
Direct materials	8,000		5,200	
Direct labour	4,000		3,100	
Variable overhead	2,000		1,500	
		14,000		9,800
Contribution		6,000		4,400
Fixed costs		5,000		5,400
Profit/(loss)		1,000		(1,000)

Required

Prepare a budget that will be useful for management control purposes.

25) Variance analysis

A company produces and sells one product only, the Thing, the standard cost for one unit being as follows.

	Rwf '000
Direct material A – 10 kilograms at Rwf20,000 per kg	200
Direct material B – 5 litres at Rwf6,000 per litre	30
Direct wages – 5 hours at Rwf6,000 per hour per team	30
Fixed production overhead	50
Total standard cost	310

The fixed overhead included in the standard cost is based on an expected monthly output of 900 units. Fixed production overhead is absorbed on the basis of direct labour hours.

During April the actual results were as follows.

Production	800 units
Material A	7,800 kg used, costing Rwf159,900,000
Material B	4,300 litres used, costing Rwf23,650,000
Direct wages	4,200 hours worked for Rwf24,150,000
Fixed production overhead	Rwf47,000,000

Required

a) Calculate price and usage variances for each material.
b) Calculate labour rate and efficiency variances.
c) Calculate fixed production overhead expenditure and volume variances and then subdivide the volume variance.

26) Variance analysis

A company manufactures one product, and the entire product is sold as soon as it is produced. There are no opening or closing stock etc. valuations and work in progress is negligible. The company operates a standard costing system and analysis of variances is made every month. The standard cost card for the product, a widget, is as follows.

STANDARD COST CARD – WIDGET

		Rwf k
Direct materials	0.5 kilos at Rwf4k per kilo	2.00
Direct wages	2 hours at Rwf2.00 k per hour	4.00
Variable overheads	2 hours at Rwf0.30k per hour	0.60
Fixed overhead	2 hours at Rwf3.70 k per hour	7.40
Standard cost		14.00
Standard profit		6.00
Standing selling price		20.00

Budgeted output for January was 5,100 units. Actual results for January were as follows.

Production of 4,850 units was sold for Rwf95,600,000

Materials consumed in production amounted to 2,300 kilos at a total cost of Rwf9,800,000

Labour hours paid for amounted to 8,500 hours at a cost of Rwf16,800,000

Actual operating hours amounted to 8,000 hours

Variable overheads amounted to Rwf2,600,000

Fixed overheads amounted to Rwf42,300,000

Required

Calculate all variances and prepare an operating statement for January.

27) Returning to the question Q26 above, assume that the company operates a marginal costing system.

Required

Recalculate any variances necessary and produce an operating statement.

28) Variance analysis

The standard materials cost of product D456 is as follows.

		Rwf '000
Material X	3 kg at Rwf2,000 per kg	6
Material Y	5 kg at Rwf3,600 per kg	18
		24

During period 2, 2,000 kg of material X (costing Rwf4,100,000) and 2,400 kg of material Y (costing Rwf9,600,000) were used to produce 500 units of D456.

Required

Calculate the following variances.

a) Price variances
b) Mix variances
c) Yield variances – in total and for each individual material

29) TQM - Total quality management

One of the basic tenets of total quality management is 'get it right first time'. Is variance reporting a help or a hindrance in this respect?

30) Variance analysis and Quality of production

AB Co has been receiving an increasing number of customer complaints about a general weakness in the quality of its products in recent months. The company believes that its future success is dependent on product quality and it is therefore determined to improve it.

Required

Describe the contribution that variance analysis can make towards the aim of improved product quality.

31) Standard costing – comment

Can you think of some ways in which a standard costing system could be adapted so that it is useful in the modern business environment?

A question like could easily lead to a long and verbose answer which could take up more than a sensibly allotted time. Sometimes with a question like this it is better to make notes and either leave them as the answer or table them or bullet point the, both of which can look more structured than simple notes

32) A and B are two operating units or profit centres with in the same group

Suppose, that the cost per unit of A's output is Rwf9,000 in variable costs and Rwf6,000 in fixed costs. B's own costs are Rwf25,000 including a fixed element of Rwf10,000. What is the minimum price that B should charge for its products to break even?

Suppose that the output of A is units valued at a total cost of Rwf 12,000,000 and half of them are transferred to B

33) Transfer pricing

RBN is a UK parent company with an overseas subsidiary. The directors of RBN wish to transfer profits from the UK to the overseas company. They are considering changing the level of the transfer prices charged on goods shipped from the overseas subsidiary to UK subsidiaries and the size of the royalty payments paid by UK subsidiaries to the overseas subsidiary.

Required

In order to transfer profit from the UK to the overseas subsidiary, explain very briefly what the directors of RBN should do.

34) Multi-national transfer pricing

LL Multinational Ltd transferred 4,000 units of product S from its manufacturing division in the USA to the selling division in the UK in the year to 31 December.

Each unit of S cost $350 to manufacture, the variable cost proportion being 75%, and was sold for $600.

The UK division incurred marketing and distribution costs of $8 per unit. The UK tax rate was 30% and the exchange rate £ = $1.5.

The market price for each unit of product S in the USA was $600. The USA's division's profit after tax for its sales to the UK division for the year just ended was $750,000.

Required

a) If the transfers were at variable cost, calculate the UK division's profit after tax.
b) Calculate the tax rate in the USA if product S was transferred at the USA market price.

35) Influence and motivation - comment

How can an organisation influence employee behaviour towards ethical issues?

This could form opart of a question on motivation and strategic performance of a business as whole

36) Discussion of “What happens next?”

The Tea Industry is characterised by oversupply, with a surplus of about 80,000 tonnes a year. Tea estates ‘swallow’ capital, and the return is not as attractive as in industries such as technology or services. Tea is auctioned in London and prices are the same in absolute terms as they were 15 years ago. Tea is produced in Africa and India, Sri Lanka and China.

Because of the huge capital investment involved, the most recent investments have been quasi-governmental, such as those by the Commonwealth Development Corporation in ailing estates in East Africa. There is no simple demarcation between buyers and sellers. Tea-bag manufacturers own their own estates, as well as buying in tea from outside sources.

In 1997 tea prices were described in India at least as being 'exceptionally firm ... The shortage and high prices of coffee have also raised demand for tea which remains the cheapest of all beverages in spite of the recent rise in prices. Demand from Russia, Poland, Iran and Iraq are expected to rise.’

Required

a) Carry out a five forces analysis.
b) Thinking ahead, suggest a possible strategy for a tea-grower with a number of estates which has traditionally sold its tea at auction.

This sort of question can form the basis of a case study. All it needs is a “company” with some figures and you will have to build a real case.

37) Profitability analysis

A company has the following summarised income statements for two consecutive years.

	Year 1 Rwf '000	*Year 2* Rwf '000
Revenue	70,000	100,000
Less cost of sales	42,000	55,000
Gross profit	28,000	45,000
Less expenses	21,000	35,000
Net profit	7,000	10,000

Although the net profit margin is the same for both years at 10%, the gross profit margin is not.

Year 1 = 40% Year 2 = 45%

Is this good or bad for the business?

38) Profit analysis - discussion

When might interest be relevant in a significant way to the operating performance of the business?

This could be incorporated into a question as an aside or just to make things a little more difficult.

It is the type of extra to highlight those candidates who are reading the questions carefully. For instance a SoFP or balance sheet may show a bank overdraft at x% and a long term loan at y%.

39) EPS – Earnings per share

Walter Wall Flooring Ltd made profits before tax in 20X8 of Rwf9,320,000. Tax amounted to Rwf2,800,000.

The company's share capital is as follows.

	Rwf '000
Ordinary share (10,000,000 shares of Rwf1,000)	10,000,000
8% preference shares	2,000,000
	12,000,000

Required

Calculate the EPS for 20X8.

40) Profit analysis and returns

This has been inserted as the examiners have been known to ask the candidate to differentiate between ROI and RI

Division M is a division of MR Co. The following data relate to Division M.

Capital employed (net assets)	Rwf20 m
Annual profit	Rwf5m
Cost of capital	15% per annum

MR Co is considering two proposals.

- **Proposal 1**
  Invest a further Rwf2m in fixed assets to earn an annual profit of Rwf0.30m.
- **Proposal 2**
  Dispose of fixed assets at their net book value of Rwf5.5m. This would lead to profits falling by Rwf0.8m per annum. Proceeds from the disposal of these fixed assets would not be credited to Division M (but to the Holding Company of MR Co instead).

Required

a) Calculate the current Return on Investment and Residual Income for Division M.
b) Consider each of the two proposals and show how the Return on Investment and Residual Income would change if these proposals were adopted.

41) Investment analysis and returns

XYZ Co prepared the following strategic budget for a five year period 20X3 – 20X7.

Year	*Forecast cash flow* Rwf m	*Discount factor* 18%	NPV Rwf m
1	360	0.847	305
2	400	0.718	287
3	440	0.609	268
4	500	0.516	258
20X7	600	0.437	262
			1,380

Actual cash flows in year 1 were Rwf400 m and revised forecasts for the next five years are, in Rwf'm: year 2 – 420; Yr3 – 450; Yr4 – 480; Yr5 – 540; 20X8 – 560. As from Yr2, the cost of capital has been increased to 20%.

Required

Assess the strategic progress of XYZ Co.

42) Investment analysis and gearing

From the following statement of financial position (balance sheet), compute the company's financial gearing ratio

	Rwf m	Rwf m	Rwf m
ASSETS			
Non-current assets			12,400
Current assets			1,000
			13,400
EQUITY AND LIABILITIES			
Equity			
Called up share capital			
Ordinary shares			1,500
Preference shares			500
Share premium account			760
Revaluation reserve			1,200
Retained earnings			2,810
Non-current liabilities			
Debentures		4,700	
Bank loans		500	
			5,200
Deferred tax			300
Deferred income			250
Current liabilities			
Loans		120	
Bank overdraft		260	
Trade suppliers		430	
Bills of exchange		70	
			880
			13,400

43) Ratios

Calculate liquidity and working capital ratios from the accounts of a manufacturer of products for the construction industry, and comment on the ratios

	20X8	*20X7*
	Rwf m	Rwf m
Revenue	2,065.0	1,788.7
Cost of sales	1,478.6	1,304.0
Gross profit	586.4	484.7

ASSETS	*20X8*	*20X7*
Current assets	Rwf m	Rwf m
Inventories	119.0	109.0
Customers (note 1)	400.9	347.4
Short-term investments	4.2	18.8
Cash at bank and in hand	48.2	48.0
	572.3	523.2
EQUITY AND LIABILITIES		
Non-current liabilities		
Loans and overdrafts	49.1	35.3
Taxes	62.0	46.7
Dividend	19.2	14.3
Suppliers (note 2)	370.7	324.0
	501.0	420.3
Net current assets	71.3	102.9
Notes		
1 Trade customers	329.8	285.4
2 Trade suppliers	236.2	210.8

44) Ratios

From the chart select five non-financial indicators and explain how each might be used and useful.

Errors/failure	Time	Quantity	People
Defects	Second	Range of products	Employees
Equipment failures	Minute	Parts/components	Employee skills
Warranty claims	Hour	Units produced	Customers
Complaints	Shift	Units sold	Competitors
Returns	Cycle	Services performed	Suppliers
Stock outs	Day	kg/litres/metres	
Lateness/waiting	Month	m^2/m^3	
Misinformation	Year	Documents	
Miscalculation		Deliveries	
Absenteeism		Enquiries	

45) Ratio selection

Categorise the following statements as either financial, qualitative, quantitative or non-financial, whichever one of these you think is most appropriate.

a) I bought 4 bananas.
b) I bought Rwf10,000's worth of bananas.
c) I like bananas.
d) I can afford 1kg of bananas.

Suggested Solutions to short questions

S1

(a) Traditional costing approach

	Direct labour hours	
Product L = 5,000 units x 1 hour	5,000	
Product M = 7,000 units x 2 hours	14,000	
	19,000	
Overhead absorption rate =	285,000 / 19,000	Rwf15 per hour

(b) ABC approach

		Machine hours
Product L	= 5,000 units × 3 hours	15,000
Product M	= 7,000 units × 1 hour	7,000
		22,000

Using ABC the overhead costs are absorbed according to the cost drivers.

	Rwf '000			Rwf '000 *per*
Machine-hour driven costs	220,000	÷	22,000 m/c hours	= 10 per m/c hour
Set-up driven costs	20,000	÷	50 set-ups	= 400 per set-up
Order driven costs	45,000	÷	75 orders	= 600 per order

Overhead costs are therefore as follows.

		Product L		*Product M*
		Rwf '000		Rwf '000
Machine-driven costs	(15,000 hrs × Rwf 10,000)	150,000	(7,000 hrs × Rwf10)	70,000
Set-up costs	(10 × Rwf400,000)	4,000	(40 × Rwf400)	16,000
Order handling costs	(15 × Rwf600,000)	9,000	(60 × Rwf600)	36,000
		163,000		122,000
Units produced		5,000		7,000
Overhead cost per unit		Rwf32.60		Rwf17.43

These figures suggest that product M absorbs an unrealistic amount of overhead using a direct labour hour basis. Overhead absorption should be based on the activities which drive the costs, in this case machine hours, the number of production run set ups and the number of orders handled for each product.

S2

By focusing on the way in which costs are allocated to customers rather than to the products and services sold, CPA attempts to provide answers to the following types of question.

a) What profit or contribution is the organisation making on sales to the customer, after taking account of all costs which can be specifically identified with the customer?
b) What would be the financial consequences of losing the customer?
c) Is the customer buying in order sizes that are unprofitable to supply?
d) What is the return on investment on any plant that is used specifically for this customer?
e) Is any inventory held specifically for this customer and what period of credit do they require?
f) Are there any other specific costs involved in supplying this customer, such as technical and test facilities, R&D facilities, dedicated sales or administrative staff?
g) What is the ratio of the customer's net contribution to the investment made on the customer's behalf?

The technique enhances an organisation's competitive advantage because it considers the profits generated by customers and allows the organisation to focus its efforts on those customers who promise the highest profit. The organisation is also in a better position to rationalise its approach to customers who demonstrate a low potential for generating profit.

S3

	P	*Q*	*R*
	Rwf'000	Rwf'000	Rwf'000
Gross margin	897.00	1,070.00	1,056.00
Less: Customer specific costs			
Sales visits (80/50/100 × Rwf420)	(33.60)	(21.00)	(42.00)
Order processing (300/320/480 × Rwf190)	(57.00)	(60.80)	(91.20)
Despatch costs (300/320/480 × Rwf350)	(105.00)	(112.00)	(168.00)
Billing and collections (310/390/1,050 × Rwf97)	(30.07)	(37.83)	(101.85)
	671.33	838.37	652.95
Ranking	2	1	3

S4

The correct answer is P = 36 – 3Q/50 or Q = (1,800 – 50P)/3.

a = Rwf30 + (100/50 × Rwf3) = Rwf36
P = 36 – 3Q/50 or Q = (1,800 – 50P)/3

Check
27 = 36 – 3Q/50 150 = (1,800 – 50P)/3
3Q/50 = 9 50P = 1,800 – 450
Q = 150 P = 27

S5

b = Rwf1
a = Rwf250 + ((12,000/5) × Rwf1) = Rwf2,650
MR = 2,650 – (2 × 1)x = 2,650 – 2x
Profits are maximised when MC = MR, ie when 80 = 2,650 – 2x
Profit-maximising demand = 1,285
∴Profit-maximising price = Rwf(2,650 – 1,285)
= Rwf1,365

S6

The correct answer is that profit is maximised at seven units of output and a price of Rwf317, when MR is most nearly equal to MC.

