THE INSTITUTE OF CHARTERED ACCOUNTANTS OF NIGERIA

SKILL LEVEL EXAMINATION - PILOT QUESTIONS AND SOLUTIONS

PERFORMANCE MANAGEMENT

TIME ALLOWED: 3¼ hours (including 15 minutes reading time)

INSTRUCTION: YOU ARE REQUIRED TO ATTEMPT FIVE OUT OF SEVEN QUESTIONS IN THIS PAPER

SECTION A: COMPULSORY QUESTIONS (30 MARKS)

Question 1

KL is a company that builds innovative, environmentally friendly housing. KL's houses use high quality materials and the unique patented energy saving technology used in the houses has been the result of the company's own extensive research in the area.

KL is planning to expand into another country and has been asked by a prominent person in that country for a price quotation to build them a house. The Board of Directors believes that securing the contract will help to launch their houses in the country and have agreed to quote a price for the house that will exactly cover its relevant cost.

The following information has been obtained in relation to the contract:

i. The Chief Executive and Marketing Director recently met with the potential client to discuss the house. The meeting was held at a restaurant and KL provided food and drinks at a cost of ₦37,500.

ii. 1,200 kg of Material Z will be required for the house. KL currently has 550 kg of Material Z in its inventory purchased at a price of ₦5,800 per kg. Material Z is regularly used by KL in its houses and has a current replacement cost of ₦6,500 per kg. The resale value of the Material Z in inventory is ₦3,500 per kg.

iii. 400 hours of construction worker time are required to build the house. KL's construction workers are paid an hourly rate of ₦2,200 under a guaranteed wage agreement and currently have spare capacity to build the house.

iv. The house will require 90 hours of engineer time. KL engineers are paid a monthly salary of ₦475,000 each and do not have any spare capacity. In order to meet the engineering requirement for the house. KL can choose one of two options:

- Pay the engineers an overtime rate of ₦5,200 per hour to perform the additional work.
- Reduce the number of engineers' hours available for their existing job, the building of Product Y. This would result in lost sales of Product Y.

Summary details of the existing job the engineers are working on:

Information for one unit of Product Y

Sales revenue	₦486,000
Variable costs	₦336,500

Engineers' time required per unit 30 hours

v. A specialist machine would be required for 7 weeks for the house build. KL have 4 weeks remaining on the 15 week specialist machine rental contract that cost ₦1,500,000. The machine is currently not in use. The machine can be rented for an additional 15 weeks at a cost of ₦1,525,000. The specialist machine can only be rented in blocks of 15 weeks.

vi. Alternatively, a machine can be purchased for ₦16,000,000 and sold after the work on the house has been completed for ₦14,000,000.

The windows required for the house have recently been developed by KL and use the latest environmentally friendly insulating material. KL produced the windows at a cost of ₦3,495,000 and they are currently the only ones of their type. KL were planning to exhibit the windows at a house building conference. The windows would only be used for display purposes at the conference and would not be for sale to prospective clients.

KL has had assurances from three separate clients that they would place an order for 25 windows each if they saw the technology demonstrated at the conference. The contribution from each window is ₦1,045,000. If the windows are used for the contract, KL would not be able to attend the conference. The conference organisers will charge a penalty fee of ₦150,000 for non-attendance by KL. The Chief Executive of KL can meet the clients directly and still secure the orders for the windows. The meetings would require two days of the Chief Executive's time. The Chief Executive is paid an annual salary of ₦41,400,000 and contracted to work 260 days per year.

vii. The house build requires 400kg of other materials. KL currently has none of these materials in its inventory. The total current purchase price for these other materials is ₦600,000.

viii. KL's fixed overhead absorption rate is ₦3,700 per construction worker hour.

ix. KL's normal policy is to add at 12% mark-up to the cost of each house.

Required:

a) Produce a schedule that shows the minimum price that could be quoted for the contract to build the house.

Your schedule should show the relevant cost of each of the nine items identified above. You should also explain each relevant cost value you have included in your schedule and why any values you have excluded are not relevant.

(21 marks)

b) Explain two reasons why relevant costing may not be a suitable approach to pricing houses in the longer term for KL **(4 marks)**

c) Recommend, with justifications, a pricing strategy for KL to use to price the innovative, environmentally friendly houses when they are launched in the new country. **(5 marks)**

(Total: 30 marks)

SECTION B: YOU ARE REQUIRED TO ATTEMPT TWO OUT OF THREE QUESTIONS IN THIS SECTION (40 MARKS)

Question 2

a) Carefully explain the following pricing strategies:

i) Penetration pricing strategy; and

ii) Market skimming pricing strategy.

