CPA IRELAND | CERTIFIED PUBLIC ACCOUNTANTS

STRATEGIC PERFORMANCE MANAGEMENT

PROFESSIONAL 2 EXAMINATION - APRIL 2016

NOTES:
You are required to answer **ALL** Questions.

PRESENT VALUE TABLES ARE PROVIDED

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. The pass mark required is 50% in total over the whole paper.

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

You are reminded to pay particular attention to your communication skills, and care must be taken regarding the format and literacy of your solutions. The marking system will take into account the content of your answers and the extent to which 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.

THE INSTITUTE OF CERTIFIED PUBLIC ACCOUNTANTS IN IRELAND

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Time Allowed: 3.5 hours, plus **20 minutes** to read the paper.
You are required to answer **ALL** Questions.

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

Case study: 'Diverse Plc'

Diverse Plc is a large divisionalised company. From small beginnings several decades ago, the company has expanded significantly through a combination of acquisitions and the expansion of existing divisions. Most (although not all) divisions are engaged in manufacturing.

Pat Bradley, chief executive of Diverse Plc, has recently appointed you as a senior member of the accounting staff at the company's headquarters. He has asked you to take on what he refers to as a "roving brief" in relation to assessing the strategic performance and potential of the divisions. Pat has told you: "*I believe that when you appoint someone as a division manager then you have to let that person get on with the job. You mustn't be looking over their shoulder every week or trying to micromanage. Each division manager knows that they will be subjected to a formal performance review at the end of the year, and I believe that the knowledge of that upcoming review concentrates their minds on achieving a good outcome for the shareholders throughout the year*".

However, Pat is not complacent and this is why he has asked you take on the 'roving brief'. He has explained that he has a number of concerns which he hopes your work will throw some light on. First, he has stated that he is not convinced that the end-of-year formal performance reviews are as useful as they could be in capturing and assessing divisions' effectiveness in generating shareholder value. In this regard, Pat has told you: "*I know there is no one metric that can perfectly measure financial performance, and I fully acknowledge the efforts of division managers to embrace additional non-financial measures of performance. However, I think our performance review system still needs a lot of improvement if it is to help us assess how well each division is serving our company's shareholders*".

Pat is also concerned that some division managers may be (in his words) "*tolerating mediocrity*" in the performance of their staff. "*In my experience division managers are a lot harsher on themselves than they are on the departments within their divisions*", said Pat, "*and while that may make for harmonious interpersonal relations, nevertheless it ultimately comes at the expense of our shareholders*".

Finally, Pat is worried about the self-perpetuating tendencies of accounting and operational practices in some divisions, most especially those divisions which have been formed by the acquisition of other companies. In many such cases there has been a tendency for accounting and operational practices to be left unchanged. Examples of this include costing systems (where a desire for continuity has sometimes taken precedence over the need for strategically useful cost information) and rules governing supply chain relationships.

As the first stage in your roving brief, Pat has asked you to address the specific questions which follow and which provide specific instances of the issues about which he is concerned.

1. The Oceanic Division (Oceanic) manufactures two types of plastic casing (referred to here as Product 1 and Product 2). Within the division there is a separate manufacturing facility for each of the two products. Each manufacturing facility is evaluated as a standard cost centre. Oceanic also has a single Sales & Marketing Department which promotes and distributes both products in the European market. The Sales & Marketing Department has considerable operating autonomy. In particular, it is permitted (and expected) to change selling prices and to promote some products more (or less) heavily than originally intended in order to pursue new market opportunities as these arise.

The following is an extract from last month's budget:

	Product 1	**Product 2**	**Total**
Sales (units)	13,400	6,600	20,000
Sales revenue	€363,006	€243,540	€606,546
Direct materials cost	€81,606	€69,300	€150,906
Direct labour cost	€26,800	€35,640	€62,440
Fixed overheads	€50,000	€25,000	€75,000
Total costs	€158,406	€129,940	€288,346
Profit	**€204,600**	**€113,600**	**€318,200**

Actual results for last month were as follows:

	Product 1	**Product 2**	**Total**
Sales (units)	14,000	8,000	22,000
Sales revenue	€399,000	€280,000	€679,000
Direct materials cost	€96,600	€61,100	€157,700
Direct labour cost	€26,712	€35,200	€61,912
Fixed overheads	€52,000	€28,000	€80,000
Total costs	€175,312	€124,300	€299,612
Profit	**€223,688**	**€155,700**	**€379,388**

Each product requires one type of specialised direct material (a different material is required for each product). The manager of each manufacturing facility purchases the direct material from an external supplier. The standard and actual prices per kilogram of these materials are as follows:

	Direct material for Product 1	**Direct material for Product 2**
Standard price per kilogram	€2.10	€5.00
Actual price per kilogram paid last month	€2.30	€4.70

The Sales & Marketing Manager of Oceanic has explained that because the two products are somewhat similar to each other and are both sold in the same European market, in practice there is some competition between the two products. Of course, there is also competition from other manufacturers' products.