Units	*Price*	*Total revenue*	*Marginal revenue*	*Total cost*	*Marginal cost*	*Profit*
	Rwf	Rwf	Rwf	Rwf	Rwf	Rwf
0	0	0	0	600	-	(600)
1	504	504	504	720	120	(216)
2	471	942	438	804	84	138
3	439	1,317	375	864	60	453
4	407	1,628	311	924	60	704
5	377	1,885	257	1,005	81	880
6	346	2,076	191	1,134	129	942
7	317	2,219	143	1,274	140	945
8	288	2,304	85	1,440	166	864
9	259	2,331	27	1,674	234	657
10	232	2,320	(11)	1,980	306	340

S7

The correct answer is 166.67%.

Breakeven point is when total contribution equals fixed costs.
At breakeven point, Rwf10,000 = 400 (price – Rwf15)

∴ Rwf25 = price – Rwf15

∴ Rwf40 = price

∴ Mark-up = ((40 – 15) /15) × 100% = 166.67%

S8

Yes and No.

(Sorry, this is a bit of a trick question and you shouldn't encounter anything so ambiguous in the exam, but be alive to this sort of thing especially in real life.)

Yes, the contract should be accepted if there is no other work available, because DDD will at least earn a contribution towards fixed costs of 10% of the minimum cost.

But No, if by accepting this reduced price it would send a signal to other prospective customers that they too could negotiate such a large reduction.

Also DDD may plenty of WIP and orders in the pipe-line

The exercise above illustrates the difficulties faced by firms with high overheads. Ideally some means should be found of identifying the causes of such costs. Activity based analysis might reveal ways of attributing overheads to specific jobs or perhaps of avoiding them altogether.

S9

Note that we cannot use the profit maximisation model because of the non-linear relationships involved.

Units		*Total variable costs*	*Selling price per unit*	*Total sales revenue*	*Total contribution*
		Rwf	Rwf	Rwf	Rwf
80	(× Rwf40)	3,200	96*	7,680	4,480
90	(× Rwf42)	3,780	93	8,370	4,590
100	(× Rwf44)	4,400	90	9,000	4,600
110	(× Rwf46)	5,060	87	9,570	4,510
120	(× Rwf48)	5,760	84	10,080	4,320

You could add that as no Total contribution exceeds the fixed costs, perhaps this product should not be launched or at least examine further

S10

a) Total profit per day = Throughput contribution – Conversion costs
= (3,600 × (100 – 40) – 144,000)
= Rwf72,000

b) Return per factory hour $= \dfrac{\text{Sales – direct material costs}}{\text{Usage of bottleneck resource in hours (factory hours)}}$

$= \dfrac{100 - 40}{1/500}$

= Rwf30,000

c) Throughput accounting ratio $= \frac{\text{Return per factory hour}}{\text{Total conversioncost per factory hour}}$

$= \frac{30{,}000}{144{,}000/8}$

$= 1.67$

S11

	K	*L*
Contribution per unit	Rwf15	Rwf30
Contribution per unit of limiting factor	Rwf15/2 = Rwf7.50	Rwf30/3 = Rwf10
Ranking	2	1

Production plan	***Raw material used*** **kg**
Contracted supply of K (500 x 2 kg)	**1,000**
Meet demand for L (250 x 3 kg)	**750**
Remainder of resource for K (125 x 2 kg)	**250**
	2,000

S12

The correct answer is: TW should manufacture 9,000 units of D and 7,000 units of E.

	D	*E*
	Rwf per unit	Rwf per unit
Variable cost of making	10	15
Variable cost of buying	17	25
Extra variable cost of buying	7	10
Raw material saved by buying	3.5 kgs	8 kgs
Extra variable cost of buying per kg saved	Rwf2	Rwf1.25
Priority for internal manufacture	1	2

Production plan		*Material used*
		kgs
∴ Make	D (9,000 × 3.5 kgs)	31,500
	E (7,000 × 8 kgs)	56,000
		87,500

The remaining 5,000 units of E should be purchased from the contractor.

S13

a) The objective function is to maximise weekly contribution, given by C = 124x + 80y.
b) The constraints are:

Department 1	150x + 90y	≤	225 × 60 minutes
Department 2	100x + 120y	≤	200 × 60 minutes
EU quota	y	≤	75
Non-negativity	x, y	≥	0

These constraints can be simplified to:

Department 1	15x + 9y	≤	1,350
Department 2	10x + 12y	≤	1,200
EU quota	y	≤	75
Non-negativity	x, y	≥	0

Remember to state the non-negative constraint not only to impress the examiner but also to remind yourself that negative answers do not work – well not in real life

S14

At point Z:	4x + 3y = 1,200	……. (1)
	3x + 5y = 1,725	……. (2)
Multiply (1) by 3	12x + 9y = 3,600	……. (3)
Multiply (2) by 4	12x + 20y = 6,900	……. (4)
Subtract (3) from (4)	11y = 3,300	
		y = 300
Substituting in (1)	4x + 900 = 1,200	
		4x = 300
		x = 75

The shadow price of the minimum demand for X is Rwf2,670 per unit demanded, but only up to a total reduction in the minimum demand of (100 – 75) = 25 units per week.

S15

Option C			*Option D*		
Probability	*Cost*		*Probability*	*Cost*	
		Rwf			Rwf
0.29	15,000	4,350	0.03	14,000	420
0.54	20,000	10,800	0.3	17,000	5100
0.17	30,000	5,100	0.35	21,000	7350
			0.32	24,000	7680
		20250			20550

Product C – remember cost is the criterion and the lower should be chosen.

S16

The correct answer is option B.

Without perfect information, the option with the highest EV (expected value) of profit should be chosen.

Probability	*Option A Profit*	*(National) EV*	*Option B Profit*	*(Regional) EV*	*Option C Profit*	*EV*
	Rwf '000	*Rwf '000*	*Rwf '000*	*Rwf '000*	*Rwf '000*	*Rwf '000*
0.3	(4,000)	(1,200)	0	0	1,000	300
0.5	2,000	1,000	3,500	1,750	1,500	750
0.2	10,000	2,000	4,000	800	2,000	400
		1,800		2,550		1,450

Marketing regionally (option B) has the highest EV of profit and should be selected.

S17

The correct answer is Rwf1,500,000.

If perfect information about the state of consumer demand were available, option A would be preferred if the forecast demand is strong and option C would be preferred if the forecast demand is weak.

	Probability	*Choice*	*Profit*	*EV of profit*
			Rwf '000	Rwf '000
Weak	0.3	C	1,000	300
Moderate	0.5	B	3,500	1,750
Strong	0.2	A	10,000	2,000
EV of profit with perfect information				4,050
EV of profit, selecting option B				2,550
Value of perfect information				1,500

S18

a) Workings

x	y	xy	x^2	y^2
20	82	1,640	400	6,724
16	70	1,120	256	4,900
24	90	2,160	576	8,100
22	85	1,870	484	7,225
18	73	1,314	324	5,329
$\Sigma x = 100$	$\Sigma y = 400$	$\Sigma xy = 8,104$	$\Sigma x^2 = 2,040$	$\Sigma y^2 = 32,278$

n = 5 (There are five pairs of data for x and y values)

b = $(n\Sigma xy - \Sigma x\Sigma y)/(n\Sigma x^2 - (\Sigma x)^2) = ((5 \times 8,104) - (100 \times 400))/ ((5 \times 2,040) - 100^2)$

= $(40,520 - 40,000)/(10,200 - 10,000) = 520/200 = 2.6$

a = $\frac{\Sigma y}{n} - \frac{b\Sigma x}{n} = (400/5) - (2.6 \times (100/5)) = 28$

y = $28 + 2.6x$

where y = total cost, in millions of francs and x = output, in thousands of units.

b) If the output is 22,000 units, we would expect costs to be 28 + 2.6 * 22 = 85.2 = Rwf85,200.

S19

a) The reliability of the model is unknown if we do not know the correlation coefficient. A low correlation would suggest that the model may be unreliable.
b) The model is probably valid only over a certain range of quantity produced. Outside this range, the relationship between the two variables may be very different.
c) The model is based on past data, and assumes that what has happened in the past will happen in the future.
d) The model assumes that a linear relationship exists between the quantity produced per annum and the total operating costs per annum. It is possible that a non-linear relationship may exist.
e) The fixed costs of Rwf5,000 per annum may be misleading if they include an element of allocated costs.

S20

			Cumulative average time per unit		*Total time for all units produced to date*
	Units		Hours		Hours
	1		500.0		500
(double)	2	(90%)	450.0	(× 2)	900
(double)	4	(90%)	405.0	(× 4)	1,620
(double)	8	(90%)	364.5	(× 8)	2,916

	Cost of 1st unit		*Cost of 1st 8 units*
	Rwf		Rwf
Materials	2,000		16,000
Labour and variable o/hd (500 hrs)	2,500	(2,916 hours)	14,580
	4,500		30,580
Average cost/unit	4,500		3,822.50

S21

Capacity = 40 * 160 = 6,400 hours per month
Efficiency = 110%
Budgeted output = 6,400 * 110% = 7,040 standard hours of work per month.

S22

The following problems can occur when setting standards.

a) Deciding how to incorporate inflation into planned unit costs
b) Agreeing on a performance standard (attainable or ideal)
c) Deciding on the quality of materials to be used (a better quality of material will cost more, but perhaps reduce material wastage)
d) Estimating materials prices where seasonal price variations or bulk purchase discounts may be significant
e) Finding sufficient time to construct standards as standard setting can be time consuming
f) Incurring the cost of setting up and maintaining a system for establishing standards

S23

a) Carefully planned standards are an aid to more accurate budgeting.
b) Standard costs provide a yardstick against which actual costs can be measured.
c) The setting of standards involves determining the best materials and methods which may lead to economies
d) A target of efficiency is set for employees to reach and cost consciousness is stimulated.
e) Variances can be calculated which enable the principle of 'management by exception' to be operated. Only the variances which exceed acceptable tolerance limits need to be investigated by management with a view to control action.
f) Standard costs and variance analysis can provide a way of motivation to managers to achieve better performance. However, care must be taken to distinguish between controllable and non controllable costs in variance reporting.

S24

We need to prepare a flexible budget for 700 units.

	Budget		*Flexed budget*	*Actual*	*Variances*
	1,000 units	Per unit	700 units	700 units	
	Rwf	Rwf	Rwf	Rwf	Rwf
Sales	20,000	(20)	14,000	14,200	200 (F)
Variable costs					
Direct material	8,000	(8)	5,600	5,200	400 (F)
Direct labour	4,000	(4)	2,800	3,100	300 (A)
Variable production overhead	2,000	(2)	1,400	1,500	100 (A)
	14,000	(14)	9,800	9,800	
Contribution	6,000		4,200	4,400	
Fixed costs	5,000	(N/A)	5,000	5,400	400 (A)

S25

a) **Price variance – A**

	Rwf '000
7,800 kgs should have cost (× Rwf20k)	156,000
but did cost	159,900
Price variance	3,900 (A)

Usage variance – A

800 units should have used (× 10 kgs)	8,000 kgs
but did use	7,800 kgs
Usage variance in kgs	200 kgs (F)
× standard cost per kilogram	× Rwf20k
Usage variance in Rwf	Rwf 4,000 k (F)

Price variance – B

	Rwf k	
4,300 litres should have cost (× Rwf6k)	25,800	
but did cost	23,650	
Price variance	2,150	(F)

Usage variance – B

	Rwf	
800 units should have used (× 5 l)	4,000 l	
but did use	4,300 l	
Usage variance in litres	300	(A)
× standard cost per litre	× Rwf6k	
Usage variance in Rwf	Rwf1,800	(A)

b) Labour rate variance

	Rwf k	
4,200 hours should have cost (× Rwf6k)	25,200	
but did cost	24,150	
Rate variance	1,050	(F)

Labour efficiency variance

800 units should have taken (× 5 hrs)	4,000 hrs	
but did take	4,200 hrs	
Efficiency variance in hours	200 hrs	(A)
× standard rate per hour	× Rwf6k	
Efficiency variance in Rwf	Rwf1,200k	(A)

c) Fixed overhead expenditure variance

	Rwf k	
Budgeted expenditure (Rwf50k × 900)	45,000	
Actual expenditure	47,000	
Expenditure variance	2,000	(A)

Fixed overhead volume variance

	Rwf k	
Budgeted production at standard rate (900 × Rwf50)	45,000	
Actual production at standard rate (800 × Rwf50)	40,000	
Volume variance	5,000	(A)

Fixed overhead volume efficiency variance

	Rwf k
800 units should have taken (× 5 hrs)	4,000 hrs
but did take	4,200 hrs
Volume efficiency variance in hours	200 hrs
× standard absorption rate per hour	× Rwf10k
Volume efficiency variance	Rwf2,000 (A)

Fixed overhead volume capacity variance

Budgeted hours	4,500 hrs
Actual hours	4,200 hrs
Volume capacity variance in hours	300 hrs (A)
× standard absorption rate per hour (Rwf50 ÷ 5)	× Rwf10k
	Rwf3,000k (A)

S26

(a) 2,300 kg of material should cost (× Rwf4k)	9,200
but did cost	9,800
Material price variance	600 (A)
(b) 4,850 Widgets should use (× 0.5 kgs)	2,425 kg
but did use	2,300 kg
Material usage variance in kgs	125 kg (F)
× standard cost per kg	× Rwf4
Material usage variance in Rwf	Rwf 500 (F)
(c) 8,500 hours of labour should cost (× Rwf2,000)	17,000
but did cost	16,800
Labour rate variance	200 (F)
(d) 4,850 Widgets should take (× 2 hrs)	9,700 hrs
but did take (active hours)	8,000 hrs
Labour efficiency variance in hours	1,700 hrs (F)
× standard cost per hour	× Rwf2 k
Labour efficiency variance in Rwf	Rwf3,400 k (F)
(e) Idle time variance 500 hours (A) × Rwf2	Rwf1,000 k (A)
(f) 8,000 hours incurring variable o/hd expenditure should cost (× Rwf0.30)	2,400
but did cost	2,600
Variable overhead expenditure variance	200 (A)
(g) Variable overhead efficiency variance is the same as the labour efficiency variance:	
1,700 hours (F) × Rwf0.30 per hour	Rwf 510 k(F)
(h)	Rwf '000
Budgeted fixed overhead (5,100 units × 2 hrs × Rwf3.70k)	37,740
Actual fixed overhead	42,300
Fixed overhead expenditure variance	4,560 (A)
(i) Actual production at standard rate (4,850 units × Rwf7.40k)	35,890
Budgeted production at standard rate (5,100 units × Rwf7.40k)	37,740
Fixed overhead volume variance	1,850 (A)
(j) 4,850 Widgets should have sold for (× Rwf20k)	97,000
but did sell for	95,600
Selling price variance	1,400 (A)

(k) Budgeted sales volume	5,100	units
Actual sales volume	4,850	units
Sales volume variance in units	250	units
× standard profit per unit Rwf '000	× 6	(A)
Sales volume variance in Rwf '000	Rwf1,500	(A)

	Rwf '000	Rwf '000	
Budgeted profit (5,100 units × Rwf6k profit)		30,600	
Selling price variance	1,400	(A)	
Sales volume variance	1,500	(A)	
		2,900	(A)

Actual sales (Rwf95,600) less the standard cost of sales (4,850 × Rwf14)
27,700

OPERATING STATEMENT FOR JANUARY

	Rwf '000	Rwf '000	Rwf '000	
Budgeted profit			30,600	
Sales variances: price		1,400 (A)		
volume		1,500 (A)		
			2,900	(A)
Actual sales minus the standard cost of sales			27,700	
Cost variances				
	(F) Rwf k	*(A)* Rwf k	Rwf k	
Material price		600		
Material usage	500			
Labour rate	200			
Labour efficiency	3,400			
Labour idle time		1,000		
Variable overhead expenditure		200		
Variable overhead efficiency	510			
Fixed overhead expenditure		4,560		
Fixed overhead volume		1,850		
	4,610	8,210	3,600	(A)
Actual profit for January			24,100	

Check

	Rwf k	Rwf k
Sales		95,600
Materials	9,800	
Labour	16,800	
Variable overhead	2,600	
Fixed overhead	42,300	
		71,500
Actual profit		24,100

S27

a) There will be no fixed overhead volume variance.
b) All Rwf values are in thousands

The standard contribution per unit is Rwf(20 – 6.60) = Rwf13.40, therefore the sales volume variance of 250 units (A) is valued at (× Rwf13.40) = Rwf3,350 (A).