Identify the major suitable conditions for the use of each of the pricing strategies. **(9 marks)**

b) AK Ltd is launching a new, innovative product onto the market and is trying to decide on the right launch price for the product.

Demand for the product is very responsive to price changes and research has established that, for ₦1,500 increase in price, demand would be expected to fall by 1,000 units. If the company set the price at ₦73,500, only 1,000 units would be demanded.

The costs of producing each unit of the product are as follows:

	₦
Materials	4,200
Labour (note 1)	1,200
Fixed overheads (note 2)	600
Total cost	6,000

Notes

i. The first of the product took 1.5 hours to make and labour cost ₦800 per hour. A 95% learning curve applies, in relation to production of the product, although the learning curve is expected to finish after making 100 units. Management have said that any pricing decisions about the product should be based on the time it takes to make the 100^{th} unit of the product. You have been told that the 95% learning co-efficient, b, = - 0.074.

ii. The fixed overheads of ₦600 have been calculated based on producing 50,000 units per annum.

iii. All other costs are expected to remain the same up to the maximum demand levels.

Required:

a. Provide an estimate of the demand function (equation) for the product **(3 marks)**

b. Calculate the marginal cost of each unit of the product, taking into account the given note on labour. **(5 marks)**

c. Estimate the optimum price and quantity of the product. **(3 marks)**

(Total: 20 marks)

Question 3

RY Ltd, a domestic airline, has recently launched a low-cost airline company providing flights within the country. The market is highly competitive and two other low-cost airlines, B Ltd and K Ltd, together hold 98% of the market.

RY Ltd commissioned some market research to help with the pricing decision for one route, Lagos to Abuja, which it is thinking of offering. The research identified three possible market states and likely number of passengers that would be attracted at three price levels on this route.

Ticket price		**₦80,000**	**₦90,000**	**₦100,000**
Market	**probability**	**Passenger seats**	**Passenger seats**	**Passenger seats**
Pessimistic	0.2	80	60	30
Most likely	0.6	100	90	80
Optimistic	0.2	150	150	120

Airport charges are incurred for each customer and these are expected to be either ₦5,000 or ₦6,000 per customer depending on the negotiations with the airports involved. The probabilities for the airport charges are 0.6 for an airport charge of ₦5,000 per passenger and 0.4 for an airport ₦6,000 per passenger.

The fixed costs of a flight from Lagos to Abuja are ₦4,422,000.

Required

a) Advise RY Ltd on the optimum selling price to set **(12 marks)**

b) i) If RY Ltd knew that there would be a pessimistic market, which price should it charge in order to maximum profit? **(3 marks)**

ii) The market research company has now stated that by performing further analysis, it will be able to accurately predict the state of the market. What is the maximum price that RY Ltd should pay for this further analysis?

(5 marks)

(Total: 20 marks)

Question 4

Femi Ltd (FL) manufactures three types of pet food. FL has had a large and stable market share for many years, which it attributes to the high quality of its products.

Recently, however, FL has experienced increasing competitive pressures. Although it believes that its customers' criteria in purchase decisions are "product quality first;

price second", nevertheless FL acknowledges that its increasingly strong competitors pose a growing threat which must be addressed. The manager of FL, Tayo Felix, has said: "If our competitors offer lower prices for the same product quality, then we have to determine how we can respond effectively so as to preserve our market share and profits. As a starting point, I have commissioned an activity-based costing (ABC) exercise to provide a comprehensive insight into the costs of our products and of the activities that are carried out in order to manufacture and distribute them". The following information has been assembled for the purposes of the ABC exercise:

i. FL manufactures three products. These are sold under the product brand names 'X', 'Y', and 'Z'. The following is a summary of a typical month's production inputs:

	X	**Y**	**Z**
Raw material cost, per kilogram of input	₦180	₦288	₦360
Total input (kg)	20,000	16,000	3,500

ii. FL carries out four main activities in relation to its three products:

- 'Materials control', i.e., inspection of incoming raw materials, to verify that they conform to the specifications of what was ordered.
- 'Process', i.e., manufacture of the various products.
- 'product control', i.e., quality control inspection of the finished products.
- 'Dispatch', i.e., shipment of finished products to customers.

iii. For each of these activities, the nature of the long-run cost driver relationship is that the total cost is determined by the number of occasions the activity is carried out, irrespective of the size or composition of any batch. The 'product control' activity is carried out twice., i.e., once for each batch of products manufactured and once for each batch of products dispatched to customers. For the other activities, details of the batch sizes for each product are as follows:

	X	**Y**	**Z**
Materials control	2,000 kg	800 kg	700kg
Process	500 kg	400 kg	350 kg
Dispatch	500 kg	200 kg	100 kg

iv. The total costs incurred in performing each of the four activities in a typical month are as follows:

Materials control	**Process**	**Product control**	**Dispatch**
₦700,000	₦1,350,000	₦2,260,000	₦1,020,000

v. Some of the products manufactured fail the first quality control test (i.e., at the end of the production process) and are then immediately discarded. The proportion of output 'lost' in this way is as follows:

X	**Y**	**Z**
10%	10%	20%

Required

a) Using an activity-based costing (ABC) approach, determine the cost driver rate for each of the four activities and the cost per kilogram of output for each of the three products. **(14 marks)**

b) Critically appraise options as to how FL could use the results of the ABC analysis in deciding how it can most successfully respond to the competitive threat which it now faces. Calculations are not required, but you should refer to the results for your analysis in part (a) in support of your appraisal. **(6 marks)**

(Total: 20 marks)

SECTION C: YOU ARE REQUIRED TO ATTEMPT TWO OUT OF THREE QUESTIONS IN THIS SECTION. (30 MARKS)

Question 5

Kolawole Ltd (KL) manufactures equipment for metal testing. It also manufactures the electronic manufacture of the testing equipment.

The company has a well-established cost and management accounting system. The cost accounting system records the actual manufacturing costs for the electronic chips and the testing equipment, and also produces standard unit costs for the purposes of budgeting and variance analysis. The management accountant of KL is pleased with the management information system that is in place within the company, and is particularly proud of the budgetary control reporting system that provides monthly control reports to the board within one week of the end of each month.

The market for metal testing equipment is growing at a reasonable rate, but there are three other competitors in the market. Competition between them is strong and consequently profit margins are fairly low at the moment, KL is operating at a profit. KL's senior management are not sure what any competitor might do next, although they suspect that at least one of them may be in financial difficulty. KL's sales director is certain that although low prices are one factor in the buying decisions of customers, customers are much more concerned about the quality, reliability and functional features of the equipment that KL produces.

At a recent board meeting, the board made two important decisions. The first was a decision not to invest in new equipment for manufacturing electronic chips that would significantly reduce the water and energy consumption in the production process. This decision was taken because the discounted cash flow return on investment was considered insufficient.

The second decision was an agreement that costs needed to be reduced to improve profitability. In relation to this, the board decided that employees in the manufacturing

units should be empowered more, and should be given some authority to take decisions affecting production operations.

The board also discussed the current lack of sufficient strategic information within KL. They were aware that the decision not to invest in the new equipment had not taken into consideration the probability of rising water and energy costs in the future, and they felt they needed more information to help them predict the long-term prospects for their industry.

Required:

a) Explain the difference between strategic, tactical and operational information, and give examples of each that should be used by a company such as KL. **(10 marks)**
b) Discuss why it will be important for KL to monitor non-financial aspects of performance as well as financial performance. **(5 marks)**

(Total = 15 marks)

Question 6

Portland Ltd consists of several autonomous divisions. Divisional managers have authority to make additional capital investments each year, subject to certain maximum capital expenditure limits.

Until now the annual bonus paid to each divisional manager has been determined on the basis of his or her division's profit, but the company is now considering the possibility of switching to a system based on Residual Income (RI). In calculating RI, the following rules would apply:

- Straight – line depreciation (with an assumption of a zero residual value) would be applied to non-current assets.
- Profits or losses on disposal of non-current assets would be included in RI.
- The total capital in a division in any year would be measured as the net book value of non-current assets at the beginning of the year plus average net current assets for the year.

The company's accountant plans to demonstrate the likely effect of RI-based performance measurement using the following two hypothetical projects available to a divisional manager:

- Project A involves investing ₦105,000 immediately in a robot. This would generate savings of ₦39,000 per annum in the company's manufacturing costs over the next 3 years. The scrap value of the robot would be ₦30,000 in three years' time.
- Project B involves a 3-years contract to supply goods (with a sales value of ₦ 200,000 per annum) to an overseas customer. The contribution margin on these sales would be 25%, and there would be incremental fixed costs of ₦40,000 per annum from hiring specialist production equipment. The average investment in trade debtors and inventory directly arising from this project would be ₦120,000.

It can be assumed that all cash flows arise at the end of the year to which they relate (except where otherwise stated) and that the cost of capital is 12% per annum.

Required

a) Calculate the Residual Income and Net Present Value of each project. (N.B: Take each of the two projects separately in answering this part). **(12 marks)**

b) Discuss whether the linking of divisional managers' bonuses to Residual Income will increase the likelihood that the division managers will take decisions that are in shareholders' best interests. Use Project A and B to illustrate your answer.

