

Operational Level Paper
P1 –Performance Operations
Examiner's Answers

SECTION A

Answer to Question One

1.1 The correct answer is A.

1.2 The correct answer is C.

1.3 The maximum regret if the Ayefield venue is chosen is \$ 810,000
The maximum regret if the Beefield venue is chosen is \$ 590,000
The maximum regret if the Ceefield venue is chosen is \$ 480,000
The maximum regret if the Deefield venue is chosen is \$ 450,000

Therefore if NG wants to minimise the maximum regret it should stage the entertainment event at the Deefield venue.

The correct answer is D.

1.4 $EOQ = \sqrt{\frac{2C_o D}{C_h}}$

Where:

C_o = (cost per order) = \$100

D = (annual demand) = 39,000 units

C_h = (cost of holding one unit for one year) = \$1.60

$$EOQ = \sqrt{\frac{2 \times 100 \times 39,000}{1.6}}$$

The correct answer is B.

- 1.5** JD must be certain that there is sufficient inventory available to satisfy demand throughout the two weeks lead time. Therefore JD must place an order for storage crates when there is the equivalent of two weeks demand in inventory.

The reorder level is therefore $39,000 \times \frac{2}{52} = 1,500$ units.

The correct answer is D.

- 1.6** Payment will be made 23 days early.

Number of compounding periods = $365/23 = 15.86957$

$$1 + r = (1.00/0.98)^{15.86957}$$

$$1 + r = 1.37797$$

The effective annual rate of the early settlement discount is 37.8%

- 1.7** The first lease payment is made in advance i.e. in Year 0

Time	Cash flow \$	Discount factor 12%	Present value \$
0	(4,000)	1.0000	(4,000)
1 - ∞	(4,000)	$1 / 0.12 = 8.3333$	(33,333)
Present Value			(37,333)

The present value of the lease payments is \$37,333.

1.8

(i)

Contribution per unit = $\$20 - (\$6.00 + \$3.50) = \10.50

Number of units sold = 400 units + 5,000 units – 900 units = 4,500 units

Marginal costing statement

	\$
Sales revenue (4,500 x \$20)	90,000
Variable costs (4,500 x \$9.50)	<u>42,750</u>
Total contribution (4,500 x \$10.50)	47,250
Fixed production overheads	<u>29,500</u>
Marginal costing profit	<u>17,750</u>

(ii)

Profit under absorption costing =	\$20,700
Profit under marginal costing =	<u>\$17,750</u>
Difference =	<u>\$ 2,950</u>

Fixed overhead absorption rate = $\$29,500 / 5,000 \text{ units} = \5.90 per unit

Increase in inventory = 900 units - 400 units = 500 units

Fixed overhead not charged to profit under absorption costing =
500 units x \$5.90 per unit = \$2,950

SECTION B

Answer to Question Two

(a)

	<i>January \$000</i>	<i>February \$000</i>	<i>March \$000</i>
Cash sales	75	80	90
Receipts from credit sales (W1)	245	253	254
Total receipts	320	333	344
Payment for purchases (W2)	(180)	(195)	(200)
Expenses paid	(122)	(123)	(123)
Forklift trucks		(100)	
Total payments	(302)	(418)	(323)
Net cash	18	(85)	21
Opening balance	15	33	(52)
Closing balance	33	(52)	(31)