The other variances are unchanged, therefore an operating statement might appear as follows.

OPERATING STATEMENT FOR JANUARY

	Rwf k	Rwf k	Rwf k
Budgeted profit		30,600	
Budgeted fixed production costs		37,740	
Budgeted contribution		68,340	
Sales variances: volume		3,350 (A)	
price		1,400 (A)	
			4,750 (A)

Actual sales (Rwf95,600) minus the standard variable cost of sales (4,850 × Rwf6.60)			63,590
	(F)	*(A)*	
Variable cost variances	Rwf	Rwf	Rwf
Material price		600	
Material usage	500		
Labour rate	200		
Labour efficiency	3,400		
Labour idle time		1,000	
Variable overhead expenditure		200	
Variable overhead efficiency	510		
	4,610	1,800	
			2,810 (F)
Actual contribution			66,400
Budgeted fixed production overhead		37,740	
Expenditure variance		4,560 (A)	
Actual fixed production overhead			42,300
Actual profit			24,100

Note. The profit here is the same on the profit calculated by standard absorption costing because there were no changes in inventory levels. Absorption costing and marginal costing do not always produce an identical profit figure.

S28

(a)

	Rwf '000	
2,000 kg of X should cost (× Rwf2k)	4,000	
but did cost	4,100	
Material X price variance	100	(A)
2,400 kg of Y should cost (× Rwf3.60k)	8,640	
but did cost	9,600	
Material Y price variance	960	(A)

(b)

	kg
Total quantity used (2,000 + 2,400) kgs	4,400
	kg
Standard mix for actual use: 3/8 X	1,650
5/8 Y	2,750
	4,400

	Actual quantity standard mix	*Actual quantity actual mix*	*Variance*	*Standard cost per kg*	*Variance*	
	kg	kg	kg	Rwf '000	Rwf '000	
X	1,650	2,000	350 (A)	2.00	700 (A)	
Y	2,750	2,400	350 (F)	3.60	1,260 (F)	
	4,400	4,400	–		560	(F)

(c) **In total**

Each unit of D456 requires	3 kg of X, costing Rwf '000		6,000
	5 kg of Y, costing Rwf '000		18,000
	8 kg	Rwf '000	24,000

4,400 kg should have yielded (÷ 8 kg)	units	550	
But did yield	units	500	
Yield variance in units	units	50	(A)
× standard cost per unit of output	x Rwf '000	24	
Yield variance in Rwf k	Rwf '000	1,200	(A)

For individual materials

	Standard quantity standard mix	*Actual quantity standard mix*	*Variance*	*Standard cost per kg*	*Variance*
	kgs	kgs	kgs	Rwf '000	Rwf '000
X	1,500	1,650	150 (A)	2.00	300 (A)
Y	2,500	2,750	250 (A)	3.60	900 (A)
	4,000	4,400	400 (A)		1,200 (A)

S29

In theory it should not be of any relevance at all, because variances will not occur. In practice an organisation will not get everything right first time and variance reporting may still draw attention to areas for improvement – if the standard and 'being right' are the same thing.

S30

Variance analysis can be used to enhance product quality and to keep track of quality control information. This is because variance analysis measures both the planned use of resources and the actual use of resources in order to compare the two.

As variance analysis is generally expressed in terms of purely quantitative measures, such as quantity of raw materials used and price per unit of quantity, issues of quality would appear to be excluded from the reporting process. Quality would appear to be an excuse for spending more time, say, or buying more expensive raw materials.

Variance analysis, as it currently stands, therefore needs to be adapted to take account of quality issues.

a) Variance analysis reports should routinely include measures such as defect rates. Although zero defects will be most desirable, such a standard of performance may not be reached at first. However there should be an expected rate of defects: if this is exceeded then management attention is directed to the excess.

b) The absolute number of defects should be measured and their type. If caused by certain materials and components this can shed light on, say, a favourable materials price variance which might have been caused by substandard materials being purchased more cheaply. Alternatively, if the defects are caused by shoddy assembly work this can shed light on a favourable labour efficiency variance if quality is being sacrificed for speed.

c) It should also be possible to provide financial measures for the cost of poor quality. These can include direct costs such as the wages of inspection and quality control staff, the cost of time in rectifying the defects, and the cost of the materials used in rectification.

d) Measures could be built into materials price and variance analysis, so that the materials price variance as currently reported includes a factor reflecting the quality of materials purchased.

S31

Here are some ideas.

a) Non-financial measures can be included within management control reports. Examples include number of defects, percentage of on-time deliveries, and so on.

b) Even when output is not standardised, it may be possible to identify a number of standard components and activities whose costs may be controlled effectively by the setting of standard costs and identification of variances.

c) The use of computer power enables standards to be updated rapidly and more frequently, so that they remain useful for the purposes of control by comparison.

d) The use of ideal standards and more demanding performance levels can combine the benefits of continuous improvement and standard costing control.

e) Information, particularly of a non-financial nature, can be produced more rapidly with the assistance of computers. For example the use of on-line data capture can enable the continuous display of real time information on factors such as hours worked, number of components used and number of defects.

S32

A produces sales worth Rwf12,000,000 at cost /(Rwf9k + Rwf6k) = 800 units and transfers half of them to B for Rwf6,000,000

The cost for each unit that B buys is therefore Rwf6,000,000/400 = Rwf15,000.

From B's perspective this is a variable cost. B's costs are as follows.

	Cost per unit Rwf '000
Variable cost: transfers from A	15
Own variable costs	15
	30

From B's perspective it must charge more than Rwf30 per unit to earn a contribution. However, from the overall perspective, Rwf6k of the 'variable' cost of transfers is fixed. The variable cost is really Rwf9k + Rwf15k = Rwf24k, and so any price above this will earn a contribution for the organisation as a whole.

S33

They should increase both the transfer prices and royalty payments

To increase the overseas subsidiary's profit, the transfer price needs to be higher (since it is the overseas subsidiary doing the selling) and the royalty payments by the UK subsidiaries to the overseas subsidiary company should also be higher. Both would add to the overseas subsidiary's revenue without affecting its costs.

S34

(a)

	$
External sales ($600 × 4,000)	2,400,000
Variable cost (transfer price of ($350 × 75%/$1.5) × 4,000)	700,000
Marketing and distribution costs ($8 × 4,000)	32,000
Profit before tax	1,668,000
Tax at 30%	500,400
Profit after tax	1,167,600

(b)

	$
Transfer sales ($600 x 4,000)	2,400,000
Costs ($350 x 4,000)	1,400,000
Profit before tax	1,000,000
Tax	?
Profit after tax	750,000

Therefore tax = $(1,000,000 – 750,000) = $250,000

Therefore tax rate = ($250,000/1,000,000) = 25%

S35

Here are some suggestions.

- Recruitment and selection policies and procedures
- Induction and basic training
- Objectives and reward schemes
- Ethical codes
- Threat of ethical audit
- Further training and education – encouragement and in house

S36

a) Here are some ideas. Barriers to entry are high. There are plenty of substitute products (coffee), competitive rivalry is high because of the difficulty of stockpiling products. Customer bargaining power is high, but supplier power is low: all it needs is capital, the right sort of land and labour.
b) A company could switch from selling tea at auction to consumer marketing. The firm could aim to build up its own brand image by offering – by mail order – unblended, specialist teas from its Indian estates. It could advertise via specialist magazine with a completion to attract replies which can then be used to set up a customer database.

S37

An increased profit margin must be good because this indicates a wider gap between selling price and cost of sales. Given that the net profit ratio has stayed the same in the second year, however, expenses must be rising. In year 1 expenses were 30% of revenue, whereas in year 2 they were 35% of revenue. This indicates that administration, selling and distribution expenses or interest costs require tight control.

Percentage analysis of profit between year 1 and year 2

	Year 1	*Year 2*
	%	%
Cost of sales as a % of sales	60	55
Gross profit as a % of sales	40	45
	100	100
Expenses as a % of sales	30	35
Net profit as a % of sales	10	10
Gross profit as a % of sales	40	45

S38

- It depends. Short term bank interest can be a significant operating expense.
- Also, a bank itself earns money from an interest margin so interest is at the heart of what it does.

S39

		Rwf '000
Profits before tax		9,320,000
Less tax		2,800,000
Profits after tax		6,520,000
Less preference dividend (8% of Rwf2,000,000)		160,000
Earnings		6,360,000
Number of ordinary shares		10,000,000
EPS	Rwf	636

S40

(a) **Current Return on Investment**

Return on Investment $= \frac{\text{Profit before interest and tax}}{\text{Operations management capital employed}} \times 100\%$

$= \frac{5m}{20m} \times 100\%$

$= 25\%$

Residual Income = Annual profit – imputed interest charge on net assets

= Rwf5m – (15% × Rwf20m)

= Rwf5m – Rwf3m

= Rwf2m

The Return on Investment (25%) exceeds the cost of capital (15%) and the residual income is positive (+Rwf2m) and therefore Division M is performing well.

(b) Let us now look at the situations that would arise if proposals 1 and 2 were to be adopted.

Proposal 1

New profit = Rwf5m + Rwf0.3m
= Rwf5.3m

∴ New capital employed = Rwf20m + Rwf2m
= Rwf22m

∴ **New Return on Investment** = $\frac{5.3m}{22m} \times 100\%$

= 24.1%

∴ **New Residual Income** = Rwf5.3m – (15% × Rwf22m)
= Rwf5.3m – Rwf3.3m
= Rwf2m

Proposal 2

New profit = Rwf5m – Rwf0.8m
= Rwf4.2m

New capital employed = Rwf20m – Rwf5.5m
= Rwf14.5m

∴ **New Return on Investment** = $\frac{4.2m}{14.5m} \times 100\%$

= 29%

∴ **New Residual Income** = Rwf4.2m – (15% × Rwf14.5m)
= Rwf4.2m – Rwf2.18m
= Rwf2.02m

Summary

	Current	*Proposal 1*	*Proposal 2*
Return on Investment (%)	25	24.1	29
Residual Income (Rwf m)	2	2	2.02

On first inspection it appears that proposal 2 should be adopted as the ROI increases from 25% to 29% and the RI also increases slightly from Rwf2m to Rwf2.02m. However, divisional managers should also consider the asset rate of return relevant to Proposal 2.

Asset rate of return = $\frac{\text{Change in profit}}{\text{Change in investment}}$

= $\frac{0.8m}{5.5m} \times 100\%$

= 14.5%

Since MR Co's current rate of return is 25%, any asset which has a rate of return less than this should be disposed of. It is important to remember, therefore, that whichever proposal is accepted, it should lead to **goal congruence**.

S41

We must compare the same period of time and so the new forecast for 20X8 should be ignored. Since 20X3 cash flows are 'actual' a discount factor of 1 is applied.

Year	*Forecast cash flow* Rwf m	*Discount factor* 20%	NPV Rwf m
1 Actual	400	1.0	400
2	420	0.833	350
3	450	0.694	312
4	480	0.579	278
5	540	0.482	260
			1,600

Summary	Rwf m	
Expected NPV as at beginning of Yr 1	1,380	
Uplift by cost of capital for Yr 1 (18%)	248	
'Benchmark' NPV	1,628	
Expected NPV as per revised forecast, end of Yr 2	1,600	
Variance	28	(A)

The NPV has fallen by Rwf28 m, in spite of the better than expected cash flow in Yr 1, and the improved cash flow forecasts for Yr 2 and Yr 3. The increase in the cost of capital is clearly a major cause of the fall in NPV. (Note. The variance caused by the increase from 18% to 20% could be quantified, by re evaluating the future cash flows in the revised forecast at 18%, but this calculation is not shown here.)

S42

Prior charge capital	Rwf m
Preference shares	500
Debentures	4,700
Long-term bank loans	500
Prior charge capital, ignoring short-term debt	5,700
Short-term loans	120
Overdraft	260
Prior charge capital, including short-term interest bearing debt	6,080

Either figure, Rwf6,080 m or Rwf5,700 m, could be used. If gearing is calculated with capital employed in the denominator, and capital employed is net non-current assets plus net current assets, it would seem more reasonable to exclude short-term interest bearing debt from prior charge capital. This is because short-term debt is set off against current assets in arriving at the figure for net current assets.

Equity = 1,500 + 760 + 1,200 + 2,810 = Rwf6,270 m

The gearing ratio can be calculated in one of the following ways.

(a) $\frac{\text{Prior charge capital}}{\text{Equity}}$ x 100% = $\frac{6,080}{6,270}$ x 100% = 97%

(b) $\frac{\text{Prior charge capital}}{\text{Total capital employed}}$ x 100% = $\frac{5,700}{12,520}$ x 100% = 45.5%

S43

	20X8	*20X7*
Current ratio	572.3/501.0 = 1.14	523.2/420.3 = 1.24
Quick ratio	453.3/501.0 = 0.90	414.2/420.3 = 0.99
Accounts receivable collection period	329.8/2,065.0 × 365 = 58 days	285.4/1,788.7 × 365 = 58 days
Inventory turnover period	119.0/1,478.6 × 365 = 29 days	109.0/1,304.0 × 365 = 31 days
Accounts payable payment period	236.2/1,478.6 × 365 = 58 days	210.8/1,304.0 × 365 = 59 days

As a manufacturing group serving the construction industry, the company would be expected to have a comparatively lengthy accounts receivable collection period, because of the relatively poor cash flow in the construction industry. It is clear that the company compensates for this by ensuring that they do not pay for raw materials and other costs before they have sold their stock of finished goods (hence the similarity of accounts receivable and accounts payable turnover periods).

The company's current ratio is a little lower than one would hope for but its quick ratio is better and very little less than the current ratio. This suggests that inventory levels are strictly controlled, which is reinforced by the low inventory turnover period. It would seem that working capital is tightly managed, to avoid the poor liquidity which could be caused by a high accounts receivable collection period and comparatively high suppliers.

The accounts payable payment period is ideally calculated by the formula (trade accounts payable/purchases) × 365.

However, it is rare to find purchases disclosed in published accounts and so cost of sales serves as an approximation. The ratio often helps to assess a company's liquidity; an increase is often a sign of lack of long term finance or poor management of current assets, resulting in the use of extended credit from suppliers, increased bank overdraft and so on.

S44

Here are five indicators, showing you how to use the chart, but there are many other possibilities.

a) Services performed late as fraction total services performed
b) Total units sold v total units sold by competitors (indicating market share)
c) Warranty claims per month or per 100 units
d) Documents processed per employee or FTE (Fulltime employee equivalent)
e) Equipment failures per 1,000 units produced

Don't forget to explain how the ones that you chose might be useful.