When last month's budget was being prepared, it was assumed that the total European market for plastic casings (including sales by the Oceanic Division and its competitors) would be 100,000 units. In fact, the European market amounted to 180,000 units sold. When asked to comment on this, the division's Sales & Marketing Department admitted that "our forecast of market size was much too conservative ... but what really counts is that the division's actual sales units were significantly higher than budgeted, so why worry when things turned out better than expected"?

No inventories of direct materials or finished goods are held. A standard marginal costing system is used.

REQUIREMENT:

(a) Analyse the Oceanic Division's sales and marketing variances in as much detail as is possible from the information provided.

(12 marks)

(b) Prepare a report for Pat Bradley in which you critically evaluate the performance of the Oceanic Division's Sales & Marketing Department, using the variance analysis information which you have determined in your answer to part (a) and any other information which is relevant.

(8 marks)

(c) Joe Murphy, the manager of the facility which manufactures Product 1, has argued that the effects of certain cost changes in relation to direct materials were beyond his control and that the effects of these supposed "uncontrollables" need to be quantified separately. These two "uncontrollable" cost changes are (i) a 25% increase in the amount of direct material per unit of output, which was a foreseeable consequence of Joe's decision to defer the preventative maintenance of production equipment, <u>and</u> (ii) a 12% increase in the list price per kilogram charged by the supplier of the direct materials for Product 1.

Perform a detailed variance analysis in respect of the direct materials used to produce Product 1. Your answer should quantify separately the effect of each of these two "uncontrollable" cost changes <u>and</u> evaluate whether it is appropriate to make this separation for purposes of assessing Joe Murphy's performance.

(10 marks)

[Total: 30 Marks]

2. The Home Division and the Away Division manufacture and sell similar products. However, the two divisions operate independently of each other in different geographical territories. Each division manager exercises her considerable autonomy in nearly all aspects of operations, and argues that in doing so she is helping to deliver maximum shareholder value from her division.

The cost of capital is 10% per annum, and the performance of each division manager is measured on a Residual Income basis. Summary Income Statements for the two divisions for the most recent year ended 31 December 2015 are as follows:

	Home Division	**Away Division**
Sales	€370,000	€490,000
Divisional variable costs	€160,000	€250,000
Divisional fixed costs	€150,000	€170,000
Divisional profits	€60,000	€70,000

For purposes of a Residual Income calculation, divisional net assets are measured at their Statement of Financial Position valuations at the year end (31 December 2015). Summary Statements of Financial Position at that date were as follows:

	Home Division	**Away Division**
Non-current assets (net book value)	€500,000	€400,000
Current assets	€200,000	€150,000
Current liabilities	€128,000	€70,000
Divisional net assets	€572,000	€480,000

The following information is also available:

- The Away Division spent €20,000 on Research & Development (R & D) in 2014 and a further €40,000 on R & D in 2015. The Away Division manager made these expenditures because she believed that they would lead to significant product improvements which would prolong product lifecycles over a 5-year period beginning in the year of expenditure in each case. There was no expenditure on R & D by the Home Division in any year, and no expenditure on R & D by the Away Division in any year before 2014.

- Each Division spent €30,000 on brand advertising in 2015. Because of the nature of this advertising, it can be assumed that it has helped (and will help) to sustain sales in each division over a 4-year period beginning in 2015.

- Both divisions created Provisions for Doubtful Debts on the express recommendation of their respective auditors. A provision of €5,000 was created by the Home Division in 2014 and a provision of €15,000 was created by the Away Division in 2015. However, given the excellent payment records of their customers, neither division manager believes that there is a real likelihood of any bad debts. Therefore, although the provisions remain in the accounts at their original amounts because of the auditor's recommendations, neither division manager increased the amount of the provision in any year after its initial creation.

- The above expenses (R & D, advertising, and the amounts provided by way of provision for doubtful debts) were written off to Income Statements as they were incurred.

- Divisional fixed costs in 2015 included depreciation calculated on a straight-line basis amounting to €50,000 in the Home Division and €40,000 in the Away Division. All divisional non-current assets were purchased one year ago (on 31 December 2014). It is estimated that the market value of the non-current assets declined during 2015 by €90,000 in the Home Division and €35,000 in the Away Division.