(8 marks)

(Total: 20 marks)

Question 7

a) Describe the possible problems which could arise when setting standards.

b) List possible advantages of standard costing

c) AB has been receiving an increasing number of customer complaints about a general weakness in the quality and 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.

d) Briefly explain the key problems with using standard costing in today's environment.

e) Briefly explain ways in which a standard costing system could be adapted so that it is useful in the modern business environment. **(15 marks)**

Formulae

Learning curve

$Y = ax^b$

Where Y = cumulative average time per unit to produce x units a = the time taken for the first unit of output x = the cumulative number of units produced b = the index of learning (log LR/log2) LR = the learning rate as a decimal

Demand curve

$P = a - bQ$

$$b = \frac{\text{change in price}}{\text{change in quantity}}$$

a = price when Q = 0

MR = a – 2bQ

The linear regression equation of Y on X is given by:

$$Y = a + bX$$

where

$$b = \frac{n\sum XY - (\sum X)(\sum Y)}{n\sum X^2 - (\sum X)^2}$$

$$a = \frac{\sum y}{n} - \frac{b\sum x}{n}$$

Coefficient of determination (r^2)

$$r^2 = \frac{(n\sum XY - \sum x \sum Y1)^2}{(n\sum X^2 - (\sum X)^2 (n\sum y^2 - (\sum X)^2}$$

SUGGESTED SOLUTIONS

Solution 1

a)

	₦	Note
Food and drink at meeting	-	1
Material Z	7,800,000	2
Construction workers	-	3
Engineers	448,500	4
Specialist machine	1,525,000	5
Windows	150,000	6
Other materials	600,000	7
Fixed overhead	-	8
Profit margin	-	9
Total relevant cost	10,523,500	

Notes

1) The food and drink costs are sunk. The meeting with the client has already occurred and therefore the costs are not relevant.

2) Material Z is regularly used by KL. The 550kg currently in inventory will need to be replaced and therefore should be valued at replacement cost. ₦6,500 × 550kg = ₦3,575,000. The remaining 650kg required for the contract is not owned by KL and therefore will need to be purchased at the replacement cost.
₦6,500 × 650 = ₦4,225,000.

   Total relevant cost ₦7,800,000.

3) The construction workers have spare capacity to complete the work and are employed under a guaranteed wage agreement. Construction workers will be paid whether or not they work on the contract; therefore, the cost is not relevant.

4) Engineers are salaried and this is not an incremental cost. However, they are currently at full capacity and do not have time within their normal hours to complete the 90 of hours work required. The Engineers' additional time should be valued at opportunity cost. If overtime is paid, the cost would be 90 hours × ₦5,200 = ₦468,000.

   Alternatively, switching engineers from their existing job.

   90 hours/30 hours to produce a unit = 3 units valued at contribution per unit ₦149,500 = ₦448,500.

   The lower cost of the two options is ₦448,500 and this is the relevant cost.

5) The first rental period is part way through and the payment of ₦1,500,000 has already been made. Therefore, this is a sunk cost and not relevant. In order to obtain the machine for the required seven week period another 15 week standard rental agreement would have to be entered into, therefore the relevant cost is ₦1,525,000.

If the machine was to be purchased, the relevant cost would be ₦2,000,000 (sales price less resale value). The lower relevant cost of the two options is to rent the machine for another rental period, ₦1,525,000.

6) The cost to produce the windows has already been incurred and is therefore sunk and not relevant.

   If KL uses the windows for the build and miss the conference the sales will not be lost. The chief executive will visit the clients at a later date to secure the sales; therefore there is no incremental loss in contribution. The chief executive's time is not relevant as he is paid an annual salary and would receive this irrespective of the visit to the clients.

   However, should the windows be used for the build, KL would not be able to attend the conference and be liable to pay the non-attendance fee of ₦150,000.

7) 400kg of other materials are required for the house build. The incremental cost is ₦600,000.

8) Fixed costs are not relevant as they will be incurred irrespective of whether the contracts is taken or not.

9) Profit mark-up is not relevant as KL is producing a minimum price quotation to exactly cover the relevant costs.

b) When quoting a minimum price for the contract, relevant costing principles are being used. Only relevant costs i.e. those that change as a direct result of the contract decision are included in the quoted cost.

   The minimum price will result in KL making neither a profit nor a loss. This is not a sustainable pricing policy in the longer term as it does not include a contribution to the fixed costs of the organisation.

   Relevant costing does not include a profit margin. This is not suitable for KL in the longer term as the company is planning to expand into different countries and investors will also require a return on their investment.

c) Market skimming would be a suitable pricing strategy to launch the houses in the new country. Market skimming charges a high price for the product initially where the product is unique and there are significant barriers to entry for competitors. The price is reduced as new competitors enter the market with a similar product. The strategy aims to maximise the profit from the product.