S45

The question asked that you put each statement into one category to make sure that you take in the essential points. For example, statement (a) is actually both quantitative and non-financial, but we would call it 'quantitative' only, because there is no suggestion of money being involved.

a) Quantitative
b) Financial (and quantitative)
c) Qualitative
d) Quantitative but could be, at a pinch, all 4)

But with a little more detail/information they could all be expressed financially and quantitatively

This question invites you to differentiate between measures which can be involved in marketing/demand/supply problems.

THE INSTITUTE OF CERTIFIED PUBLIC ACCOUNTANTS OF RWANDA

STRATEGIC PERFORMANCE MANAGEMENT Advanced Level A2.2 EXAMINATION

Time Allowed: 3.5 hours, plus 20 minutes to read the paper.

You are required to answer <u>ALL</u> Questions.

Instructions to candidates:

Read the following case study and all answer the questions which follow.

Case study: "Big Capital Group"

Big Capital Group ("BCG") is a conglomerate, owned and managed by a group of seven wealthy individuals. The seven owner-managers jointly established BCG a number of years ago and work full-time for the Group, having previously worked for many decades for high-profile management consulting firms. The owner-managers are not related to each other, although they share strong mutual loyalty and trust because of personal friendship developed over many years working together.

Shortly after you obtained your CPA qualification, you were approached by a recruitment consultant acting on behalf of BCG. She explained that the Group is seeking to recruit a qualified accountant who could make a real contribution to the strategic management process. The person appointed would become a director of the company so that s/he could participate fully at board level. The only other directors are the seven owner-managers, and they intend to remain as fully involved as before.

The recruitment consultant told you: *"At first, I wasn't clear why they wanted to recruit this extra person, given that the seven owner-managers have many decades of highly relevant experience behind them and that all of them intend to remain closely involved with the running of the business. However, they explained that six of the seven are not accountants, and that the only one of the seven who is an accountant qualified a very long time ago when the accountants' training was mainly 'technical' rather than 'managerial'. The owner-managers decided that they need to augment the board's collective skill-set by recruiting what they describe as 'an accountant who thinks strategically'. In practice, that means recruiting someone who has qualified in fairly recent years, but it must also be someone with the experience and breadth of vision to be able to facilitate the implementation of BCG's distinctive strategy".*

The recruitment consultant outlined BCG's strategy in the following terms. *"At first glance, the strategy appears simple, perhaps even bland. BCG buys up underperforming companies and then uses its collective expertise to turn them around. Often the underlying reasons for underperformance seem fairly obvious to the owner-managers of BCG, because the breadth and depth of their collective consulting experience enables them to identify this kind of thing*

quite readily. For example, a supply chain may need to be reconfigured; management controls may need to be seriously overhauled; or it may be a straightforward issue of needing more capital to finance essential investment. In spite of (or perhaps because of) their close involvement, often the previous owners and managers of the firm haven't been able to see what are actually fairly obvious sources of problems or haven't been able to find a way to resolve them."

"Unlike many firms whose strategy centres on acquiring underperforming businesses, BCG does not typically aim to 'sell on' the acquired businesses after a quick turnaround. Instead, many acquired companies become more or less permanent subsidiaries of BCG, and the Group earns its financial reward from the on-going superior trading profits of the revamped companies, rather than from the short-term capital gains which a venture capitalist might seek. Of course, this approach creates its own pressures as well as delivering rewards – an analogy might be that the acquired companies are 'permanently adopted' by BCG rather than being 'temporarily fostered' by a venture capitalist".

The owner-managers have relatively few restrictions on the type of sector which BCG is willing to get involved in through the acquisitions strategy. For ethical reasons, they rule out investing in sectors such as armaments, tobacco and alcohol. They also have a rule that BCG does not invest in any sector 'outside their collective comfort zone' (in other words, where none of the owner managers has any significant previous experience), but in practice the only significant sector which this has prevented BCG from investing in is internet-based retailing and distribution.

The final choice as to whom (if anyone) will be appointed to the new position rests with the existing seven owner-managers of BCG. However, the recruitment consultant will draw up a shortlist from which the appointee is ultimately likely to be selected, and you are anxious to be included in that shortlist. To facilitate the short-listing process, the recruitment consultant has provided you with information about a number of situations which have recently been considered by the board of BCG, and has invited you to appraise them and to suggest options for their resolution. (These situations are described on the following pages). This exercise will enable her to make an initial assessment of your capability to fulfil the role envisaged for the appointee in BCG.

1. BCG is considering the possibility of making a takeover bid for the “Trader Tom” chain of grocery stores. BCG believes that such a bid would be favourably received by the senior management of Trader Tom, because the grocery store chain has been earning disappointing profits for several years and has had no real success in developing a strategy for resolving this problem.

Trader Tom operates a chain of 20 grocery stores (all of similar size), as well as a central warehouse to which all suppliers deliver their goods. These goods are then stored at the central warehouse until needed at the grocery stores. Transport from warehouses to grocery stores is carried out by haulage firms which are hired by Trader Tom at a cost of Rwf 6,240,000 for a delivery trip using a refrigerated lorry and Rwf 5,200,000 for a delivery trip using a non- refrigerated lorry. Each lorry (of either type) has a carrying capacity of 200 cubic metres. Trader Tom sells 25,000 cubic metres of goods each week, including 8,000 cubic metres of refrigerated produce. The “average” product spends one week at the warehouse and one week in a grocery store prior to sale, but of course the times differ greatly between products.

The following table shows the weekly costs incurred at the warehouse and at each grocery store, excluding the costs of purchasing any goods:

		Warehouse costs (per week)	Grocery store costs (per grocery store per week)
Labour costs	Rwf '000	325,000	97,500
Refrigeration costs	Rwf '000	520,000	52,000
Other costs	Rwf '000	260,000	39,000
Total costs	Rwf '000	1,105,000	188,500

One of the directors of BCG has suggested that one reason for Trader Tom’s poor profitability may be that Trader Tom does not properly understand the relative profitability of its products and is therefore unable to manage effectively either its product profitability or its supply chain. In particular, the director is aware that the only product profitability analysis conducted by Trader Tom consists of a comparison of the retail selling price of each product with the bought-in price (i.e., the price paid to the supplier). To facilitate a more detailed analysis, this director of BCG has obtained the following data about a sample of three of the products sold by Trader Tom:

	Breakfast cereal (non-refrigerated)	Ground coffee (non-refrigerated)	Smoked Fish (refrigerated)
Number of items in each case	10	5	4
Number of cases per cubic metre	20	80	50
Weeks in warehouse, prior to sale	1	5	1.5
Weeks in grocery store, prior to sale	0.5	2	2
Retail selling price, per unit	Rwf1,300	Rwf5,200	Rwf4,875
Bought-in price, per unit	Rwf390	Rwf1,560	Rwf1,267.5

REQUIRED:

Prepare a report for the recruitment consultant which sets out the following:

a) An evaluation of the profitability of each of the products in whatever manner you consider most appropriate with justification of the approach you have taken.

(12 marks)

b) Recommendations of the options as to how BCG could improve the profitability of Trader Tom if they (BCG) were to take over the grocery store chain. (Use appropriate detailed information presented above to justify and illustrate your answer.)

(9 marks)
(Format and presentation 1 mark)
[Total: 22 marks]

2. BCG has just completed the purchase of White Manufacturing Ltd. ("WML"), which owns and operates several manufacturing plants. WML managed these plants as profit centres, with profit being measured on an absorption costing basis. However, WML was unable to earn a satisfactory rate of return from its investment in these plants and therefore the shareholders were happy to sell the company in its entirety to BCG, even though the price paid for the shares was modest.

Although the senior management of WML defined the implementation of just-in-time (JIT) manufacturing as a key strategic objective, the directors of BCG believe that this strategic objective was never seriously accepted or embraced by individual plant managers. The directors of BCG believe that this attitude was a significant cause of the poor profitability of the plants, and that changing this attitude will be crucial to achieve the profit potential which the new owners expect.

As an example, the following data is provided for one of WML factories for the forthcoming three-month period. The product manufactured in the factory sells for Rwf78,000 per unit. Variable costs per unit of the product are Rwf27,950 for raw materials plus Rwf33,800 for direct labour and variable overhead. Fixed production overheads are Rwf585m per month. The normal level of output is 50,000 units per month. The plant manager has provided the following schedule of activities for the next three months:

	September	**October**	**November**
Opening stock	NIL	1,000	4,000
(units) Production	48,000	50,000	45,000
(units) Sales (units)	47,000	47,000	48,000
Closing stock (units)	1,000	4,000	1,000

REQUIRED:

Prepare for the recruitment consultant a report in which you:

a) Critically evaluate the suggestion that the existing performance measurement system creates a disincentive for plant managers to implement the stated JIT production strategy. (You are required to illustrate your answer with appropriate detailed calculations.) **(11 marks)**

b) Formulate an alternative profit-based performance measurement system (involving the use of backflush accounting) which would motivate plant managers to implement the stated JIT production strategy. Justify your recommendation by demonstrating and explaining the effectiveness of the proposed system.

(10 marks)
(Format and presentation 1 mark)
[Total: 22 marks]

3. In January 2011, BCG acquired a company ("EPL") which manufactures and sells small electronics products. An attraction to BCG of making this acquisition was EPL's experienced sales force, some of whom had been with the company for many years. The following data for July 2011 relates to the sales department of Division Q of EPL, which is responsible for distributing three products manufactured by the production cells of the same Division:

		Product X	**Product Y**	**Product Z**
Budgeted selling prices, per unit	Rwf	6,500	7,800	11,700
Budgeted sales	Units	5,000	4,000	1,000
Actual selling prices, per unit	Rwf	6,175	7,020	10,530
Actual sales	Units	6,300	2,500	2,200.

A significant part of the remuneration paid to sales staff in Division Q is linked to their performance. When BCG acquired EPL, it changed the basis on which this performance-related remuneration is calculated with effect from January 2011. The new arrangement is that sales staff are paid a bonus linked to the total actual contribution (i.e., sales minus variable manufacturing costs) earned on the goods sold each month. However, some of the longer- serving sales staff objected to this arrangement on the grounds that they (the sales staff) do not have the ability to control variable manufacturing costs, but can influence the sales quantities and selling prices achieved. As a compromise, BCG agreed that any sales staff already employed by EPL at the time of the takeover by BCG had the option of remaining on the existing bonus arrangement if they so wished, although any new sales staff hired from January 2011 onwards would be employed on the basis of the new bonus arrangement.

The following is a summary of variable manufacturing costs in July 2011:

	Product X	**Product Y**	**Product Z**
Budgeted variable manufacturing cost, per unit	2,600	5,200	7,150
Actual variable manufacturing cost, per unit	2,340	5,265	7,280

REQUIRED:

Prepare for the recruitment consultant a report in which you:

a) Analyse and evaluate the controllable performance of the sales department.

(12 marks)

b) Critically evaluate the suitability of each of the measures used at present (i.e., total sales and total actual contribution) as the basis of the bonus arrangement in the sales department. Additionally, you should propose an alternative metric which would be a more appropriate basis for the bonus arrangement. You are required to justify your answer in detail.

(9 marks)
(Format and presentation 1 mark)
[Total: 22 marks]

4. BCG is considering the possible acquisition of Central EA Telecom ("CET") but is unsure what price ceiling it should have in mind during forthcoming negotiations on the possible purchase of that company. CET has not yet commenced trading, but has been awarded a licence to offer mobile phone services in an African country. BCG's strategy for CET would involve using the mobile phone customer base as a platform for selling a number of other services (namely: mobile broadband connections; fixed line services; and cable TV).

   A total of 500,000 potential customers for CET's mobile phone services would be targeted by a marketing campaign in the first instance, and it is estimated that 7% of these would become actual customers. Customers would sign up for a two-year contract initially, and the probability of any customer renewing the contract for a further two years is estimated at 0.4. Marketing costs would be Rwf19,500 per potential customer targeted and there would be further costs (such as subsidising the costs of mobile phone handsets) averaging Rwf65,000 for each actual customer acquired. The probabilities of a mobile phone service customer also buying each of the other services offered by CET are estimated as follows:

Mobile broadband	Fixed line services	Cable TV
0.	0	0

The following estimates of the average contribution per annum from a customer who buys each service have been made:

		Mobile phone services	Mobile broadband	Fixed line services	Cable TV
In Years 1 & 2	Rwf '000	325	234	98	273
In Years 3 & 4	Rwf '000	260	195	78	312

Given the risk category of this investment, the directors of BCG regard a discount rate of 5% as appropriate. The following are the 5% present value factors for a cash flow of Rwf1 received at the end of each year:

Year 1	Year 2	Year 3	Year 4
0.952	0.907	0.864	0.823

REQUIRED:

Prepare a report for the recruitment consultant in which you appraise the profitability of CET as a potential business segment of BCG. In your answer, you should explicitly state and justify any assumptions which underlie your appraisal and propose a methodology which BCG could use in order to assess the effects of varying those assumptions.

(19 marks)
(Format and presentation 1 mark)
[Total: 20 marks]

5. BCG Pharmaceuticals is a division of BCG which was formed by acquiring a previously independent company ("PRE") in February 2011. The budgetary control system used in this division has remained largely unchanged since PRE was acquired, including a form of strategic planning and control which involves the comparison on a monthly basis (against budgets) of three aggregate-level performance measures, namely:

- Economic value added ™ (EVA) ;
- Residual income (RI);
- Return on investment (ROI), restated to its annual equivalent (e.g., if ROI for a given month is 1% then this is restated as 1 * 12 months = 12% annual equivalent ROI).

The following is the forecast of these three measures for the next six months:

		Sept	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**
EVA	Rwf '000	850	620	950	1,170	730	500
RI	Rwf '000	750	700	1,000	1,100	700	700
Annual equivalent ROI		9.6%	9.2%	10.6%	11.1%	9.5%	9.7%

REQUIRED:

Prepare a report for the recruitment consultant in which you critically assess this approach to budgetary control, and suggest options as to how the current approach to strategic planning and control should be improved.

(13 marks)
(Format and presentation 1 mark)
[Total: 14 marks]

END OF PAPER

SUGGESTED SOLUTIONS

SOLUTION 1

To: Ms. R.E. Cruiter From: T. Rainee, CPA.
Re: Big Capital Group
Date: 31/8/2011

Please find enclosed a report containing an evaluation of the profitability of the Breakfast Cereal, Ground coffee and Smoked Fish products of the Big Capital Group (part a) and recommended options for the improvement of the profitability of Trader Tom if BCG were to take over the grocery store chain (part b)

I will be pleased to provide any clarification that you may require.

Yours Sincerely

T. Rainee, CPA

a) An evaluation of profitability:

This report is based on an activity-based analysis which allows for all of the costs in the supply chain up to the point of sale – not just the purchase cost, but also the costs of warehousing, grocery store storage, and transport. These costs differ quite considerably between products because of (for example) significant differences in storage time and the fact that some products need to be refrigerated which causes significant extra cost.

The analysis presented in Appendix 1 recognises this difference in overhead costs. By contrast, Trader Tom at present does not understand these differences in profitability because it assesses products only in terms of gross margin.

Comparison:	**Cereal**	**Ground coffee**	**Smoked Fish**
Gross margin as % of selling price	70%	70%	74%
Activity-based profit as % of sales	30%	53%	8%

b) Recommendations to improve the profitability of Trader Tom:

To identify options for improving profitability, it is necessary to begin by identifying why each product generates particular amounts of overheads:

1. Refrigeration costs (applicable to smoked fish only): The three costs of refrigeration (in warehouse, grocery store, and transport) per item amount to Rwf487.5, Rwf1,300 and Rwf156 respectively.

   POSSIBLE IMPROVEMENT: If the manufacturer delivered directly to each grocery store → cost saving to Trader Tom of (Rwf487.5 + Rwf156 = Rwf643.5). This would more than double the profit margin.