REQUIREMENT:

(a) Determine the Residual Income earned by each division in accordance with the company's existing performance measurement rules. <u>Then</u>, insofar as is possible from the information provided, determine the Economic Value Added (EVA™) of each division.

(13 marks)

(b) After reviewing your answer to part (a), Pat Bradley has queried the appropriateness of EVA™ in measuring the amount of shareholder value created by each division. In particular, Pat argues that your EVA™ calculation significantly overstates the shareholder value generated by the Away Division. He also argues that it takes no account of what Pat calls "extraordinarily difficult ongoing macroeconomic circumstances" faced by the Home Division in the markets in which that division operates. Prepare a memo to Pat Bradley in which you respond appropriately to these arguments. You should make full use of the elements of your calculation in part (a) to support your point.

(9 marks)

[Total: 22 Marks]

3. The Profuse Division manufactures three products, Product X, Product Y & Product Z. Selling prices for each product are set partly by reference to the cost of production as indicated by the company's product costing system. Production overheads amount to €1,710,000 per month and at present these are allocated to products on a machine hour basis. Labour costs amount to €12 per direct labour hour.

The following summary of a typical month's production activities is available:

	Product X	**Product Y**	**Product Z**
Units of output per month	2,000	5,000	10,000
Machine hours per unit	1	3	4
Direct labour hours per unit	0.75	1	1.25
Direct materials cost per unit	€20	€12	€25
Number of production setups per month	60	100	200
Number of materials movements per month	100	150	200
Number of inspections per month	70	80	90

The division is considering the implementation of an activity-based costing (ABC) system instead of its existing product costing system. To facilitate this, the division's accountant has carefully analysed the nature of the monthly overhead expenditure and has determined that the total €1,710,000 monthly overhead expenditure relates to the various activities in the following proportions:

Costs relating to operating of machinery	10%
Costs relating to production setups	40%
Costs relating to materials movements	25%
Costs relating to inspections	25%
Total	100%

REQUIREMENT:

(a) Using the information provided above, estimate the production cost per unit for each of the three products using:

(i) the division's existing product costing system, and
(ii) an ABC system. (13 marks)

(b) Compare and contrast the effects of the two costing systems in this case. In particular, provide a specific assessment as to why the costs of each product differ between each of the two systems and critically evaluate whether and how the division should use the activity-based costing information as a basis for revising its product selling prices.

(7 marks)

[Total: 20 Marks]

4. The Critical Division is an online retailer of consumer products such as books and music. The division has exceeded its profit targets in recent years but the division manager, Mary Boyle, is not complacent about future prospects. Mary has just received the report of a consultant who she hired to carry out a strategic assessment of the division. The consultant was free to choose whatever metrics he felt provided the most important indication of the division's strategic performance. The data relates to the most recent financial year and has been collected for both the Critical Division and on an estimated basis for a major competitor. Both the Critical Division and the major competitor sell directly to the public from their websites and both offer customers completely free postage and packing.

The following data has been provided by the consultant:

	Critical Division	**Competitor**
Number of products offered for sale at any one time	20,000	15,000
Digital media as a percentage of all items sold	10%	15%
Average delivery cycle time for physical items (working days)	4	7
Physical items returned by customers as damaged in transit	0.5%	0.25%
Product prices as percentage of recommended retail prices (average)	90%	88%
Average number of orders per customer per year	12	8

REQUIREMENT:

(a) Critically evaluate the importance of each of the six metrics listed above in terms of strategic performance <u>and</u> (for each metric) briefly assess the performance of the Critical Division as compared with its competitor.

(12 marks)

(b) Recommend and justify two other significant performance metrics which should be used to assess the strategic performance of the Critical Division and its competitor.

(4 marks)

[Total: 16 Marks]

5. The Smartphone Division manufactures and sells a range of smartphones, and also manufactures many of its own components for these products. There are a number of profit centres within the Smartphone Division, including the Phones Profit Centre (PPC) and the Batteries Profit Centre (BPC). In recent months PPC, has been highly profitable but BPC has reported significant losses. Asked to explain BPC's disappointing performance, BPC's manager has complained that the division has required it to sell all output to PPC even though rival phone manufacturers in other companies would be willing to pay much higher prices for BPC's batteries.

Note: In answering the questions below, assume that issues relating to taxation can be ignored.

REQUIREMENT:

(a) Critique the most likely reasons why the Smartphone Division requires BPC to sell all of its output to PPC.