   The high quality materials and unique energy saving technology used in the houses should command high prices from customers keen to have a house with this technology. The house that consumers are willing to pay a high price for, together with the barrier to competitors of the new energy saving technology, make KL's product suited to the market skimming pricing strategy. This market skimming approach will allow KL to recover the research and development costs incurred to develop the energy saving technology.

Solution 2

a) **Penetration Pricing Strategy**

Penetration pricing is a strategy where a company sets a **low initial price** for a product or service to attract a large number of customers and gain market share quickly. Once the product has established a strong customer base or market dominance, the company may gradually increase the price.

Key Objectives:

i. **Market Entry and Growth**: To penetrate a competitive market quickly.
ii. **Discourage Competition**: By offering lower prices, competitors may find it unprofitable to enter the market.
iii. **Economies of Scale**: High sales volumes help reduce per-unit costs through economies of scale.

Suitable Conditions for Penetration Pricing:

i. **Price-Sensitive Market**: Customers are highly responsive to price changes.
ii. **Large Market Potential**: The market has significant untapped potential for growth.
iii. **Economies of Scale**: The business can reduce costs as production volume increases.
iv. **Intense Competition**: There are many competitors, and a low price helps to stand out.
v. **Low Customer Switching Costs**: Customers can easily switch to the new product if the price is attractive.
vi. **Product Differentiation is Minimal**: When products in the market are similar, price becomes a key competitive tool.

Example in Nigeria: A telecommunications company like MTN could use penetration pricing to launch a new data plan, offering extremely low rates to attract customers away from competitors like Airtel.

Market Skimming Pricing Strategy

Market skimming is a strategy where a company sets a **high initial price** for a new or innovative product to maximize revenue from early adopters who are willing to pay a premium. The price is gradually reduced over time to attract price-sensitive customers.

Key Objectives

i. **Recover Research and Development (R&D) Costs**: Especially in industries like technology or pharmaceuticals.
ii. **Maximize Early Profits**: Capture high margins from early adopters.
iii. **Create a Perception of Quality**: High prices may signal superior quality or exclusivity.

Suitable Conditions for Market Skimming

i. **High Perceived Value**: The product is seen as unique, innovative, or superior.
ii. **Low Price Sensitivity**: Early adopters are less concerned about the price and more interested in owning the latest product.
iii. **Strong Brand Reputation**: A trusted or premium brand can justify high prices.
iv. **Limited Competition**: There are few or no competitors offering similar products.
v. **Barriers to Entry**: Competitors find it difficult to replicate the product due to patents, technology, or high R&D costs.

Example in Nigeria: A luxury car dealer introducing a high-end electric vehicle, such as a Tesla Model S, might use market skimming to target wealthy individuals and create an aura of exclusivity.

b) i) **Estimating demand function**

$P = a - bq$

b = change in price/change in quantity

= ₦1,500/1,000 = 1.50

To establish 'a', we know that if price is ₦73,500, quantity = 1,000.

Then:

$73,500 = a - 1.5\ (1,000)$

$73,500 = a - 1,500$

$a = 75,000$

Therefore, price equation is:

$P = 75,000 - 1.5q$

ii) **Calculation of marginal cost**

We need to compute the labour cost of the 100th unit

- Average labour cost per unit for output of 100 units = Y_{100}, using

  $Y = ax^{-b}$

  $Y_{100} = 1,200\ (100)^{-0.074}$ = ₦853.46

- Calculate total cost of the first 100 units, i.e. T_{100}

  T_{100} = 100 × ₦853.46 = ₦85,346

- Calculate Y_{99}, i.e the average per unit of the 99 units:

  $Y_{99} = 1,200(99)^{-0.074}$ = ₦854.09

- Compute T_{99}, i.e. total labour cost for the first 99 units:

T_{99} = 99 × ₦854.09 = ₦84,555

Total labour cost for the 100th unit = $T_{100} - T_{99}$ = ₦85,346 – ₦84,555 = ₦791

Total marginal cost:

	₦
Material	4,200
Labour	791
MC	= 4,991

Fixed overhead cost ignored because it is not part of marginal cost.

iii) At the optimum production plan:

MC = MR

MR = a – 2bq = 75,000 – 3q

MC = 4991

Thus:

4991 = 75,000 – 3q

-70,009 = -3q

q = 23,336.33 or 23,336 units

The optimum quantity is 23,336 units.