Workings

(W1) Credit sales – receipts

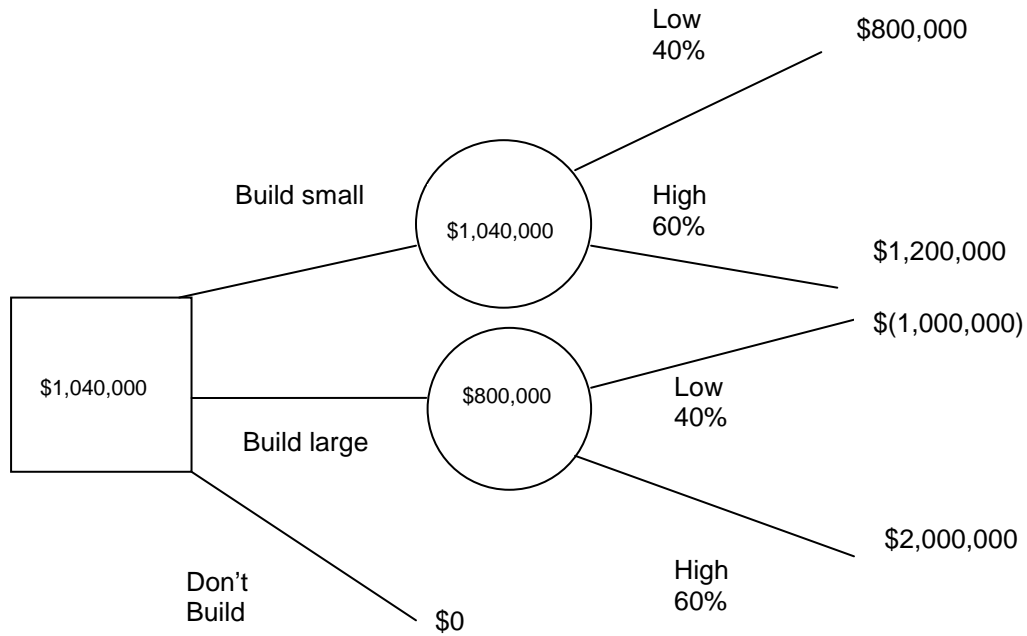
	<i>Total sales \$000</i>	<i>January \$000</i>	<i>February \$000</i>	<i>March \$000</i>
October	250	20		
November	250	25	20	
December	250	200	25	20
January	260		208	26
February	260			208
Total		245	253	254

(W2) Credit purchases – payments

	<i>Total purchases \$000</i>	<i>January \$000</i>	<i>February \$000</i>	<i>March \$000</i>
November	180	45		
December	180	135	45	
January	200		150	50
February	200			150
Total		180	195	200

(b)

(i) Decision tree: Build a new restaurant or not



(ii)

Expected value with the survey
= $(0.4 \times \$800,000) + (0.6 \times \$2,000,000)$
= $\$320,000 + \$1,200,000$
= $\$1,520,000$

Expected value without the survey
= $\$1,040,000$ (see diagram)

Therefore maximum value of the survey = $\$1,520,000 - \$1,040,000 = \$480,000$

(c)

Examiner's note: the question asks for two sources. Examples of sources that would be rewarded are given below.

Bank references

These may be provided by the customer's bank to indicate the customer's financial standing. However, the law and practice of banking secrecy determines the way in which banks respond to credit enquiries, which can render such references uninformative, particularly if the company is experiencing financial difficulties.

Trade references

Companies already trading with the customer may be willing to provide a reference. This can be extremely useful, providing that the companies approached are a representative sample of all of the customer's suppliers. Such references can be misleading, as they are usually based on direct credit experience and contain no knowledge of the underlying financial position of the customer.

Financial statements

The most recent financial statements of the customer can be obtained either direct from the customer or for limited companies from Companies House. While subject to certain limitations, past accounts can be useful in assessing the creditworthiness of the customer. In circumstances where the credit risk appears high or substantial levels of credit are required, the supplier may ask to see evidence of the customer's ability to pay in accordance with proposed payment terms. This would require access to internal future budget data.

Personal contact

A representative of the supplier might visit the business premises of the customer. Through visiting the premises and interviewing the senior management, the representative of the supplier should gain an impression of the efficiency and financial resources of the customer and the integrity of its management. The management will however be keen to give the best impression of the company and the standard of the premises and other resources will reflect past rather than present financial standing.