(4 marks)

(b) Recommend and justify appropriate changes that the Smartphone Division would make to the policy requiring BPC to sell all of its output to PPC <u>and / or</u> to the way in which BPC's performance is assessed?

(8 marks)

[Total: 12 Marks]

[Total: 100 Marks]

END OF PAPER

SUGGESTED SOLUTIONS

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SOLUTION 1

(a) Workings:

	← BUDGET → PRODUCT 1	← BUDGET → PRODUCT 2	← ACTUAL → PRODUCT 1	← ACTUAL → PRODUCT 2
Selling Prices, per unit	€363,006 / 13,400 = €27.09	€243,540 / 6,600 = €36.90	€399K / 14,000 = €28.50	€280K / 8,000 = €35
Standard VC, per unit	(€81,606 + €26,800 = €108,406) / 13,400 = €8.09	(€69,300 + €35,640 = €104,940) / 6,600 = €15.90		
Standard contribution per unit	€19	€21		

Weighted average standard contribution(13,400/20,000 = 0.67)*€19 + (6,600/20,000 = 0.33)*€21 = €19.66
Standard market share percentage (SMS)20,000 / 100,000 = 20%

Sales Price Variances:

	Actual Price	Budget Price	Actual Quantity	SPV = (AP-BP)*AQ
PRODUCT 1	€28.50	€27.09	14,000	€19,740 F
PRODUCT 2	€35	€36.90	8,000	€15,200 U
Total				€4,540 F

Sales Volume Variances (not essential if SMV and SQV Variances below are shown):

	Actual Quantity	Budget Quantity	Standard Contribution per Unit	SVV = (AQ-BQ) *Standard contribution
PRODUCT 1	14,000	13,400	€19	€11,400 F
PRODUCT 2	8,000	6,600	€21	€29,400 U
Total				€40,800 F

Sales Mix Variance:

	Actual Quantity in actual mix	Actual Quantity in standard mix [67:33]	Standard Contribution per Unit	SMV = (AQ_{AM}-AQ_{SM})* SCPB
PRODUCT 1	14,000	14,740	€19	€14,060 U
PRODUCT 2	8,000	7,260	€21	€15,540 F
Total	22,000	22,000		€1,480 F

Sales Quantity Variances:
(AQ 22,000 – BQ 20,000) * €19.66 weighted average standard contribution = €39,320 F

OR SQV =

	Actual Quantity in standard mix [67:33]	**Budgeted Quantity in standard mix**	**Standard Contribution per Unit**	**SQV**
PRODUCT 1	14,740	13,400	€19	€25,460 F
PRODUCT 2	7,260	6,600	€21	€13,860 F
Total	22,000	20,000		€39,320 F

Market Size Variance (MSZV):

Actual Market Size	**Budget Market Size**	**Change in Market Size (CMS)**	**SMS**	**Weighted average Standard Contribution (SC)**	**MSZV = (CMS*SMS) *SC**
180,000	100,000	80,000	20%	€19.66	€314,560 F

Market Share Variance (MSHV):

Actual Quantity	**Actual Market Size**	**SMS**	**Standard Share of Actual Market (SSAM)**	**Weighted average Standard Contribution (SC)**	**MSHV = (AQ- SSAM) * SC**
22,000	180,000	20%	180,000 *20% = 36,000	€19.66	€275,240 U

(12 marks)

(b) The most noticeable trend is the catastrophic decrease in market share, from a standard 20% to an actual (22 / 180 = 12.22%). A plausible reason for this was the Sales & Marketing Department's very significant underestimation of the actual market size. This would have quite possibly have led the manufacturing facilities to limit their output levels to far less than the market demanded, and thus constrained the Sales & Marketing Department in its ability to capitalise on the greatly expanded market opportunities.

Although the Sales & Marketing Department has authority to vary the product mix, it is not clear that this is of itself very significant in financial terms since the two products have fairly similar standard contributions per unit (€19 vs. €21); hence the small sales mix variance. In the case of Product 2 it is disappointing that an admittedly impressive favourable SQV has been achieved only by cutting the selling price and thus generating a significant unfavourable SPV for this product. It is surprising that this should be necessary in such a greatly expanding market. Perhaps a more aggressive mix strategy in favour of Product 1 would have delivered a more profitable outcome since it proved possible to deliver favourable variances for sales price AND quantity for that product.