2. Delivery procedures: Of course, the manufacturers of all goods could be "requested" to deliver to grocery stores (and not to the central warehouse), and this would eliminate all the existing warehouse and transport costs – unless the suppliers changed their prices because deliveries were to different locations.

3. Stock turnover: Another cause of significant overhead costs is the long "lead time" between purchase and sale of a product (e.g., the Ground coffee is "stored" by Trader Tom for five weeks in the warehouse plus two weeks in the grocery store, a total of seven weeks).

   Thus, even though this product does not need to be refrigerated, the storage cost is significant (Rwf292.5 + Rwf546 = Rwf838.5 per unit sold) because of the long storage time, and costs the company almost a quarter of the gross margin on the product.

POSSIBLE SOLUTION: “Request” the supplier to make smaller and more frequent deliveries (either to the warehouse, or – even better – directly to the grocery store) so that the average lead time is reduced.

4. When all improvements have been made, and the profit margin of each product cannot be increased further, nevertheless profit margins can be used as the basis of “merchandising” decisions to improve overall grocery store profitability, e.g.:

    - Products with the highest profit margin should be displayed in positions where they are most likely to be purchased (usually at eye level and at the front of the store);
    - Products with low profit margin (e.g., Smoked Fish) should probably continue to be stocked (as “loss leaders” or “footfall drivers”), but in less prominent shelf positions (and preferably in smaller quantities and fewer varieties) . It is not feasible to eliminate products altogether, because customers expect grocery stores to offer them a comprehensive range of products and by not selling one item may result in customers going elsewhere not only to look for that item, but others.

APPENDIX 1

Average storage times at each location = 1 week ⇒ quantity stored = quantity sold each week.

Hence: Cost driver rates:

	Rwf k	Rwf k	Rwf k	Cu M			
Warehousing excl. refrigeration	325,000	260,000	585,000	25,000		23.4	per cu m per week
Warehousing refrigeration costs	520,000		520,000	8,000		65	per cu m per week
Grocery store costs excl. refrigeration	97,500	39,000.	136,500	25,000	20	109.2	per cu m per week
For each of 20 stores							
Grocery store costs of refrigeration -ditto	52,000		52,000	8,000	20	130	per cu m per week
Transport			5,200	200		26	per cu m
Refrigerated transport			6,240	200		31.2	per cu m

Profit per unit:

	Cereal	**Ground coffee**	**Smoked Fish**
	Rwf	Rwf	Rwf
Selling price	1,300	5,200	4,875
Bought-in price	390	1,560	1,267.5
Gross margin	910	3,640	3,607.5

Cereals	Rwf / cu m	Items / case	Cases / cu m	Rwf / item
Selling price				1,300.00
Bought-in price				390.00
Gross margin				910.00
Warehouse costs excluding refrigeration per week	23,400	10	20	117.00
for x weeks			1.00	117.00
Grocery store costs excluding refrigeration	109,200	10	20	546.00
for x weeks			0.50	273.00
Transport	26,000	10	20	130.00
Profit				390.00
ABB				30.00%

Coffee	Rwf	Items /case	Cases / cu m	Rwf / item
Selling price				5,200.00
Bought-in price				1,560.00
Gross margin				3,640.00
Warehouse costs excluding refrigeration per week	23,400	5	80	58.50
for x weeks			5.0	292.50
Grocery store costs excluding refrigeration	109,200	5	80	273.00
for x weeks			2.00	546.00
Transport	26,000	5	80	65.00
Profit				2,736.50
ABB				52.63%

Smoked fish	Rwf	Items / case	cases/ cu m	Rwf / item
Selling price				4,875.00
Bought-in price				1,267.50
Gross margin				3,607.50
Warehouse costs excluding refrigeration per week	23,400	4	50.0	117.00
for x weeks			1.5	175.50
Warehouse costs of refrigeration	65,000	4	50.0	325.00
for x weeks			1.5	487.50
Grocery store costs excluding refrigeration	109,200	4	50.0	546.00
for x weeks			2.0	1,092.00
Grocery store costs of refrigeration	130,000	4	50.0	650.00
for x weeks			2.0	1,300.00
Transport	31,200	4	50.0	156.00
Profit				396.50
ABB				8.13%

Tutorial notes

- Purpose of question: To test candidates' ability to identify and perform an activity-based analysis and to use the information for purposes of product profitability analysis and improving performance by changes to the supply chain.

- Options: The format of the calculations may differ in part (a), but overhead costs should be fully and appropriately traced in each product. There is also scope for variation in the precise points raised in the evaluation in part (b).

- Essential components: In part (a), candidates need to be able to identify the most appropriate form of level of profitability analysis; to conduct it properly; and to justify why it is the most suitable approach. In part (b), although there is scope for variation in the precise points made, nevertheless there are clearly opportunities for eliminating activities and costs from the supply chain and these need to be identified and fully explained.

- Exam performance: Part (a) of this question is usually reasonably well answered. Many candidates identify a suitable means of evaluating the profitability of the three products, but it is too easy to forget the requirement to provide justification of the approach taken.

- The standard of answering to part (b) is often less satisfactory. The main problem in this regard is that even where candidates make sensible suggestions for improving profitability (e.g., by reducing time spent in inventory at the warehouse and/or grocery store) they fail to use the detailed information presented to justify and illustrate their answers (as the question specifically requires).

This is a reminder – Read the question carefully and more than once !!

What is the examiner really asking?

SOLUTION 2

To: Ms. R. E. Cruiter
From: T. Rainee, CPA
Date: 31/8/2011
Re: White Manufacturing Ltd (WML)

Please find enclosed a report containing a critical evaluation of the existing performance measurement system of one of WML's factories (part a). Part b of the report proposes an alternative profit-based performance management system.

I will be pleased to provide any clarification that you may require.

Yours Sincerely

T. Rainee, CPA

a) Under the current system, all costs incurred are transferred each month either to the Income Statement or to the Balance Sheet (closing stock valuation). A profit centre manager (such as a plant manager in WML) has an incentive to maximise profits, and therefore has an incentive to keep costs out of the Income Statement and instead capitalise them in closing stock as much as possible.

A characteristic of absorption costing is that increasing production (even if the goods are not sold) has the effect of reducing the amount of fixed overhead charged to Income Statement in the current period. This is a dysfunctional incentive given that the company has stated a strategic commitment to JIT.

JIT involves (inter alia) not producing goods which cannot be sold immediately at the time of production – there is no need to store good not made and they cannot be used in incentive calculations Therefore, the suggestion that the existing performance measurement system acts as a disincentive to JIT is probably true.

For example, Table 1 shows that profits are higher in October than in September, even though sales are exactly the same. The plant manager is “rewarded” (in the form of higher reported profits in October) for the higher production in that month, even though the higher production is dysfunctional because it leads only to an increase in closing stock.

An even more stark example is that reported profits are at their lowest in November (i.e. reported performance is at its worst), even though sales are at their highest. The reason for this is that the unfavourable FOVV is of greater magnitude than the reported profit effect of the extra sales.

TABLE 1

Standard cost card (absorption costing):

	Qty	Rwf	Rwf
Raw materials			27,950
Direct labour and variable overheads			33,800
Fixed overheads, based on normal output	50,000	585,000,000	11,700
Total			73,450

Profit per month (absorption costing): *Rwf values in thousands*

	Sept.			Oct.			Nov.	
Sales	47,000	x 78		47,000	78	48,000	78	
	=	3,666,000			3,666,000		3,744,000	
Cost of goods sold	47,000	73.5		47,000	73.5	48,000	73.5	
		3,452,150			3,452,150		3,525,600	
Normal output	50,000			50,000		50,000		
Production	48,000			50,000		45,000		
Fixed overhead volume variance (FOVV)	(2,000)	x 11.7		-	11.7	(5,000)	11.7	
Rwf '000	=	(23,400)	A		-		(58,500)	A
Profit Rwf '000		190,450			213,850		159,900	

b) Proposal for an alternative profit-based performance measurement system:

A profit-based performance measurement which will motivate a JIT approach by plant managers is one based on backflush accounting. This involves costing units of product on the basis of raw materials content only, with all costs of labour and overhead (whether fixed or variable) being treated as period costs.

In particular, treating variable labour and overhead costs as period costs means that the marginal effect on reported profits of producing one extra unit is as follows:

- If the extra unit is sold in the current period, then profits increase (because the Rwf78,000 selling price exceeds the Rwf33,800 direct labour / variable OH cost);
- If the extra unit is not sold in the current period, then profits for the period decrease by the amount of the direct labour / variable OH cost (Rwf33,800).

This is entirely consistent with JIT. Extra production is encouraged (reflected in higher profits) but only to fulfil an immediate sales opportunity.

The effectiveness of this system is demonstrated in Table 2 below.

TABLE 2

Profit / Month (Back-flush accounting			September		October		November
Sales	*Rwf '000*		3,666,000		3,666,000		3,744,000
	Qty		47,000		47,000		48,000
Cost of goods sold (raw materials cost only)	*Rwf '000*	28	1,313,650	28	1,313,650	28	1,341,600
Labour and variable overhead cost of goods produced	*Qty*		48,000		50,000		45,000
	Rwf '000	34	1,622,400	34	1,690,000	34	1,521,000
Fixed overheads	*Rwf '000*		585,000		585,000		585,000
Profit	*Rwf '000*		144,950		77,350		296,400

The figures reflect the fact that back-flush accounting creates a direct disincentive for the plant manager to build up stock.

For example, in November profits are substantially higher than in either of the previous months. This represents the combined effect of two actions, namely (1) achieving higher sales units than in any other month, (2) reducing the level of output as compared with the previous month (which is consistent with JIT, since it resulted in a reduction in the inventory level without any loss of sales).

Tutorial notes

- Purpose of question: To test candidates' ability to appraise a performance measurement system in a JIT manufacturing environment and to identify the potential of backflush accounting to form the basis of a more goal congruent performance measurement system.

- Options: The precise calculations offered and arguments made may differ from those presented here. For example, the dysfunctional nature of the absorption costing system could be illustrated by deriving a profit equation (showing the connection between profits and surplus production) instead of calculating net profit each month.

- Essential components: As indicated above, the calculations offered and arguments made may differ from those shown here, but must be sufficient to make a comprehensive and convincing case for the problems caused by the current performance measurement system and the potential benefits offered by the alternative.

- Exam performance: Part (a) requires candidates critically to evaluate the suggestion that the existing performance measurement system creates a disincentive for plant managers to implement JIT. Many candidates score badly as a result of ignoring this requirement and instead answer questions which are not asked; such as whether or not JIT "is a good thing".

- Similarly, in part (b), the question asked is often ignored or addressed only peripherally. Many candidates concentrate on the advantages of backflush costing as a means of reducing bookkeeping costs whereas the question asks for an alternative profit-based performance measurement system. The answer also calls upon candidates to justify their recommendation. This last is often ignored.

SOLUTION 3

To: Ms. R.E. Cruiter
From: T. Rainee, CPA
Date: 31/8/2011
Re: EPL

Please find enclosed a report with an analysis and evaluation of the controllable performance of EPL's sales department (part a), and a critical evaluation of the metrics used as the basis for the sales department's bonus arrangement (part b).

I will be pleased to provide any clarification that you may require.

Yours Sincerely

T. Rainee, CPA

a) Analysis and evaluation of the controllable performance:

Standard weighted average contribution per unit:

	X			Y			Z		
Standard contribution	6,500	2,600	3,900	7,800	5,200	2,600	11,700	7,150	4,550
Weighting = Units / Total Units	5,000	10,000	0.50	4,000	10,000	0.40	1,000	10,000	0.10
			1,950			1,040			455
Average weighting			3,445.00						

Sales quantity variance	AQ	11,000			
AQ - BQ * Avg wt	BQ	10,000			
Rwf		1,000	3,445.00	3,445,000	F

Sales mix variance	AQ	- AM	x	=	
X	6,300	5,500	3,900	3,120,000	F
Y	2,500	4,400	2,600	(4,940,000)	A
Z	2,200	1,100	4,550	5,005,000	F
Total	11,000	11,000		3,185,000	F

Selling price variance	+	-	X AQ	Rwf	
X	6,175	6,500	6,300	(2,047,500)	A
Y	7,020	7,800	2,500	(1,950,000)	A
Z	10,530	11,700	2,200	(2,574,000)	A
				(6,571,500)	A
Total of variances				58,500	F

The sales staff have the ability to influence sales price, quantity and (by implication) mix. The sum total of these three variances is Rwf58,500 F, i.e., close to nil being 0.9% of selling price variance or less than 2% of Sales quantity variance. Hence, in overall terms, their controllable performance could fairly be described as “on target”. What is clear, however, is that this overall picture resulted from a pattern of cutting prices which had the overall effect of increasing quantities sold. There was also a shift in mix away from the lowest-profit product (Y), and this may reflect the fact that at least some of the sales staff are now motivated to maximise the profitability of sales and not just to maximise sales (see below).

Variable cost manufacturing variances could also be calculated. However, they are not controllable by sales department staff. Therefore, even though these variances would be significant (Rwf1,189.5k F) and would complete the reconciliation of budgeted and actual profit, they should not be included in an evaluation of the controllable performance of the sales department.

b) Evaluation of the present user:

Total sales value is an unsuitable performance measure because it incentivises staff to emphasise the highest-priced products, even where these do not have the highest contribution. Furthermore, in their eagerness to sell these high-priced products, sales staff are likely to offer deep discounts on these products (even where this seriously erodes their profitability) and would be rewarded for doing so. This may well be why the actual prices of the two most expensive products (Y and Z) are 10% below budget while the actual price of the cheapest product (X) is only 5% below budget. For example, a sales staff member, who is paid on the basis of sales, receives a higher contribution for selling Y than for selling X (even allowing for the bigger price cut on Y), despite the fact that Y is much less profitable per unit.

At first glance, linking sales to actual profits might appear to be the solution. However, a problem is that actual variable manufacturing costs are not controllable by sales staff, and therefore any cost variances introduce a random element to the performance measure, thus reducing its effectiveness as a motivator. In this case, there are variances between actual and budget variable manufacturing costs for all three products.

Proposed Alternative measure:

An improved performance measure is “pseudo-profit”, i.e.: (actual sales price minus standard variable manufacturing cost) multiplied by actual units sold. This performance measure encourages sales staff to make sales which maximise the profitability of sales (rather than simply maximise sales), while at the same time removing the distorting (and uncontrollable) effect of any cost variances in the variable manufacturing costs.

One way to verify the suitability of this performance measure is to compare the “actual” and “budget” pseudo-profit. These figures are Rwf34,508.5k and Rwf34,450k respectively, indicating a variance of Rwf58.5kF. This is the sum of the three variances which summarise controllable performance, as indicated in the answer to part (a) above.

Tutorial notes

- Purpose of the question: To assess the candidate's ability to select and apply an appropriate basis for assessing controllable performance (viz., controlled advanced variance analysis) and their ability critically to evaluate the current performance measures used as the basis of an incentive scheme and to recommend an improved performance measure for this purpose.

- Options: There is scope for variation in the sequence of calculations presented in part (a) and in the points made in answer to part (b).

- Essential components: It is essential that the answers to both parts be based on a clear recognition of which elements of performance are controllable by sales staff. For example, in part (a) it would not be acceptable to treat cost variances as controllable on the same basis as sales variances, and in part (b) an essential basis of the existing profit-based performance measure is that it reflects (inter alia) cost variances which are not controllable by the sales staff.