Past experience

If the credit limit is being determined for an existing customer, the supplier will have access to their past payment record. However, if it is a key supplier to the customer, the supplier should be aware that many failing companies preserve solid payment records with key suppliers in order to maintain supplies, but only do so at the expense of other creditors. Indeed, many companies go into liquidation with excellent payment records with key suppliers.

(d)

Examiner's note: the question asks for three benefits. Examples of points that would be rewarded are given below.

Increased awareness of the impact of environment related activities on their financial statements

Organisations that alter their management accounting practices to incorporate environmental concerns will have greater awareness of the impact of environment related activities on their financial statements. This is because conventional management accounting systems tend to attribute many environmental costs to general overhead accounts with the result that they are "hidden" from management.

Cost reduction

Organisations which adopt environmental cost management principles are more likely to identify and take advantage of cost reduction and other improvement opportunities.

Improved decision making

A concern with environmental costs will also reduce the chances of employing incorrect pricing of products and services and taking the wrong options in terms of mix and development decisions. This in turn may lead to enhanced customer value while reducing the risk profile attaching to investments and other decisions which have long term consequences.

Avoidance of costs of failure

A lack of concern for the environment can result in significant costs, for example the associated costs of clean-up and financial penalties associated with environmental disasters.

Avoidance of damage to the company's reputation

A concern with environmental costs will also reduce the risk of damage to the company's reputation. The well publicised Brent Spar incident that cost the oil company Shell millions of pounds in terms of lost revenues via the resultant consumer boycott is an example of the powerful influence that environmental concern has in today's business environment. Shell learned the lesson, albeit somewhat belatedly and as a result completely re-engineered their environmental management system.

(e)

(i)

\$ 80 - \$40 = \$40	Joint probability is 0.25 x 0.20 =	0.05
\$100 - \$40 = \$60	Joint probability is 0.30 x 0.20 =	0.06
\$100 - \$60 = \$40	Joint probability is 0.30 x 0.55 =	0.165
\$120 - \$40 = \$80	Joint probability is 0.45 x 0.20 =	0.09
\$120 - \$60 = \$60	Joint probability is 0.45 x 0.55 =	0.2475
\$120 - \$80 = \$40	Joint probability is 0.45 x 0.25 =	<u>0.1125</u>
		<u>0.725</u>

Alternatively:

\$ 80 - \$40 = \$40	Joint probability is 0.25 x 0.20 =	0.05
\$100 - \$40 = \$60	Joint probability is 0.30 x 0.20 =	0.06
\$100 - \$60 = \$40	Joint probability is 0.30 x 0.55 =	0.165
At a selling price of \$120, the contribution per unit under all three alternatives is greater than \$40 therefore probability is		
		<u>0.450</u>
		<u>0.725</u>

(ii)

Expected value of selling price per unit

$$(\$80 \times 0.25) + (\$100 \times 0.30) + (\$120 \times 0.45) = \$104$$

Expected value of variable cost per unit

$$(\$40 \times 0.20) + (\$60 \times 0.55) + (\$80 \times 0.25) = \$61$$

$$\text{Expected value of contribution per unit} = \$104 - \$61 = \$43$$

(f)

Examiner's note: the question asks for three benefits. Examples of benefits that would be rewarded are given below.

Planning

Budgeting forces an organisation's management to look ahead and set performance targets. This ensures that management anticipates any future problems and gives the organisation direction. It also ensures that managers are aware of their own targets and responsibilities and how they relate to those of other managers within the organisation.

Control/Evaluation

The budget acts as a control mechanism, with actual results being compared with budget. Appropriate actions can then be taken to correct any deviations from plan. The budget also provides an internal benchmark against which performance can be evaluated. The performance measured may be that of a department or division or of an individual manager.

Co-ordination

The budget ensures actions of different parts of the organisation are co-ordinated and reconciled otherwise managers take actions for the benefit of their own part of organisation that may not benefit the organisation as a whole. The budget compels managers to examine the relationship between their own operation and other departments.