(8 marks)

(c) **Direct Materials Variances (Product 1 Only)**

Working: Basic Variances:

Direct Materials Price Variance:

Actual Price per kg	**Standard Price per kg**	**Actual Quantity**	**RMPV**
€2.30	€2.10	€96,600 / €2.30 = 42,000 kg	€8,400 U

Direct Materials Usage Variances:

AQ	SQ	SP	RMUV
42,000 kg	(€81,606 / €2.10 = budget 38,860 kg / 2,970 = standard 2.9 kg p.u. of output) * 14,000 = 40,600 kg	€2.10	€2,940 U

Analysing separately the purportedly "uncontrollable" events: planning and operational variances:

XASQ = 40,600 kg.
XPSQ = 40,600 * 125% = 50,750 kg.
AQ = 42,000 kg.
XASP = €2.10
XPSP = €2.10 * 112% = €2.352
AP = €2.30

Planning variances:

Price: (XPSP – XASP) * XPSQ = (€2.352 - €2.10) * 50,750 = €12,789 U
Use: (XPSQ – XASQ) * XASP = (50,750 – 40,600) * €2.10 = €21,315 U

Operational variances:

Price: (AP - XPSP) * AQ = (€2.30 - €2.352) * 42,000 = €2,184 F
Use: (AQ – XPSQ) * XPSP = (42,000 – 50,750) * €2.352 = €20,580 F

Evaluation:

- The basic variances show below-budget performance in relation to both direct materials price and usage. Yet Joe is asking to be absolved from the effect of certain cost overruns which he must accept responsibility for, since he is the cost centre manager and they occur from events which are reasonably within his control.

- He is responsible for negotiating with suppliers, or switching suppliers if necessary, rather than just passively accepting the 12% increase. Joe paid a price per kilogram for direct materials which was approximately 9.5% above budget, but he seems to expect a positive evaluation for not paying the full 12%.

- Joe must also accept the consequences of the lack of maintenance. As manager of the facility it is his job to ensure that the maintenance is carried out as necessary. If the maintenance is not carried out then more material per unit of output is used and Joe must accept responsibility for the cost consequences of this in full.

(10 marks)

Tutorial notes

- *Purpose of question:* To require candidates to carry out an advanced variance analysis, including selecting, calculating, and interpreting the variances which provide information content for two different types of responsibility centre (Syllabus Topic 2).

- *Options:* There is scope for variation within the detailed calculation procedures required in parts (a) and (c). A variety of valid points could be made in answer to part (b) and the discussion element of part (c), subject to the "essential elements" below.

- *Essential components:* Candidates need to be able to calculate the variances in appropriate detail using the information available, and to assess the performance of the Sales & Marketing Department. They must also be able to critically appraise the suggestion that certain variances are uncontrollable by the manufacturing facility manager in part (c). In part (b) it is essential to identify and critically evaluate the performance problems issues arising from the very significant underestimate of the total market size.

[Total: 30 marks]

SOLUTION 2

(a) Residual Income

	Home Division	**Away Division**
Divisional profit	€60,000	€70,000
Capital charge	10% * €572,000 = €57,200	10% * €480,000 = €48,000
Residual income	€2,800	€22,000

Economic Value Added (EVA)™

Adjusted profit:

	Home Division	**Away Division**
Divisional profit	€60,000	€70,000
Add back: straight line depreciation	€50,000	€40,000
Less: economic depreciation	(€90,000)	(€35,000)
Less: Amortisation of 2014 R & D expenditure		20% * €20K = (€4,000)
Add back: Capitalised 2015 R & D expenditure		80% * €40K = €32,000
Add back: Capitalised 2015 advertising expenditure	75% * €30K = €22,500	75% * €30K = €22,500
Add back: Economically unjustified provision for doubtful debts charged to 2015 Income Statement		€15,000
Adjusted profit	€42,500	€140,500

Adjusted net assets:

	Home Division	**Away Division**
Net assets per Statement of Financial Position	€572,000	€480,000
Adjustment to restate non-current assets at market value (difference between economic and straight-line depreciation)	+ €50K – €90K = - €40,000	+ €40K – €35K = €5,000
Unamortised 2014 R & D expenditure		60% * €20K = €12,000
Unamortised 2015 R & D expenditure		80% * €40K = €32,000
Unamortised 2015 advertising expenditure	75% * €30K = €22,500	75% * €30K = €22,500
Adjustment to restate debtors at collectable amount (elimination of provision)	€5,000	€15,000
Adjusted net assets	€559,500	€566,500

EVA™:

	Home Division	**Away Division**
Adjusted profit	€42,500	€140,500
Capital charge	10% * €559,500 = €55,950	10% * €566,500 = €56,650
EVA™	(€13,450)	€83,850

(13 marks)

(b) At first glance, it is surprising that the Away Division has generated additional shareholder value of €83,850 when the Residual Income is a much more modest €22,000. However, close scrutiny reveals that €83,850 is an appropriate measure of the value created.