- Exam performance: There is generlly considerable variation between candidates in terms of the quality of answering to part (a). On the one hand, some candidates are successful in evaluating the controllable performance of the sales department, taking into account the variables that appear to be within that department's control. By contrast, other candidates do not seem to understand the concepts of controllability, of which variables might be controllable, and how controllable performance might be assessed. This is where "reading round the subject" is of importance.

  There is often significant variation in the standard of answering part (b). On the one hand, there are some very good answers. On the other hand, some candidates fail to provide credible evaluations of the existing performance measures or to justify a suitable alternative.

  This question emphasises that this subject is not just churning out numbers but requires the candidate to demonstrate proper reasoning behind the numbers.

SOLUTION 4

To: Ms. R. Cruiter
From: T. Rainee, CPA
Date: 31/8/2011
Re: CET – A potential business segment of BCG

Please find enclosed a report appraising the profitability of CET detailing the underlying assumptions and suggestions as to how to:

i. vary those assumptions, and
ii. assess the effects of varying them.

I will be pleased to provide any clarification that you may require.

Yours Sincerely

T. Rainee, CPA

The profitability of 500,000 customers - this set of customers - is estimated at

Rwf 37,213,454 – Rwf12,025,000 = Rwf25,188,454.

Appendix 1 shows the detailed calculations supporting this expected profitability.

Assumptions:

The only potential customers for the "additional" services (mobile broadband, fixed line, and cable TV) are the customers who first buy the mobile phone services - it is stated that the mobile phone customer base will be used as a platform for selling the other services.

All cash inflows from the services arise at the end of the year to which they relate. This is of course not an exact approximation, which could be relaxed by (for example) forecasting and discounting cash flows on a monthly basis should that be the frequency of customer billing.

No customer renewals after the end of Year 4: This may not be literally true, but is perhaps far enough into the future for predictions to be unreliable, especially considering the rapidly-changing technology of this sector. In any case, it is likely that there will be extra customer renewal costs after such a long period, e.g., subsidising a new handset. In order to relax this assumption, market research would need to be conducted to predict future customer numbers, renewal probabilities, contributions and costs.

Methodology to assess the effect of varying the underlying assumptions:

The actual outcomes will conform to the data provided, e.g., as regards the proportion of customers who will renew after Year 2 and the profits in each year from each service. The justification for this assumption is that it reflects the best data available. In order to relax the assumption, it would be appropriate to build a spreadsheet incorporating a range of possible outcomes. For example, the 0.4 probability of renewal may be a single-point representation of three possibilities (0.3, 0.4 and 0.5) which have all been estimated as equally likely. Similarly, each of the single-point estimates of probabilities and contributions may have been derived from a probability distribution. These probability distributions could all be built into the spreadsheet so as to simulate a range of possible profit outcomes.

APPENDIX 1

Number of customers acquired = 7% * 500,000 = 35,000.

Customer targeting and acquisition costs
= (500,000 * Rwf19,500) + (35,000 * Rwf65,000) =
Rwf12,025,000.

Expected values (EVs) of number of customers buying each service:

	Years 1 & 2	**Years 3 & 4**
Mobile phone	35,000	35,000 * 0. 4 = 14,000
Mobile broadband	35,000 * 0.25 = 8,750	14,000 * 0.25 = 3,500
Fixed line services	35,000 * 0.3 = 10,500	14,000 * 0.3 = 4,200
Cable TV	35,000 * 0.1 = 3,500	14,000 * 0.1 = 1,400

Expected contributions (in each year) from customers for each service:

	Years 1 & 2			**Years 3 & 4**		
	No.	Rwf	Rwf '000	**No.**	Rwf	Rwf '000
Mobile phone	35,000	325.000	11,375,000	14,000	260.000	3,640,000
Mobile broadband	8,750	234.000	2,047,500	3,500	195.000	682,500
Fixed line services	10,500	97.500	1,023,750	4,200	78.000	327,600
Cable TV	3,500	273.000	955,500	1,400	312.000	436,800
Totals	-		15,401,750			5,086,900

PV of expected contributions

	Years 1 and 2		Rwf '000	Years 3 and 4		Rwf '000
Totals from above			15,401,750			5,086,900
5% PV Factors	0.952	0.907	1.859	0.864	0.823	1.687
PV			28,631,853			8,581,600
						37,213,454

Tutorial notes

- Purpose of question: To examine candidates' ability to appraise the profit potential of a business segment, incorporating customer profitability analysis and the measurement and management of uncertainty.

- Options: There is considerable scope for variation in the way in which the calculations are carried out. There is also scope for variation in assumptions and in the points made both to justify the assumptions and to propose how BCG could assess the effects of varying those assumptions. For this question, it may well pay dividends to state/table assumptions you have made. Also doing this ensures that you stick to those assumptions.

- Essential components: It is essential that the profitability assessment is based on a comprehensive use of the data about the customer base. It is also essential that assumptions be justified (and not merely listed) and that the proposals as to how to assess the effects of varying those assumptions are properly explained.

- Exam performance: This type of question often that where students score a high percentage of the available marks.

  But the quantitative element is quite straightforward but yet often a significant minority of candidates show disappointing results for questions of this nature.

  The second sentence of the requirement paragraph indicates a need for candidates to state and justify assumptions made and to propose how the effects of varying those assumptions could be assessed. In the past candidates often neglect these qualitative elements. Again, read around the subject.

SOLUTION 5

To: Ms. R. Cruiter
From: T. Rainee, CPA
Date: 31/8/2011
Re: Assessment of BCG Pharmaceutical's budgetary control system.

Please find enclosed a report with a critical assessment of BCG Pharmaceutical's budgetary control system and suggestions for improvement.

I will be pleased to provide any clarification that you may require.

Yours Sincerely

T. Rainee, CPA

Assessment of current system:

The existing system is unnecessarily complex in the sense that it uses multiple measures of what are (to a large extent) the same underlying phenomena. In particular, it is evident from the data that there is a very strong correlation between ROI and RI, and this is because they are simply different ways of capturing the same two basic pieces of information (operating profit and capital invested).

Admittedly the correlation between ROI and RI is not "perfect", e.g., RI is exactly the same in October, January and February whereas ROI differs slightly between these months. However, this is essentially only a technical difference (RI factors cost of capital into the calculation, whereas, in an ROI assessment, the cost of capital acts as the benchmark). The point remains that there is no strategic advantage in trying to manage using both of these variables.

Suggestion for improvement:

EVA does have “extra” information content, not captured by ROI or RI. For example, a more “cyclical” trend is evident in the EVA data than in the RI data. This is due to adjustments to the income or asset measures used in calculating EVA to make the measure “economically meaningful”, such as the capitalisation and amortisation of intangible assets. For example, scrutiny of the data seems to suggest that this has depressed EVA in February.

In essence, EVA is a more economically meaningful version of RI, and in this sense EVA may be preferred to RI as the financial performance measure to be used for strategic planning and control. However, EVA is necessarily more subjective. It does not seem appropriate to use both RI and EVA in a budgetary control system because their information content has many fundamental similarities, some differences notwithstanding.

Irrespective of the performance measure, the use of a monthly basis of budgetary control is inappropriate at the strategic level. The success (or otherwise) of a strategic investment can really only be assessed over its whole lifecycle, e.g., there may be an initial costly investment in market research or branding without any expectation of financial return until much later. At the very least, measures such as those already in use are typically applied on an annual basis because monthly assessment is at best meaningless and can at worst encourage dysfunctional behaviour.

More fundamentally, the use of measures such as ROI and RI (at any fixed time interval) to represent degrees of strategic success is questionable. It is appropriate that a strategic target be broken down into manageable goals which can be tracked and measured in the short term, often in ways that are nonfinancial (e.g., rates of consumer awareness of a new product). If ROI or RI are used as “the” performance measure, then they become ends in themselves and focus on the original strategic objective is likely to be lost.

Tutorial notes

- Purpose of the question: To examine the candidate's ability to critically assess the use of RI, ROI and EVA as part of a budgetary control system for strategic management purposes.

- Options: While there is scope for acceptable variation in the precise points made, there are some fundamental issues which must be raised in some way (see below).

- Essential components: It is essential that candidates criticise the existing system as regards: the overlap between the information content of the various measures; the excessive frequency of measurement; and the use of divisional profitability measures as devices for strategic control. It is also essential to identify changes to the strategic planning and control system which would overcome these deficiencies.

BLANK

STRATEGIC PERFORMANCE MANAGEMENT

Advanced Level A2. 2 EXAMINATION

NOTES:
You are required to answer ALL Questions.

Time Allowed
3.5 hours plus 20 minutes to read the paper.

Examination Format
This is an open book examination. Hard copy material may be consulted during this examination subject to the limitations advised on the Institute's website.

Reading Time
During the reading time you may write notes on the examination paper but you may not commence writing in your answer booklet

Marks
Marks for each question are shown. A mark of 50 or more is required to achieve a pass in this paper.

Answers
Start your answer to each question on a new page.

You are reminded that candidates are expected to pay particular attention to their communication skills. Care must be taken regarding the format and literacy of the solutions. The marking system will take into account the content of the candidates' answers and the extent to which the answers are supported with relevant legislation, case law or examples where appropriate.

Answer Booklets
List on the cover of each answer booklet, in the space provided the number of each question attempted. Additional instructions are shown on the front cover of each answer booklet.

You are required to answer <u>ALL</u> Questions.

Instructions to candidates:

Read the following case study ("Zephyr Ltd.")and answer the questions which follow.

Case study: "Zephyr Ltd."

Zephyr Ltd. (Zephyr) is an independent company which manufactures consumer electronics products such as DVD players, car radios, and low-spec digital cameras. In recent years, profits have been disappointing and the company's turnover has declined. Jim Callaghan was called in as a consultant three months ago to advise the company on its business model, and he has now been appointed to the position of CEO following a decision by the company's board to invite the previous CEO to take early retirement. You are employed in the consultancy practice where Jim formerly worked, and he recently briefed you on the matters which came to light during the consultancy assignment and on his future plans and aspirations for the company.

"This company would not have survived much longer with their old business model", explained Jim. "It was a simple enough model in theory, but completely unsustainable in practice. They were trying to offer the consumer low-priced products. To make this possible, they limited themselves to making only fairly straightforward products like DVD players which they could manufacture using a simple combination of a few bought-in components. Furthermore, because the products were so straightforward, their research and development (R & D) was mostly limited to reverse engineering of competitors' products – or, in plain English, playing copycat. They weren't doing anything illegal, but clearly it's impossible to be innovative when you are essentially just copying what other people are already doing. All of this was intended to keep costs (and therefore selling prices) down. But competing on cost alone has two problems. Firstly, in any industry, only one player can be the cheapest. Secondly, consumers have certain expectations about quality even for fairly low-priced electronics products. When I scrutinized Zephyr's recent poor financial performance, I wasn't at all surprised to find that they were caused by the fact that both of these problems were beginning to bite. In the last few years, consumers have found that they can buy big brand products of superior quality at lower prices – for example, you can get a really reliable Japanese DVD player for very little money. My predecessor as CEO had no idea how to operate in this competitive environment. He admitted to me that several of Zephyr's products were near the end of their product life cycles, and that the production technology used for manufacturing many products was reducing quality far below the levels offered by competitors. He said the company couldn't afford the investment in R & D or new production technology required in order to solve these problems".

Jim told the board of Zephyr that the very idea of a small independent manufacturer in an industry dominated by global giants is something of an anomaly, and he is not certain that Zephyr can prosper or even survive. Nevertheless, he accepted the job of CEO because he believes that there is at least some chance of saving the company if certain major changes are made. As a condition of accepting the appointment, Jim obtained the Directors' agreement to give him freedom of action in a number of important areas.

"First of all", Jim said, "Zephyr is going to have to get real about the whole R & D thing. Just ripping off other firms' product designs or manufacturing products long after the market has lost interest in them isn't going to deliver us a profitable or sustainable product family. Secondly, the Board has told me that we can obtain significant funds for capital investment – in both production equipment and R & D facilities – by making a major share issue which will be taken up by the existing shareholders. Since this is a family-owned company, with many of the existing shareholders sitting on the Board, I'm willing to accept that assurance at face value".

Jim also intends to scrutinize the company's budgetary and distribution procedures, because he believes that financial improvements are possible through (as he puts it) "rooting out an established culture of inertia". "There's a terrible tendency in this company to keep on funding things that have always been funded, and to keep on doing things the way that they've always been done. For example, there may be far too much production capacity in some parts of the organization and far too little elsewhere", said Jim. "Another example is our distribution channels. Most of our products are distributed through large electronics retail chain stores. Those guys don't exactly pay us great prices, and given the unimpressive quality of our products we aren't in any position to demand better prices from them. Our profit margins are slim enough as it is, and it seems to me that this approach to distribution means that we are giving away most of our margins to these retail chains. There has to be a more profitable approach to distribution".

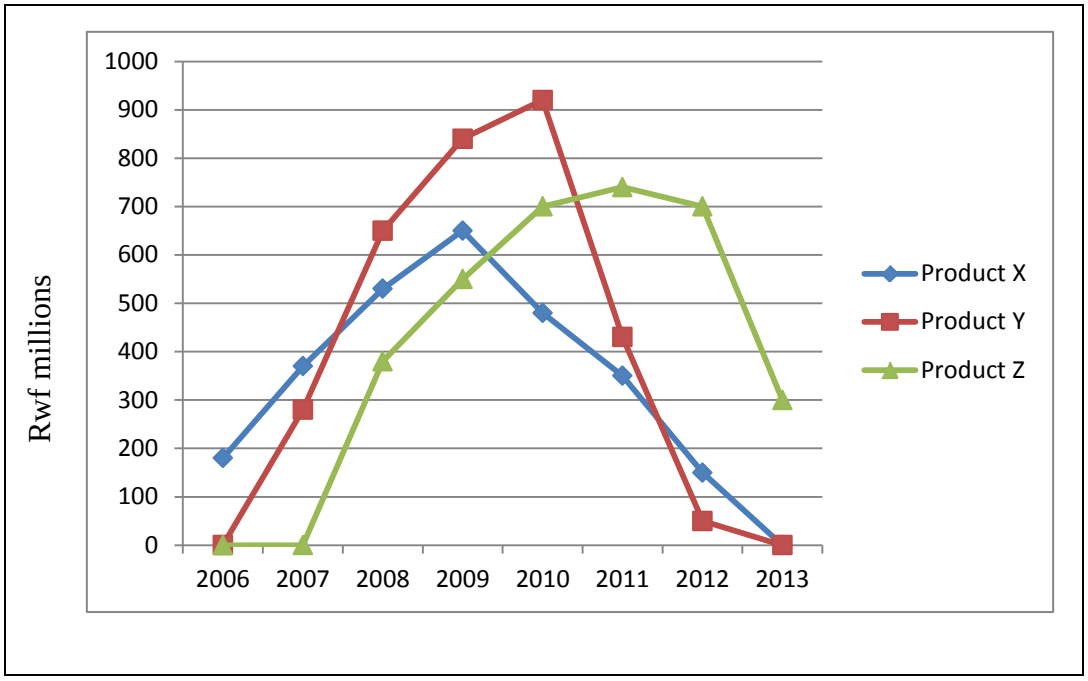
1. One of Zephyr's factories is located in Musasa and manufactures equipment suitable for use with home broadband networks such as wireless routers and digital radios. Because of technological and market changes, this factory's manager finds that its products typically have a product lifecycle of approximately six or seven years, after which there is no further market for them in their existing designs.