Substituting for q in the price equation:

P = 75,000 – 1.5 (23,336) = ₦39,996

Thus, the optimum price is ₦39,996

Solution 3

a) Expected airport charge = (₦5,000 × 0.6) + (₦6,000 × 0.40) = ₦5,400

i) **Option 1** – Ticket price of ₦80,000

Unit contribution = ₦80,000 – ₦5,400 = ₦74,600

Possible demand (Q)	80	100	150
	₦000	₦000	₦000
Total contribution = (Q × ₦74,600)	5,068	7,460	11,190
Fixed costs	(4,422)	(4,422)	(4,422)
Conditional profit	1,546	3,038	6,768
Probability	0.2	0.6	0.2
Expected profit (₦000)	309.20	1822.80	1353.60
Total		3485.60	

ii) **Option 2** – Ticket price of ₦90,000

Unit contribution = ₦90,000 – 5,400 = ₦84,600

Possible demand (Q)	60	90	150
	₦000	₦000	₦000
Total contribution = (Q × ₦84,600)	5,076	7,614	12,690
Fixed costs	(4,422)	(4,422)	(4,422)
Conditional profit	654	3,192	8,268
Probability	0.2	0.6	0.2
Expected profit (₦000)	130.80	1915.20	1653.60
Total		3699.60	

iii) **Option 3** – Ticket price of ₦100,000

Unit contribution = ₦100,000 – 5,400 = ₦94,600

Possible demand (Q)	30	80	120
	₦000	₦000	₦000
Total contribution = (Q × ₦94,600)	2,838	7,568	11,352
Fixed costs	(4,422)	(4,422)	(4,422)
Conditional profit	(1,584)	3,146	6,930
Probability	0.2	0.6	0.2
Expected profit (₦000)	316.80	1887.60	1386.00
Total		2956.80	

Note: Since the total fixed cost of ₦4,422,000 is the same for all the alternatives, it can be excluded from the above calculations without altering the **relative** position of each of the options. It has been included in our calculations to demonstrate its treatment.

Recommendation: Holding other factors constant, a ticket price of ₦90,000 is recommended.

b) i) **Pessimistic Market**

Ticket Option	**Demand**	**Expected profit ₦000**
₦80,000	80	309.20
₦90,000	60	130.80
₦100,000	30	(316.80)

The company should therefore charge ₦80,000 per flight if they knew the market was going to be pessimistic.

ii) **Calculation of value of Perfect Information (₦000)**

Possible Outcome	**Option 1**	**Option 2**	**Option 3**	**Option Selected**	**Conditional Profit**
Pessimistic	1,546	654	(1,584)	1	1,546
Most likely	3,038	3,192	3,146	2	3,192
Optimistic	6,768	8,268	6,930	2	8,268

Expected profit with perfect information is:	₦000
(1,546 × 0.2) + (3,192 × 0. 6) + (8,268 × 0.2)	3,878.00
Expected profit without information (as per (a) above)	(3,699.60)
Incremental expected profit = value of perfect information =	₦178.40

Thus, the maximum price to pay is ₦178,400

Solution 4

a) **Frequency of activities & cost driver rates**:

Materials control inspection:

X	Y	Z	Total
20,000/2,000 = 10	16,000/800 = 20	3,500/700 = 5	35 inspections

- Cost driver rate = ₦700,000/35 = ₦20,000 per materials control inspection.

Process:

X	Y	Z	Total
20,000/500 = 40	16,000/400 = 40	3,500/350 =10	90 production batches

- Cost driver rate = ₦1,350,000/90 = ₦15,000 per production batch.

Dispatch:

	X	Y	Z	Total
Amount of product dispatched (kg)	20,000 less 10% = 18,000	16,000 less 10% = 14,400	3,500 less 20% = 2,800	
Number of shipments	18,000/500 = 36	14,400/200 = 72	2,800/100 = 28	136

shipments

- Cost driver rate = ₦1,020,000/136 = ₦7,500 per shipment

Product control inspection:

	X	Y	Z	Total
Number of production batches (above)	40	40	10	90
Number of shipments (above)	36	72	28	136
Number of product inspections	76	112	38	226

- Cost driver rate = ₦2,260,000/226 = ₦10,000 per product control inspection.

Total overhead cost per kg

	X		Y		Z
	₦000		₦000		₦000
Materials control (₦20,000 × 10)	200	(× 20)	400	(× 5)	100
Process (₦15,000 × 40)	600	(× 40)	600	(× 10)	150
Dispatch (₦7,500 × 36)	270	(× 72)	540	(× 28)	210
Product control (₦10,000 × 76)	760	(× 112)	1120	(× 38)	380
Total (₦000)	1830		2660		840
Good units produced (kg)	18,000		14,400		2,800
Overhead cost per kg	101.67		184.72		300

Total cost per kg

	₦		₦		₦
Gross material cost (180 × 100/90)	2,000	(288 ×100/90)	320	(360 × 100/80)	450
Overhead as above, rounded up	102		185		300
Total	2,102		505		750

b) - Cost driver rates for various activities: Compare these against what subcontractors would charge for performing the same activities, to see if cost reductions can be achieved by outsourcing. Such savings could be passed on to the customers as price reductions, without either product quality or FL's profit margins being adversely affected.