The Away Division's non-current assets declined in economic value by an amount (€35K) which is less than the straight-line depreciation (€40K). Therefore the "accounting" figures understate the shareholder value generated by €5K.

The Away Division made significant investments in intangible fixed assets (viz., R & D and advertising) which are expected to generate value for shareholders over a number of years. Accordingly it is appropriate that these amounts should be amortised gradually over the years expected to benefit from their use. Thus the approach adopted here recognises the long-term value of these investments instead of treating them as a drain on current-year resources (as the basic accounting calculation does).

The basic accounting calculation understates the realistic collectable value of trade debtors by €15,000 in the case of the Away Division. This not only undervalues an asset but also (because the provision was created in the current year) creates an entirely fictitious expense in the profit calculation. Therefore a realistic assessment of the shareholder value created must recognise that there was (in reality) no such expense or loss of value.

As for the argument that the Home Division faced "extraordinarily difficult economic circumstances", any losses arising out of these difficult circumstances are nevertheless real and must be included in any realistic measure of the amount of shareholder value created (which is an economic measure, not a managerial one). If any of these losses are "uncontrollable" by the division manager, then a separate calculation of the controllable performance of the manager can be carried out if desired.

(9 marks

Tutorial notes

Purpose of question: To test candidates' ability to evaluate divisional performance, including the selection, implementation, and evaluation of an EVA™ performance metric (Syllabus Topic 3).

Options: Part (a) must include a suitable calculation (see below) but there is some limited scope for variations, mainly in layout and sequencing. There is also scope for acceptable variation in the points which could validly be made in answer to part (b) although there are some essential issues which must be raised.

Essential components: Candidates must present suitable calculations of Residual Income and the amount of shareholder value created. They must be able to comprehensively defend the method they have adopted by reference to the specific adjustments made in this case, and they must explain that it provides a measure of economic performance which would require further adjustment if a measure of managerial performance were required.

[Total: 22 marks]

SOLUTION 3

(a) Existing product costing system

Total MH:

Product X	**Product Y**	**Product Z**	**Total**
2,000 * 1 = 2,000	5,000 * 3 = 15,000	10,000 * 4 = 40,000	57,000

Overhead allocation rate = €1,710,000 / 57,000 MH = €30 per MH

Unit costs:

	Product X	**Product Y**	**Product Z**
Direct labour	0.75 * €12 = €9	1 * €12 = €12	1.25 * €12 = €15
Direct materials	€20	€12	€25
Direct cost per unit	**€29**	**€24**	**€40**
Production overheads	1 MH * €30 = €30	3 MH * €30 = €90	4 MH * €30 = €120
Product cost per unit	**€59**	**€114**	**€160**

ABC

Cost pools:
- Operation of machinery = 10% * €1,710,000 = €171,000.
- Production setup = 40% * €1,710,000 = €684,000.
- Materials movements = 25% * €1,710,000 = €427,500.
- Inspections = 25% * €1,710,000 = €427,500.

Cost driver rates:

Activity	**Costs in pool**	**Activity level**	**Cost driver rate**
Operation	€171,000	57,000 MH	€3 per MH
Setup	€684,000	60 + 100 + 200 = 360 setups	€1,900 per setup
Movement	€427,500	100+150+200 = 450 movements	€950 per movement
Inspection	€427,500	70+80+90 = 240 movements	€1,781.25 per movement

Total OH traced to each product on an ABC basis:

	Product X	**Product Y**	**Product Z**
Operation	2,000 MH * €3 = €6,000	15,000 MH * €3 = €45,000	40,000 MH * €3 = €120,000
Setup	60 setups * €1,900 = €114,000	100 setups * €1,900 = €190,000	200 setups * €1,900 = €380,000
Movement	100 movements * €950 = €95,000	150 movements * €950 = €142,500	200 movements * €950 = €190,000
Inspection	70 inspections * €1,781.25 = €124,687.50	80 inspections * €1,781.25 = €142,500	90 inspections * €1,781.25 = €160,312.50
Total OH	**€339,687.50**	**€520,000**	**€850,312.50**

Unit costs on an ABC basis:

	Product X	Product Y	Product Z
Direct cost per unit (as before)	€29	€24	€40
Production overheads	€339,687.50 / 2,000 = €169.84 rounded	€520,000 / 5,000 = €104	€850,312.50 / 10,000 = €85.03 rounded
Product cost per unit	**€198.94 rounded**	**€128**	**€125.03 rounded**

(13 marks)