The following actual sales data (for the years 2006 to 2009) and forecast sales data (for the years 2010 to 2013)

is available in relation to the products manufactured in the Musasa factory (all figures are in thousands of francs):

	Actual Sales Rwf m				Forecast Sales Rwf m			
	2006	2007	2008	2009	2010	2011	2012	2013
Product X	180	370	530	650	480	350	150	Nil
Product Y	Nil	280	650	840	920	430	50	Nil
Product Z	Nil	Nil	380	550	700	740	700	300

The following is a graphical representation of the above sales data:



The contribution margins on Products X, Y and Z are estimated at 60%, 50% and 40% respectively. As regards annual fixed costs, the factory manager has explained that these are of two types. "Firstly, there are general fixed costs of Rwf50,000 per annum, which could only be avoided by shutting down the entire factory. Secondly, there are product line fixed costs, which – as the description suggests – could be avoided only by completely discontinuing a particular product line. These product line fixed costs (per annum) are Rwf220m for Product X, Rwf170 m for Product Y, and Rwf150m for Product Z".

REQUIRED:

a) Prepare calculations of the profit or loss for each product, and for the factory as a whole, for each of the years 2010 and 2011. **(7 marks)**

b) Without performing additional calculations, explain the reasons for the change in profitability between 2010 and 2011 and discuss the likely trend in profitability in 2012 and 2013. **(7 marks)**

c) At your request, the accountant at the Musasa factory has explained the approach to cost control to you. "When a decision is made to add a new product to our range, the first step is for the R & D people to develop a finalized product design. Only after that do the accounting people get involved. After scrutinizing the design, we are in a position to specify standard cost for materials, labour and so on. Thus, we have cost standards which we use in conjunction with a variance analysis system throughout the years of the product lifecycle".

Is this a suitable and effective approach to cost control in this factory? Justify your answer. **(4 marks)**

d) Recommend the principal actions (other than changes to the system of cost control) which the company should take in order to improve the future profitability of the Musasa factory. In your answer, you should explain why each of the actions which you recommend would be both feasible and effective.

(6 marks)
(Total: 24 Marks)

2. From his previous experience as a consultant, Jim Callaghan is aware that activity-based budgeting (ABB) may be an effective means of determining whether the resources employed in a part of an organisation are too much or too little for its needs. Jim initially decided to commission an ABB exercise on an entire factory owned by Zephyr which produces a range of computer peripheral devices. However, the factory manager explained that the factory is divided into twelve distinct production cells (each with its own product line and dedicated production facilities) and Jim decided to limit the initial ABB exercise to one of those cells (which manufactures computer keyboards).

Production of the keyboards does not involve any direct labour input, but three types of indirect labour are employed in the cell (namely, 1 team Quality Control Inspector, 4 teams Administrative Staff, and 8 Machine Setup Technician teams who perform setup at the commencement of each production run). Each of these teams works a 160-hour month and they are employed on a permanent basis. The cost of employing one team at each of these grades per month is as follows:

Quality Control Inspection	**Administration**	**Machine Setup Technicians**
Rwf 4,500	Rwf 3,000	Rwf2,000

The cell's production machinery has a capacity of 4,000 hours per month. There is also a setup machine (with a capacity of 100 hours per month) which is used by the machine setup technicians, and a tracking machine (with a capacity of 1,000 hours per month) which is used to track customer orders after they are dispatched until they reach customers' premises.

The following is a summary of monthly operations:	Product P	Product Q	Product R	Product S
Units of output	25,000	10,000	5,000	2,000
Production machine hours (PMH) per unit of output	0.08	0.04	0.02	0.05
Production batch size (units)	5,000	2,500	2,500	1,000
Customer order size (units)	1,000	250	125	100

At the beginning of a production run, procedures are carried out which involve 80 hours of Machine Setup Technicians' labour and 4 hours of the setup machine's time. When a production run is completed, the Quality Control Inspection team spends 2 hours carrying out an inspection of the output. The resources consumed in sending an order to a customer (including tracking during the delivery process) are 2.8 hours of Administrative Staff Labour and 3 hours of tracking machine time.

REQUIRED:

a) For each of the six types of resources (i.e., three types of indirect labour and three types of machinery), prepare detailed calculations of the amounts required by the cell each month in order to facilitate the current level of activities.

(7 marks)

b) Jim's main reason for commissioning ABB in this case was to identify the extent of (and measure the cost of) un-used resources. He has therefore asked you to:

- Quantify the cost of any surplus indirect labour.
- Consider if and how the costs of any such surplus indirect labour can be eliminated and advise him of the outcome of your consideration.
- Calculate the amount of any surplus machine capacity. You are required to comment on the extent of this surplus machine capacity and suggest what actions should be considered in response.

(13 marks)

c) A manager in another business unit has stated that she uses ABB in a completely different way: “For me, ABB involves using recent estimates of cost driver rates to predict next month’s total production costs. For example, suppose my output next month will require a total of 8,000 production machine hours (PMH) and will involve 4 batches of output. Also, suppose that the cost driver rates are Rwf2,000 per PMH and Rwf5,000,000 per batch. That means my budgeted total production cost for next month is (8,000 * Rwf2,000) plus (4 * Rwf5,000,000) which is a total of Rwf36m”.

Is this a reliable means of forecasting next month’s production costs? Justify your answer.
(4 marks)

3. Zephyr also operates a factory in Gitarama which manufactures analogue communications equipment. Jim Callaghan recognises that this type of equipment is nearing the end of its product lifecycle because of the proliferation of digital technology. Consequently, Jim expects that the Gitarama factory will close within the next few years, and has commissioned R & D which will facilitate the development of a new digital communications equipment manufacturing facility on a different site within the next three years. In the meantime, however, he is anxious that the Gitarama factory should perform to its maximum potential for the remainder of its life. The Gitarama factory operates as a profit centre and its actual results for last year were as follows:

	Rwf '000	Rwf '000
Sales		840,000
Direct materials	58,800	
Direct labour	250,000	
Fixed overheads	350,000	
Sales commissions	25,200	
Total costs		684,000

The manager of the Gitarama factory, Luke Masengo, directed his accountant to establish product prices on the basis of full cost of production plus a standard percentage mark-up. However, individual sales staff are permitted to negotiate with customers to give discounts from these list prices and are paid bonuses on the basis of the achievement of sales targets. Justifying this incentive arrangement, Luke explained that "fixed overheads amounted to more than 40% of our sales last year and were by far our biggest cost category … therefore, the most sensible approach to revenue management is simply to make sure that we maximise our total sales and avoid production idle time".

At a recent meeting, Jim Callaghan pointed out to Luke that the actual results were disappointing when compared with the budgets approved by Luke for the year. In particular, actual sales were 12.5% below budget and actual profit was nearly 40% below budget. Luke offered an explanation as to why profits had declined much more sharply than sales: "my accountant had always assumed that direct labour was a variable cost, but when I asked her to analyse the composition of our workforce she concluded that the vast majority of our direct labour is actually a fixed cost".

REQUIRED:

a) On the basis of the actual results for last year, calculate the contribution-to-sales ratio and the breakeven point assuming that all direct labour is a fixed cost.

   Also, calculate the contribution-to-sales ratio and the breakeven point assuming that all direct labour is a variable cost.

   (5 marks)

b) Recommend a strategy for managing the performance of the Gitarama factory over the remainder of its useful life. **(11 marks)**

(Total: 16 marks)

4. Jim Callaghan has decided to commission a review of the way in which the performance of profit centres in the organisation is evaluated. “Although Zephyr as a whole has had disappointing profits in recent years”, said Jim, “our performance reporting system often makes it hard to pin down which specific profit centres are performing badly. In particular, it’s typically not clear whether (for example) poor performance in a centre is an indication that the profit centre is not economically viable, or whether it’s simply the case that the centre’s manager is incompetent”.

By way of illustration, you are provided with the following information for last year about two of Zephyr’s profit centres:

	Profit Centre A	Profit Centre B
Sales	Rwf5,000 m	Rwf4,000 m
Variable manufacturing cost of goods sold	25% of sales	37% of sales
Variable selling and distribution costs	10% of sales	5% of sales
Fixed costs incurred within the profit centre	Rwf2,250 m	Rwf1,520 m

In addition to the above costs, each centre was allocated certain costs from Zephyr’s corporate headquarters. These allocated costs were of two types. Firstly, each profit centre requested certain support services from headquarters (such as equipment maintenance and marketing consultancy) and was allocated a charge in proportion to service usage. These support service charges were Rwf500 m in the case of Profit Centre A and

Rwf300 m in the case of Profit Centre B. Secondly, each division was allocated a charge equal to 5% of its sales revenue in respect of miscellaneous headquarters fixed overheads. The justification offered for this allocation is that the profit centres could not exist if there were no corporate headquarters.

The two profit centres are located in different jurisdictions and therefore different tax rates apply. The tax rate on net profits is 12.5% for Profit Centre A and 30% for Profit Centre B. The authority and responsibility of profit centre managers does not include changing the location of the centres.

REQUIRED:

a) Prepare a detailed profit calculation for each of the two centres in a format which maximises the usefulness of the calculation for assessing the managerial and economic performance of the two profit centres.

(8 marks)

b) Prepare a detailed report in which you:

i. Compare and explain the managerial performances of the two centres;
ii. Compare and explain the economic performances of the two centres; and
iii. Critically evaluate the company's rules concerning the allocation of corporate headquarters costs to profit centres. This evaluation should address any conflict between the responsibility accounting principle and other considerations which may in practice be relevant to the choice of allocation rules

(12 marks)
(Total: 20 marks)

5. Two types of digital radio are manufactured at the company's factory in Kigali. The price received for each radio depends on whether it is sold to one of two major retail chain stores (Arrow Ltd. and Bow Ltd.) or to independent electrical retailers:

	Model X	**Model Y**
Price paid by Arrow Ltd.	Rwf17	Rwf18
Price paid by Bow Ltd.	Rwf18	Rwf21
Price paid by independent electrical retailers	Rwf19	Rwf22

The following additional information in relation to each model is also available:

	Model X	**Model Y**
Variable cost of production	Rwf13	Rwf15
Direct labour hours, per unit	0.2	0.3
Machine hours, per unit	0.6	0.7

The monthly capacity of the factory is limited to 10,000 direct labour hours and 15,000 machine hours. Zephyr's supply contracts with both major chain stores include minimum quantity agreements. Specifically, Arrow Ltd. requires a minimum of 13,000 radios per month, although these can be of either model (or a combination of both). Similarly, Bow Ltd. requires a minimum of 9,000 radios per month, although these can be of either model (or a combination of both).

The manager of the Kigali factory would like to determine the mix of products he should produce (and to whom he should sell them) in order to maximise his total monthly profits. Assume that the minimum quantity agreements with Arrow Ltd. and Bow Ltd. will be honoured.

REQUIRED:

a) Formulate the problem identified by the manager in linear programming form, insofar as is possible from the information provided. (Note: you should write down the objective function and constraints, but you are not required to compute the optimal solution).

(9 marks)

b) Jim Callaghan has suggested a completely new approach to distribution of the Kigali factory's products. He proposes that the radios should not be sold to retailers but should instead be sold to the general public through a website established by Zephyr especially for this purpose. You are to consider if this alternative approach to distribution could lead to significant improvements in profitability and recommend if Jim's suggestions should be implemented. Justify your recommendation.

(7 marks)
(Total: 16 marks)

END OF PAPER

SUGGESTED SOLUTIONS

SOLUTION 1: The Musasa factory

Part (a):

2010		Product X	Product Y	Product Z	Factory
	Rwf	480	920	700	
Contribution		60%	50%	40%	
	Rwf	288	460	280	1,028
Product line fixed costs	Rwf	(220)	(170)	(150)	(540)
General fixed costs	Rwf				(50)
Profit	Rwf	68	290	130	438

2011		Product X	Product Y	Product Z	Factory
	Rwf	350	430	740	
Contribution		60%	50%	40%	
	Rwf	210	215	296	721
Product line fixed costs	Rwf	(220)	(170)	(150)	(540)
General fixed costs	Rwf				(50)
Profit	Rwf	(10)	45	146	131

Part (b):

Reasons for decline between 2010 and 2011:

- Both X and Y are in the decline phases of their product lifecycles. Sales of both products declined sharply between 2010 and 2011, leading to a proportionate decrease in contribution. The problem is exacerbated by the high level of product-line fixed costs. In the case of X, the net effect is that the 2011 sales are below the breakeven level

- Although Z is still in the growth phase of its product lifecycle in 2011, this is not enough to offset the decline in profits of X any Y, for two reasons. First, the increase in sales of Z between 2010 and 2011 is small (just Rwf40,000). Second, Z has a lower contribution margin (40%) than either X or Y; Jim Callaghan's statements would suggest that this lower margin for this relatively new product is quite likely to be a result of intense competition and/or the distribution channels used.

Likely trend in 2012 and 2013:

- Sales of all three products decline in 2012 and 2013, so the problems which occurred in 2011 will get worse and profitability will decline even further. X will suffer even bigger losses than in 2011; and, in the case of Y and Z, falling sales and high product-line fixed costs may mean that either or both products (and even the factory as a whole) become loss-making before these products reach the end of their product lifecycles.

Part (c):

This approach to cost control is suboptimal for a number of reasons:

- A high proportion of the costs incurred during the manufacturing phase may be "locked in" or committed as a result of decisions made at the design stage. For example, if the design is an unnecessarily complex one then this may cause frequent costly production errors during the manufacturing process. If the accountants were involved during (rather than after) the design process, this would provide an opportunity to ensure that the finalised designs did not include any unnecessarily costly features such as these.

- Cost control at the design stage can often make a far bigger contribution to profitability than cost control during the manufacturing phase of the product lifecycle. An example is target costing, which is an iterative process of initiating changes to the product design which continues until a design is identified which can be manufactured at a cost which will provide the firm with an adequate profit margin (given the selling prices obtainable in the competitive market). This ensures the manufacturing phase does not begin until (and unless) a "profitable" product design is identified.

- Standard costs of the type currently used can play an important role in cost control, but usually only to the extent that they relate to direct costs which can be influenced by actions and decisions taken during the manufacturing phase. To play even this limited role, standards must be "realistic" which means (for example) that they should be updated for inflation as necessary and must incorporate the effect of inefficiencies arising as a result of decisions made at the design stage.

Part (d):

- A product should be discontinued before the end of its lifecycle if this is more profitable. This requires product profitability analysis on a predictive basis. For example, it is clear from the analysis in parts (a) and (b) that the last year in which Product X will be profitable is 2010. Therefore, the factory's total profits in 2011 and 2012 will be higher in those years if X is not produced in those two years, even though there is some sales demand for it in both years.

- New products need to come into production on a regular basis in order to replace older products whose lifecycles have ended (or which, like X in 2011 and 2012, should be discontinued because they are no longer profitable).

- The profitability of new products should be improved. Since the company is willing to fund "proper" R & D and investments in modern production technology, it should be possible for the company to develop products which can compete on the basis of something other than low price and may even have some unique selling points compared to competitors' products. This should enable the pattern of diminishing contribution margins on new products to be reversed and should also boost the sales volumes of new products.

Tutorial notes

- Purpose of question: This question is designed to enable candidates to integrate and apply their knowledge of a number of areas of syllabus topics 1,2 and 4, especially the following: lifecycle costing; target costing; product profitability analysis; critical appraisal of standard costing in modern manufacturing environments; alternative competitive strategies.

- Options: Variations are possible in the points made in answer to part (d) and (to a lesser extent) part (c).

- Essential components: The calculations in parts (a) and (b) would be expected to be quite close similar to the solutions above. In part (c), it is essential to identify the disadvantages of having no effective cost control until after the design is finalised. In part (d), although there are a number of valid answers which could be given, nevertheless candidates must show that (as required in the question) these are "feasible and effective". For example, simply saying "increase selling prices" or "extend the lifecycles of existing products" would not meet these criteria.