- Having identified the costs of these activities, ask whether any activities could be reduced or elimated completely. For example, in relation to materials inspection, if the supplier would deliver in bigger batches or was more reliable (so that less materials inspection was needed) then cost savings in this area could be achieved. This is another way to generate cost savings which could be passed on to the customers as price reductions, without either product or FL's profit margins being adversely affected.

- Selling prices should be compared with ABC product costs to determine the profit margins on each product. If product margins are particularly high on the product then FL has options which may improve overall profitability including (i) reducing refocusing the company's marketing efforts to create greater emphasis on the more profitable product and less emphasis on less profitable product.

Solution 5

a) Strategic, tactical and management information are classifications of information that distinguish the purposes for which that information is used. The classifications can also be used to distinguish the type of information that is used at different levels in an organisation with a hierarchical management structure.

Strategic information - Strategic information is used for strategic decision making. It often relates to long-term objectives and performance, and to matters that are external to the organisation.

For KL, relevant strategic information would include information about competitors in the market. It appears that a competitor may be in financial difficulty; it may be useful for KL to know more about this and the reasons why the competitor may be in difficulty. It would also be useful to have information about how rival organisations may respond to any competitive initiative by KL.

The management of KL would also benefit from strategic information about technological developments in the industry, the possibility of rising water and energy prices, or even the possibility of government action to discourage excessive energy use by business organisations.

Tactical information - Tactical information is generally associated with planning and control activities within the framework of annual budgets or plans. It is information to help management make decisions for planning, or for monitoring actual performance against the budget expectation, and also to manage spending and efficiency within the organisation.

Tactical information can include both non-financial and financial information. Examples of tactical information include budgets, variance reports for control purposes, efficiency and capacity ratios and summary information about quality failures (re-working of faulty items and items returned under warranty) and on-time deliveries.

Operational information - Operational information is information provided to management, supervisors and other employees at a day-to-day operational level. It is usually detailed information and much of it is non-financial in nature. It is needed to help individuals to do their day-to-day work.

Examples of operational information include detailed information about throughput times, machine failures and downtime, bottlenecks, complaints, quantities of rejected items and so on.

Information systems should provide sufficient relevant information for decision-making at all levels and for all management an operational purposes within the organisation. When information is not sufficient, there is a much greater risk of inappropriate decision-making by management.

b) **Importance of non-financial measures** - The quality and reliability of the equipment that KL produces could both potentially be critical success factors for KL because they are likely to be important in customers' buying decisions.

By performing well in these areas, KL should be better placed to sustain its financial performance than if it performs badly in them. For example, if it provides its customers with high quality, reliable equipment, this should ensure a high level of customer retention, which should in turn help it maintain its revenues.

In this way, there would seem to be a strong link between non-financial performance and financial performance.

Importance of financial measures: However, it is also important that KL continues to monitor its financial performance, because there is no guarantee that favourable non-financial performance will necessarily translate into favourable financial performance. For example, although KL's equipment may be very reliable, if it is significantly more expensive than competitors', customers may choose to buy the competitors' equipment instead.

Also, the directors have already highlighted the importance of reducing costs in order to improve profitability. This identifies the importance of monitoring financial performance, in order to assess how successfully KL is reducing its costs and improving profitability.

Combination of measures – KL's profit margins are known to be low, as a result of the intense competition in the market. This reinforces the need to monitor aspects of its financial performance (such as costs and margins). However, it is equally important to monitor whether sale and market share are increasing or decreasing in this competitive market, and how KL is performing in relation to the other critical success factors which will affect customers buying decisions.

Efficiency measures: KL's costs and margins are also likely to be affected, at least to some extent, by operational efficiency. Measures of efficiency (such as machine utilisation or capacity utilisation usage, for example) could be seen as non-financial performance measures, but they are also closely related to financial performance.