Communication

Every part of the organisation needs to be informed of plans, policies and constraints. In that way, everyone should have a clear understanding of the part they need to play in achieving the budget. It is through the budget that top management communicates its expectations to lower level managers and in return lower level managers can communicate what they consider to be achievable targets.

Motivation

Another benefit of budgeting is to set targets to motivate managers and optimise their performance. The budget is a useful device for influencing managers' behaviour and motivating managers to perform in line with the organisation's objectives. It provides a standard which managers may be motivated to achieve. It can also encourage inefficiency and conflict between managers particularly if the budget is imposed from above, whereby it may act as a threat rather than as a challenge.

SECTION C

Answer to Question Three

(a)

Reconciliation Statement

Flexed budget material cost (original standard)	9,000 units x \$189	\$1,701,000
Material price planning variance - Ingredient A	36,000kg x (\$25 - \$23)	\$72,000 F
Material price planning variance - Ingredient B	27,000kg x (\$22 - \$20)	\$54,000 F
Flexed budget material cost (revised standard)		\$1,575,000
Material price operational variance - Ingredient A	(35,000kg x \$23) - \$910,000	\$105,000 A
Material price operational variance - Ingredient B	(28,000kg x \$20) - \$630,000	\$70,000 A
Material price variance Ingredient C	(27,000kg x \$11.50) - \$296,000	\$14,500 F
Material mix variance	See workings below	\$74,500 F
Material yield variance	See working below	\$175,000 A
Actual material cost		\$1,836,000

Material mix variance

	Actual input @ standard mix kg	Actual input @ actual mix kg	Variance kg	Standard price \$	Variance \$
Ingredient A	40,000	35,000	5,000 F	23	115,000 F
Ingredient B	30,000	28,000	2,000 F	20	40,000 F
Ingredient C	20,000	27,000	7,000 A	11.50	80,500 A
	90,000	90,000			74,500 F

Or alternatively:

Material mix variance

	Actual input @ standard mix	Actual input @ actual mix kg	Variance Kg	Standard price difference \$	Variance \$
Ingredient A	40,000	35,000	5,000	(23 - 19.444)	17,778 F
Ingredient B	30,000	28,000	2,000	(20 - 19.444)	1,111 F
Ingredient C	20,000	27,000	(7,000)	(11.50 - 19.444)	55,611 F
	90,000	90,000			74,500 F

Material yield variance

Standard kg per cake = 9kg

9,000 cakes x 9kg = 81,000kg

Actual usage = 90,000kg

Variance = 9,000kg A

Standard price per kg = \$19.4444

Variance = 9,000 kg x \$19.4444 = \$175,000 A

Or alternatively:

90,000 kg should produce 10,000 cakes

Did produce 9,000 cakes

Yield variance = 1,000 A

Standard material cost = \$175

Yield variance = 1,000 x \$175 = \$175,000 A

(b)

The calculation of planning and operational variances will be useful to TP for the following reasons:

- The use of planning and operational variances will enable TP's management to draw a distinction between variances caused by factors extraneous to the business and planning errors (planning variances) and variances caused by factors that are within the control of management (operational variances). In this case they can separate the materials price variance caused by general price rises (planning variance) and the price variance as a result of efficient or inefficient procurement.
- The purchasing managers' performance can be compared with the adjusted standards that reflect the conditions the manager actually operated under during the reporting period. If planning and operational variances are not distinguished, there is potential for dysfunctional behaviour especially where the manager has been operating efficiently and effectively and performance is being judged by factors outside the manager's control. In the case of TP it became evident during the period that the prevailing market prices for materials were significantly less than those set during the budget process. It can be seen from the reconciliation statement that the operational performance of the material buyers was poor with large adverse operational price variances on both of the ingredients A and B which was slightly offset by a favourable variance on ingredient C.
- The use of planning variances will also allow TP's management to assess how effective the company's planning process has been. Where a revision of standards is required due to environmental changes that were not foreseeable at the time the budget was prepared, the planning variances are uncontrollable. However standards that failed to anticipate known market trends when they were set will reflect faulty standard setting. It could be argued that some of the planning variances due to poor standard setting are in fact controllable at the planning stage.