SOLUTION 2: ABB

Part (a):

Activities required for production:

Activities required for production:

- Number of production batches:

P	Q	R	S	Total
25,000 / 5,000 = 5	10,000 / 2,500 = 4	5,000 / 2,500 = 2	2,000 / 1,000 =2	13 batches

- Total PMH:

P	Q	R	S	Total
25,000 * 0.08 =2,000	10,000 * 0.04 = 400	5,000 * 0.02 = 100	2,000 * 0.05 = 100	2,600 PMH

- Number of customer orders:

P	Q	R	S	Total
25,000 / 1,000 = 25	10,000 / 250 = 40	5,000 / 125 = 40	2,000 / 100 = 20	125 orders

Resources required in order to perform the activities required for production:

- Indirect labour:

  Quality control inspection: 13 batches @ 2 hours =
  26 hours Administration: 125 orders @ 2.8 hours =
  350 hours Machine setup technicians: 13 batches @ 80 hours =
  1,040 hours

- Machine time:

  Production machines (see above)
  2,600 PMH Setup machine: 13 batches @ 4 hours =
  52 hours
  Tracking machine: 125 orders @ 3 hours =
  375 hours

Part (b):

Cost of surplus indirect labour:

Surplus labour	Available teams	Required Hours	Available Hrs	Used fraction	Surplus	Cost of team Rwf '000	Cost of surplus Rwf '000
QI	1	26	160	0.1625	0.8375	4,500	3,768.75
Admin team	4	350	160	2.1875	1.8125	3,000	5,437.50
M/c set up	8	1040	160	6.5	1.5	2,000	3,000.00
							12,206.25

How (if at all) can this surplus indirect labour cost be eliminated?

- By increasing production in the cell in response to an increase in customer demand, so that the currently surplus resources are in future used productively.

- By redeploying staff - e.g., one machine setup technician could be redeployed to another cell; the cell has less than 20% of the work required to justify a quality control inspector so this person could be shared over several cells.

- By retraining staff so that they can perform multiple functions and are therefore less likely to have idle time.

- By making staff redundant. However, this is likely to be a last resort. These are permanent staff so making them redundant might involve significant redundancy payments and would mean that their expertise was permanently lost to the company.

- By reducing the number of staff in each team – training and pay incentives. Whilst each member may cost a little more, the cost of team should be reduced and staff released could be relocated to other roles.

Surplus machine capacity:

	Production machinery	Setup machine	Tracking machine
Capacity	4,000 PMH	100 hours	1,000 hours
Required	2,600 PMH	52 hours	375 hours
Surplus	1,400 PMH	48 hours	625 hours

Comment on extent of surplus machine capacity, and appropriate actions:

- The cell clearly has far more capacity than it needs. Either the volume of activity has declined sharply or the company has made an excessive and costly investment in idle capacity.

- The possibility of reducing the capacity should be investigated, either by trading down for smaller machines or by sharing the machines across multiple users (e.g., in other cells of the same factory).

- Another possibility may be to increase machine utilisation by increasing output. However production should only be increased in response to additional demand; otherwise a costly accumulation of surplus inventory will occur.

- The original decision to acquire this amount of capacity should be reviewed with a view to improving the quality of future capital investment decision-making.

Part (c):

- No, costs cannot be reliably predicted in this way.

- Cost driver rates are measures of the resources consumed in the performance of an activity, such as the production of a unit or a batch of output. A cost driver rate typically contains a number of cost elements and the cost behaviour patterns (e.g., fixed or variable) are likely to differ greatly between one element and the next.

- The specific mistake made by this manager is assuming that cost driver rates are measures of variable cost per unit or per batch. This assumption is unlikely to be valid. For example, the rate of Rwf2,000 per PMH may include an element of machine running cost such as electricity (which is strictly variable even in the short

run) and an element of maintenance cost such as maintenance staff wages (which are likely to be fixed in the short run).

- If the manager wants to forecast next month's costs she should use an appropriate forecasting technique which incorporates realistic assumptions about the behaviour of costs in the short term. A flexible budgeting model, perhaps incorporating a regression-based cost estimation model, may be appropriate.

Tutorial notes

- Purpose of question: This question is designed to assess candidates' ability to apply activity-based budgeting (ABB) and to interpret the results.

- Options: In the calculation parts of the question, the precise sequence and format may differ but the end result should be close to what is presented here. There is also scope for variation in the discussion parts, especially part (b).

- Essential components: Candidates need to be able to perform detailed and accurate ABB calculations, including the amount and (in the case of indirect labour) the cost of surplus capacity. In the discussion points, they need to address the issues arising from the results of this analysis and in part (c) they need to be able to explain why ABB is not suitable for forecasting next month's costs.

SOLUTION 3: The Gitarama factory

Part (a):

If all direct labour is a fixed cost:

- Fixed costs = Rwf350m + Rwf250m = Rwf600m.
- Contribution = Rwf840m - Rwf58.8m - Rwf25.2m = Rwf756m.
- Contribution-to-sales ratio (C-S Ratio) = Rwf756m / Rwf840m = 90%.
- Break even point (BEP) = Rwf600m / 0.9 = Rwf666.67m.

If all direct labour is a variable cost:

- Fixed costs = Rwf350m.
- Contribution = Rwf840m - Rwf58.8m - Rwf250m - Rwf25.2m = Rwf506m.
- Contribution-to-sales ratio (C-S Ratio) = Rwf506m / Rwf840m = 60.2%.
- Break even point (BEP) = Rwf350m / 0.602 = Rwf581.028 m.

Part (b):

- Two important facts should be noted. First, the fact that actual sales were 12.5% below budget suggests that the products are approaching the end of their lifecycle even more quickly than was previously thought. Second, the accountant's revelation that the vast majority of direct labour is actually a fixed cost indicates that the contribution- to-sales ratio (C-S Ratio) is very high (close to the 90% indicated in part [a]) and that the BEP is also high (close to the Rwf667m indicated in part [a]).

- A high BEP means that a high level of sales is required in order to break even, and the apparently faster-than- expected rate of decline in sales means that sales may fall below their breakeven level sooner than might otherwise be expected. Nevertheless, the company made a healthy net profit margin of (Rwf156m / Rwf840m = 18.5% on sales) last year, so what is needed is a strategy for managing the Gitarama factory profitably over what is likely to be a short remaining profitable life.

- Given the very high C-S Ratio, Luke's preferred approach to revenue management (i.e., selling as much as possible and avoiding idle time) does indeed seem to be likely to come close to maximising profits for the remaining life of the factory. Admittedly, it could (at least in principle) be argued that some sales may be more profitable than others, and that sales staff should therefore be rewarded not on the current basis of sales but instead on the basis of the contribution earned from those sales. However, the very high C-S Ratio means that the effect on the total profits earned of such a change would be negligible.

- Although the closure of the Gitarama factory is unavoidable, nevertheless there are long-term considerations to be considered in developing a strategy for this facility. There are at least two aspects to this. First, an exit strategy must be devised. Product sales are declining at a faster-than-expected rate, so the company should regularly assess the benefits and costs of exit (such as the sale value of the Gitarama facility, compared with the project future operating profits) in order to identify the optimal time at which to close the operation. Second, although it is tempting to regard all sales of the analogue communications equipment as essentially opportunistic (i.e., of purely short-term significance, with no potential for long-term repeat business), this would be a mistake. Customers for the existing analogue equipment are very likely potential future customers for the digital communications equipment to be produced at the new factory when it begins operations, so the strategy adopted should include appropriate customer relationship management with a view to continuing the business relationship in the long term.

Tutorial notes

- Purpose of question: This question is designed to assess candidates' ability to recommend and justify a competitive strategy, including the appropriateness for that strategy of an incentive scheme and an approach to revenue management.

- Options: There is also scope for variation in points made in answer to part (b) of the question, subject to the essential components indicated below.

- Essential components: In part (a), it is essential to calculate the contribution-to-sales ratio and breakeven point on the two bases required. In part (b), the strategy recommended (and the advice given in relation to the incentive scheme and revenue management) must be appropriate for the specific situation in which the Gitarama factory finds itself, i.e., at the very late phase of the product lifecycle and with a very high proportion of fixed costs. It is essential that the information provided in the question and resulting from the analysis in part (a) should be drawn upon in answering part (b).

Solution 4: Profit centres

Part (a):

		Profit Centre A		Profit Centre B
		Rwf m		Rwf m
Sales		5,000.00		4,000.00
Variable manufacturing cost % of goods sold	25%	(1,250.00)	37.0%	1,480.00)
Variable selling and distribution costs % of sales	10%	(500.00)	5.0%	(200.00)
Controllable contribution margin		3,250.00		2,320.00
Fixed costs incurred within the profit centre		(2,250.00)		(1,520.00)
Direct profit		1,000.00		800.00
Support service charge allocated		(500.00)		(300.00)
Controllable profit		500.00		500.00
Headquarters fixed overhead (allocated)	5%	(250.00)	5.0%	(200.00)
Profit before tax		250.00		300.00
Tax	12.5%	(31.25)	30.0%	(90.00)
Profit after tax		218.75		210.00

Part (b):

Economic performance:

- This can best be assessed by reference to the bottom line net profit figure, either before or after tax.

- In terms of profit before tax (PBT), B outperformed A both in absolute terms (Rwf300m compared to Rwf250m) and as a percentage of sales (7.5% compared to 5%).

- In terms of profit after tax (PAT), B managed to outperform A in terms of PAT as a percentage of sales (5.25% compared to 4.375%) even though B suffered a much higher tax rate.

- Admittedly, A suffered a higher allocation of headquarters fixed overhead than B (because this charge is made as a flat percentage of turnover). This puts A at something of a disadvantage in comparing its PBT and PAT to those of B. Whether

this is of economic significance depends ultimately on whether the allocated amounts would be escapable (at least in the long run) if a profit centre were to be discontinued.

Managerial performance:

- Three profit figures are relevant to this comparison: controllable contribution margin (CCM), direct profit (DP) and controllable profit (CP).

- In terms of CCM, A outperformed B both in absolute terms and as a percentage of sales (65% compared to 58%).

  However, this is the least important of the three managerial performance measures since it includes only one category of controllable costs (namely, variable costs incurred with the profit centre).

- In terms of DP, A outperformed B both in absolute terms, but the two divisions performed equally well as a percentage of sales (20%). This is a fairer basis for comparison than CCM because a profit centre manager must accept responsibility for controlling the centre's fixed (as well as variable) costs.

- In terms of CP, the two centres performed equally well in absolute terms, but A performed less well than B as a percentage of sales (10% compared to 12.5%). This is the most appropriate basis for comparing managerial performance, for the reasons explained below.

- In view of the variety of signals emerging from the three measures, it is not surprising that Jim Callaghan found it difficult to identify the better- and worse- performing profit centres. Depending on the measure chosen, and on whether absolute or percentage-of-sales figures are used, it appears to be possible to argue that A outperformed B, or vice-versa, or that they performed equally well.

- However, CP provides (by far) the most valid basis for inter-centre comparison of managerial performance, because it reflects all revenues and costs under the managers' control (including support service charges, which managers have the ability to control by demanding more - or less – services). Using the CP figures as a percentage of sales (rather than the absolute figures) is more appropriate because it factors in differences of scale between the two centres. Therefore, Profit Centre B's manager has outperformed the manager of Profit Centre A.

Allocation of costs from headquarters:

- Tax savings from headquarters costs can be maximised by diverting them into Profit Centre B (where they will attract tax relief at 30%) rather than Profit Centre A (where they attract tax relief at only 12.5%).

- However, in the case of support service charges, a major benefit to Zephyr of the current systems is that profit centre managers have an incentive to limit their consumption, since they only pay for what they use. If Zephyr were to allocate all support service charges to B (including the cost of services supplied to A) then this would certainly maximise tax relief but it would remove the incentive for A to limit its service consumption. Profit Centre A would very likely demand more of the services (since they would be available at no cost to A) and this would result in Zephyr incurring higher costs.

- The same incentive problem does not apply to the headquarters fixed overheads. The current system is not only tax-inefficient; it also reduces the incentive for each cost centre to make extra sales. A lump-sum allocation of all of these costs to Profit Centre B (and none to A) would seem to be optimal because it would remove both of these problems.

Tutorial notes

- Purpose of question: This question requires candidates to address the distinction between economic and managerial performance evaluation. Part (c) is concerned with the interaction of transfer pricing and taxation.

- Options: There is some scope for variation in the points made in answer to parts (b) and (c).

- Essential components: In part (a), candidates need to present clearly the various measures of profit which are necessary in order to assess both managerial and economic performance. In part (b), the information set from part (a) must be used fully to compare the economic and managerial performance of the two divisions. In part (c), the two categories of allocated cost (support costs and fixed overheads) must be addressed separately because the conclusions for the two categories are very different.

SOLUTION 5: The Kigali factory

Part (a):

Variable names used in this solution:

XA Model X sold to Arrow Ltd.

XB Model X sold to Bow Ltd.

XR Model X sold to independent electrical retailers

YA Model Y sold to Arrow Ltd.

YB Model Y sold to Bow Ltd.

YR Model Y sold to independent electrical retailers

Contributions per unit Rwf '000:

XA Rwf17 - Rwf13 = Rwf4

XB Rwf18 - Rwf13 = Rwf5

XR Rwf19 - Rwf13 = Rwf6

YA Rwf18 - Rwf15 = Rwf3

YB Rwf21 - Rwf15 = Rwf6

YR Rwf22 - Rwf15 = Rwf7

Objective function:

- Maximise 4XA + 5XB + 6XR + 3YA + 6YB + 7YR

Constraints:

0.2XA + 0.2XB + 0.2XR + 0.3YA + 0.3YB + 0.3YR <= 10,000 Direct labour

0.6XA + 0.6XB + 0.6XR + 0.7YA + 0.7YB + 0.7YR <= 15,000 Machine hours

XA + YA >= 13,000 Supply contract (Arrow)

XB + YB >= 9,000 Supply contract (Bow)

XA, XB, XR, YA, YB, YR >= 0 Non-negativity

Part (b):

- The radios could be sold directly to the public at the prices currently charged by retailers (giving Zephyr higher unit contributions), or else Zephyr could sell to the public at prices which it currently charges to retailers (this would represent a reduction in the retail selling price and should make it possible to increase sales volumes).

- Selling through a Zephyr website should make it possible to implement a sophisticated marketing strategy. For example, the company could experiment with frequent price changes and promotional offers. Also, the website could be used to collect aggregate and individual data about buying habits, so that market offerings could be tailored for particular market segments and even individual customers based on their purchasing history.

- The website could be used to facilitate improvements in the efficiency and productivity of manufacturing. Ideally, production would occur on a just-in-time basis in response to customer orders taken online, although this would require a computer integrated manufacturing facility. However, even in the short term, the company could use site traffic and order data to track patterns in the level of demand (including peaks and troughs) and could schedule production accordingly so as to minimise surplus inventory.

- The proposed distribution approach would give Zephyr more control over the retail marketing of its products. At present, these products compete with other brands for prominence on retail stores' shelves, and Jim Callaghan's comments suggest that

retailers are unlikely to give Zephyr's product the best shelf positions. By contrast, the products would not suffer any competition for prominence on a Zephyr website, although of course it would be necessary to devise a strategy for motivating potential customers to visit the site.

Tutorial notes

Purpose of question: Part (a) requires candidates to formulate a linear programming problem. Part (b) involves assessing an opportunity for a new distribution strategy which would make use of developments in IT and e- commerce.

Options: A variety of points is acceptable in answer to part b).

Essential components: Candidates need to formulate the objective function and constraints in part (a).