(b) The unit costs of each product have changed very significantly. Products X and Y (the two lowest-volume products) generate much more overhead than previously thought and Product Z (the highest-volume product) generates much less overhead, as the following table shows:

	Product X	Product Y	Product Z
OH cost per unit: Existing costing system	€30	€90	€120
OH cost per unit: ABC	€169.84 rounded	€104	€85.03 rounded
Units of output	2,000	5,000	10,000

Why is this? Products X and Y take less MH per unit to make, but these products require a disproportionately high share of the other overhead-causing activities. MH are the cost driver for only 10% of OH costs; the other 90% are driven by other activities which Products X and Y demand in amounts which are greater than their small production volumes would suggest. The fact that Product Z provides better value for these overhead-driving activities is shown by the following table of the number of units of output per instance of each activity:

	Product X	Product Y	Product Z
Setup	2,000 units / 60 setups = 33.33 units per setup	5,000 units / 100 setups = 50 units per setup	10,000 units / 200 setups = 50 units per setup
Movement	2,000 units / 100 movements = 20 units per movement	5,000 units / 150 movements = 33.33 units per movement	10,000 units / 200 movements = 50 units per movement
Inspection	2,000 units / 70 inspections = 28.57 units per inspection	5,000 units / 80 inspections = 62.5 units per inspection	10,000 units / 90 inspections = 111.11 units per inspection

It is stated in the question that selling prices are set partly by reference to the costs of production. Given that the ABC data has revealed that unit costs of production are very different from what was previously believed, there would appear to be a case for increasing the selling price of Products X and Y while decreasing the selling price of Product Z. The division could point out to its customers that this set of changes is designed to be revenue-neutral and to ensure that prices are "fairer" in the sense of more closely reflecting the costs of production.

Another argument in favour of such changes is that prices are more likely to be competitive. At present Products X and Y are likely to be selling at prices far lower than the market will bear while Product is likely to be overpriced and potential customers for this product are lost.

However, before implementing significant price changes, the division must reflect on what changes the market will bear. The statement that prices are set "partly" by reference to the costs of production is a vague one. It might be, for example, that the principal consideration in setting prices is the need to match competitors' prices for similar products, in which case radical price changes may not be acceptable to customers.

(7 marks)

Tutorial notes

Purpose of question: To require candidates to implement an activity-based costing (ABC) system as an alternative to a traditional costing system, to assess the underlying reasons for the results, and to critically evaluate the usefulness of the ABC information as basis for product selling price changes (Syllabus Topic 1).

Options: Although the substantive content of both parts must satisfy the requirements of the question (see below) nevertheless there is scope for variation as to how this is approached, especially in part (b). The model solution to part (b) as presented here includes two sets of calculations in order to illustrate points made; conceivably additional narrative could be used to make the points with sufficient clarity so that calculations would not be needed in answer to this part.

Essential components: Candidates must perform the detailed analysis under two costing systems in order to answer part (a) satisfactorily. In part (b) a critical evaluation making use of the information specific to the situation although there are acceptable variations as to format of part (b) as indicated above.

[Total: 20 marks]

SOLUTION 4

(a) **Number of products:** Unlikely to be of major strategic importance. Both Critical Division and the competitor offer large enough product ranges to generate significant web traffic, and it is unlikely that an online shopper would be deterred from visiting a website just because a specific item is not in stock. The online shopper can easily buy that particular item from another website with minimal additional effort, and since there is free P & P there is no incentive for a shopper to necessarily buy everything from one site. Insofar as there is a difference, Critical Division's bigger product range enables it to make more sales than the competitor, but will not necessarily create more customer loyalty.

Digital media %: Again, it is not clear that there is a strategic advantage in having a higher (or lower) concentration on digital media. It depends on the profitability of each type of product and the trend in customer demand (e.g., digital books remain a much smaller niche than physical books). The free P & P offered to customers creates a cost which must be absorbed by the retailers in the case of physical products, but there is no significant marginal cost in delivering digital products. So it is not clear which retailer's percentage is preferable.

Delivery cycle time: This is of considerable strategic importance; the shorter the cycle, the more quickly the customer's "need" for the product is fulfilled. Rapid delivery cycle time can help a retailer build market share and even make buyers tolerant of higher prices than those available from other retailers. The Critical Division's time of 4 days puts it in a much stronger position than its competitor (7 days) and this is potentially a significant foundation for long-term financial success.

Items returned: In relative terms, Critical Division is receiving twice as many returns as the competitor (0.5% vs 0.25%). To an extent, this reduces the competitive advantage of the faster delivery cycle time: there is little advantage to a customer in receiving a delivery quickly and then having to return it. Reputational damage is likely to result so that not only the individual customer is affected. The competitor enjoys an advantage with only 1 in 400 items being returned.