(c)

Total sales price variance

(9,000 units x \$400) - \$3,456,000 = \$144,000A

Total sales volume contribution variance

(9,000 units – 10,000 units) x \$151 = \$151,000 A

(d)

JIT purchasing involves having an arrangement with a small number of key suppliers where the supplier is able to provide raw materials or components on demand or with a very short lead time. This means that the company can hold zero or very little inventory thus reducing the costs involved with holding inventory including storage costs, insurance costs and obsolescence costs. The costs involved with ordering inventory may however increase. The use of a small number of suppliers should also reduce administrative costs for the company and result in greater quantity discounts. The successful operation of a JIT purchasing system involves the company working together with their suppliers to ensure that they can rely on receiving supplies at the right time and at the required quality level. This should result in a

reduction in quality control costs for the company. Quality standards should improve resulting in lower wastage in the production process.

Answer to Question Four

(a)

Other operating costs

System 1

Depreciation per annum $(\$600k - \$60k) / 3 = \$180k$

Operating costs excluding depreciation = $\$360k - \$180k = \$180k$

System 2

Depreciation per annum $(\$800k - \$50k) / 5 = \$150k$

Operating costs excluding depreciation = $\$305k - \$150k = \$155k$

	<i>Cash flows System 1</i>	<i>Annuity factor/ discount factor @12%</i>	<i>Present value System 1</i>
	<i>\$000</i>		<i>\$000</i>
Initial investment	(600)	1.00	(600)
Contribution	580	2.402	1,393
Operating costs	(180)	2.402	(432)
Maintenance costs	(20)	1+ 1.690	(54)
Residual value	60	0.712	43
Net present value			350
Expected life			3 years
Cumulative discount factor			2.402
Annualised equivalent cash flow			146
	<i>Cash flows System 2</i>	<i>Annuity factor/ discount factor @12%</i>	<i>Present Value System 2</i>
	<i>\$000</i>		<i>\$000</i>
Initial Investment	(800)	1.00	(800)
Contribution	600	3.605	2,163
Operating costs	(155)	3.605	(559)
Maintenance costs	(40)	1+3.037	(161)
Residual value	50	0.567	28
Net present value			671
Expected life			5 years
Cumulative discount factor			3.605
Annualised equivalent cash flow			186

System 2 has the highest annualised equivalent discounted cash flows and therefore should be purchased.

(b)

(i)

Sensitivity analysis recognises the fact that not all cash inflows and cash outflows for a project are known with certainty. Sensitivity analysis enables a company to determine the effect of changes to variables on the planned outcome. Particular attention can then be paid to those variables that are identified as being of special significance. In project appraisal, an analysis can be made of all the key variables to ascertain by how much each variable would need to change before the net present value (NPV) reaches zero i.e. the indifference point. Alternatively, specific changes can be made to the variables to determine the effect on NPV.

(ii)

The annualised equivalent NPV for System 1 is \$40k less (i.e. \$186k - \$146k) than for System 2 therefore it would need to increase by more than \$40k before the decision would be to invest in System 1.

The present value of the contribution would need to increase by $\$40k \times 2.402 = \$96k$. This is an increase of $\$96k/\$1393k = 6.9\%$

Alternatively, the increase would need to be $\$40k/\$580k = 6.9\%$.

(c)

Year	Reducing balance \$000	Tax depreciation \$000	Tax benefit @ 30% \$000	Tax benefit \$000	Tax benefit \$000	Total tax benefit \$000
1	800	200	60	30	0	30
2	600	150	45	23	30	53
3	450	113	34	17	22	39
4	337	84	25	13	17	30
5	253	203	61	31	12	43
6				0	30	30

The Senior Examiner for P1 – Performance Operations offers to future candidates and to tutors using this booklet for study purposes, the following background and guidance on the questions included in this examination paper.

Section A – Question One – Compulsory

Question One consists of 8 objective test sub-questions. These are drawn from all sections of the syllabus. They are designed to examine breadth across the syllabus and thus cover many learning outcomes.

Section B – Question Two – Compulsory

Question Two has 6 sub-questions.

- (a) The question assesses learning outcome E1 (c) *analyse cash-flow forecasts over a twelve month period*. It examines candidates' ability to prepare a cash budget.
- (b) The question assesses learning outcome D1(f) *apply decision trees*. It examines candidates' ability to use decision trees to evaluate a decision where there is uncertainty regarding expected cash flows.
- (c) The question assesses learning outcome E1(f) *analyse the impact of alternative debtor and credit policies*. It examines candidates' ability to identify potential sources of information that can be used when assessing a customer's credit worthiness.
- (d) The question assesses learning outcome A3(a) *apply principles of environmental costing in identifying relevant internalised costs and externalised environmental impacts of the organisation's activities*. It examines candidates' ability to explain the benefits that a company could gain from using an environmental costing system.
- (e) The question assesses learning outcome D1(c) *analyse risk and uncertainty by calculating expected values and standard deviations together with probability tables and histograms*. It examines candidates' ability to calculate the expected values of possible outcomes using joint probabilities.
- (f) The question assesses learning outcome B1(a) *explain why organisations prepares forecast and plans*. It examines candidates' ability to identify and explain THREE benefits of using a budgetary planning and control system.

Section C – Questions Three and Four - Compulsory

Question Three The question assesses a number of learning outcomes. Part (a) assesses learning outcome A1(d) *apply standard costing methods, within costing systems, including the reconciliation of budgeted and actual profit margins* and learning outcome A1(f) '*interpret material, labour, variable overhead, fixed overhead and sales variances, distinguishing between planning and operational variances*'. It examines candidates' ability to calculate material variances including material mix and yield variances and material planning and operational variances. Part (b) also assesses learning outcome A1(f) *interpret material, labour, variable overhead, fixed overhead and sales variances, distinguishing between planning and operational variances*. It examines candidates' ability to discuss the usefulness of the planning and operational variances calculated in part (a). Part (c) also assesses learning outcome A1(d) *apply standard costing methods, within costing systems, including the reconciliation of budgeted and actual profit margins* and examines candidates ability to calculate sales price and sales volume variances. Part (d) assesses learning outcome A1(h) *explain the benefit of just-in-time manufacturing methods on cost accounting and the use of*

'back-flush accounting' when work-in-progress stock is minimal. It examines candidates' ability to explain the benefits of a JIT purchasing system for materials.

Question Four Part (a) assesses learning outcomes C1(b) *apply the principles of relevant cash flow analysis to long-run projects that continue for several years* and learning outcome C2(c) *prioritise projects that are mutually exclusive, involve unequal lives and/or are subject to capital rationing.* It examines candidates' ability to identify the relevant costs of a project and then apply discounted cash flow analysis to calculate the net present value of the project. It then requires candidates to prioritise the projects using an annualised equivalent method. Part (b) assesses learning outcome C1(f) *apply sensitivity analysis to cash flow parameters to identify those to which net present value is particularly sensitive.* It examines candidates' ability to explain the benefits in carrying out sensitivity analysis and then to calculate the sensitivity of one variable. Part (c) assesses learning outcome C1(c) *calculate project cash flows, accounting for tax and inflation, and apply perpetuities to derive 'end of project' value where appropriate.* It examines candidates' ability to calculate tax depreciation and the resulting tax cash flows for a project.