Product prices as % of RRP: Pricing is part of virtually any strategy, so this variable is important. Of course there are both "low price" and "high price" strategies, so it is not clear whether the Critical Division or its competitor has the more favourable score on this metric. On the one hand, the competitor appears to have marginally lower prices which should be a source of competitive advantage. However, as indicated above, Critical's superior delivery cycle time may make customers less price-sensitive and thus enable Critical to "get away with" charging higher prices and earning bigger margins. Another consideration is that since Critical Division and its competitor do not sell exactly the same product range it is not clear that the difference in "average" prices is reflected in differences in the prices of specific items.

Average number of orders per customer per year: This metric is not a good indicator of strategic performance because it is open to two completely different interpretations. On the one hand, more orders per year may indicate a more loyal customer base and in that sense Critical Division may have achieved a better strategic performance than its competitor. Alternatively, it might simply be the case that the average number of items per customer order is smaller in the case of Critical Division than in the case of its competitor. Given the economies of scale (in terms of P & P costs absorbed by the retailer) a small number of large orders is likely to be preferable to a large number of small orders.

(12 marks)

(b) Number of new products added to the range offered for sale each month. The first step in generating sales is to drive traffic to the website, and shoppers are more likely to visit a site if new items are on offer.

Average size of physical customer orders. For the reasons explained in the answer to part (a), it is necessary to know this average size in order to place a meaningful interpretation on the "average number of orders per customer per year" which is included in the consultant's report.

(4 marks)

Tutorial notes

Purpose of question: To require candidates to critically evaluate the strategic significance of certain nonfinancial performance measures in the context of an online retailer and its competitor, and to suggest additional measures (Syllabus Topics 4 and 5).

Options: A wide variety of valid points can be made in answer to both parts, subject to candidates' answers fulfilling the essential criteria stated below.

Essential components: In part (a), candidates must be able to critically evaluate the strategic importance and limitations of each metric, and to briefly assess the importance of the Critical Division and its competitor in terms of each metric. In part (b) candidates must state and justify two strategically significant performance metrics.

[Total: 16 marks]

SOLUTION 5

(a) The Smart Phone Division may regard its batteries as a source of competitive advantage for its mobile phones, which the Division may regard as its strategically most important products.

For example, the batteries may be technically superior to those which PPC could purchase from external battery suppliers, or they may simply be cheaper for batteries of equivalent quality. Thus if the BPC batteries were to be sold to other manufacturers then the profitability or competitive strength of PPC's mobile phones would be undermined.

The Smart Phone Division may believe that allowing other manufacturers to use its product (batteries) in their phones would create commercial vulnerability after the current period. For example, these other manufacturers might reverse-engineer the batteries and thus piggyback on the Smart Phone Division's R & D, or offer lower prices for the batteries in future price negotiations.

(4 marks)

(b) One possibility is for the Smart Phone Division to remove the position of PPC as exclusive purchaser, and allow PPC to bid freely against external buyers of the buyers. In principle this should lead to optimal allocation of the batteries as between internal transfer and external sale, allowing each division to maximise its open market profits. The problem with this solution is that it is unlikely to be acceptable in practice: the battery is not an undifferentiated commodity product and the Smart Phone Division is right to be cautious about making it freely available for purchase by rival phone manufacturers.

Another possibility is to leave the restriction in place that requires all batteries to be sold by BPC to PPC. For the reasons explained above, there may be sound strategic reasons for doing this. However in this situation BPC has no effective power in price negotiations and therefore cannot realistically make a profit, so a different performance evaluation system is needed for that centre. This may involve (i) treating it as a standard cost centre with additional metrics for quantity and quality of batteries produced, or (ii) retaining the profit centre structure but with modifications such as a dual-rate transfer pricing system whereby BPC receives a monthly fixed transfer from PPC in addition to reimbursement of variable costs of batteries.

(8 marks)

Tutorial notes

Purpose of question: To require candidates to address performance measurement issues in a modern manufacturing environment where an organisation has made an important choice concerning its supply chain (Syllabus Topic 4).

Options: Valid alternative points can be made in answer to both part (a) and part (b), subject to candidates' answers fulfilling the essential criteria stated below.

Essential components: Candidates must identify strategically credible reasons for the existing arrangement in part (a), and in part (a) they must state and justify possible changes encompassing changes to the supply arrangement and/or the type of performance evaluation used for the profit centre whose freedom of action is constrained at present.

[Total: 12 marks]