Solution 6

Portland Ltd.
a):

- Project A – NPV:

	Year 0	Year 1	Year 2	Year 3
Investment	- ₦105,000			
Cost savings		+ ₦39,000	+ ₦39,000	+ ₦39,000
Scarp value				+ ₦30,000
Totals	- ₦105,000	+ ₦39,000	+ ₦39,000	+ ₦69,000
PV Factors	1	0.893	0.797	0.712
PV	- ₦105,000	+ ₦34,827	+ ₦31,083	+ ₦49,128

NPV = + ₦10,038

- Project A – Residual incomes:

	Year 0	Year 1	Year 2	Year 3
Cost savings		+ ₦39,000	+ ₦39,000	+ ₦39,000

Depreciation		- ₦35,000	+ ₦35,000	- ₦35,000
Profit on disposal				+ ₦30,000
Profit		**+ ₦4,000**	**+ ₦4,000**	**+ ₦34,000**
Capital		₦105,000	₦70,000	₦35,000
Charge		- ₦12,600	- ₦8,400	- ₦4,200
RI		- ₦8,600	- ₦4,400	+ ₦29,800

- Project B – NPV:

	Year 0	Year 1	Year 2	Year 3
Contribution		+ ₦50,000	+ ₦50,000	+ ₦50,000
Fixed costs		- ₦40,000	- ₦40,000	- ₦40,000
Working capital	- ₦120,000			+ ₦120,000
Totals	- ₦120,000	+ ₦10,000	+ ₦10,000	+ ₦130,000
PV Factor	1	0.893	0.797	0.712
PV	- ₦120,000	+ ₦8,930	+ ₦7,970	+ ₦92,560

NPV = + ₦10,540

- Project B – Residual incomes:

	Annually – Year 1 to Year 3
Contribution	+ ₦50,000
Fixed costs	- ₦40,000
Profit	**+ ₦10,000**
Capital	₦120,000
Charge	₦14,400
RI	- ₦4,400

b)

- The use of RI as the performance measure ensures that division managers take account of the cost of capital and not merely the profit from the investment. This is seen most clearly in the case of Project B. it has a positive 'profit' and would be accepted by a manager who is not 'charged' for the use of capital. However, it has a negative NPV and this is 'mirrored' in the RI calculation which shows that the cost of the capital investment outweighs the operating profit from the investment.

- However, RI is not completely in harmony with NPV. This is most apparent in Project A where there is a significant difference in timing as between profits and cash flows. Specifically, the cost of investment occurs in cash flow terms at Year 0, but is recognized for RI purposes only through depreciation over three years.

- A related consideration, which is likely to vary from one manager to the next, is the time horizon. NPV assesses each project over its entire lifecycle, and this is almost certainly in the best interests of the shareholders. With RI, a major question which arises (in the case of Project A) is whether a manager will base his decision on the fact that the overall effect on RI is positive over the three-

year period. There is a major possibility that a manager will reject Project A because of its negative impact on RI in the first two years.

Solution 7

a) i) Deciding how to incorporate inflation into planned unit costs.

ii) Agreeing a short-term labour efficiency standard (current, attainable or ideal).

iii) Deciding on the quality of materials to be used (a better quality of material will cost more, but perhaps reduce material wastage).

iv) Deciding on the appropriate mix of component materials, where some change in the mix is possible (for example in the manufacture of foods and drink).

v) Estimating materials prices where seasonal price variations or bulk purchase discounts may be significant.

vi) Finding sufficient time to construct accurate standards. Standard setting can be a time-consuming process.

vii) Incurring the cost of setting up and maintaining a system for establishing standards.

viii) Dealing with possible behavioural problems. Managers responsible for the achievement of standards might resist the use of a standard costing control system for fear of being blamed for any adverse variances.

ix) Keeping standards realistic and up-to-date.

b) i) Carefully planned standards are an aid to more accurate budgeting.

ii) Standard costs provide a yardstick against which actual costs can be measured.

iii) The setting of standards involves determining the best materials and methods which may lead to economies.

iv) A target of efficiency is set for employees to reach and cost consciousness is stimulated.

v) 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.

vi) Standard costs and variance analysis can provide a way of motivating managers to achieve better performance. However, care must be taken to distinguish between controllable and non-controllable costs in variance reporting.

c) 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.

i) 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.

ii) 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 favorable labour efficiency variance if quality is being sacrificed for speed.

iii) It should also be possible to provide financial measure 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.

iv) 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.

d) Problems with using standard costing in today's environment

i) Variance analysis concentrates on only a narrow range costs, and does not give sufficient attention to issues such as quality and customer satisfaction.

ii) Standard costing places too much emphasis on direct labour costs. Direct labour is only a small proportion of costs in the modern manufacturing environment and so this emphasis is not appropriate.

iii) Many of the variances in a standard costing system focus on the control of short-term variable costs. In most modern manufacturing environments, the majority of costs, including direct labour costs, tend to be fixed in the short run.

iv) The use of standard costing relies on the existence of repetitive operations and relatively homogeneous output. Nowadays many organisations are forced

continually to respond to customers' changing requirement, with the result that output and operations are not so repetitive.

v) Standard costing systems were developed when the business environment was more stable and less prone to change. The current business environment is more dynamic and it is not possible to assume stable conditions.

vi) Standard costing systems assume that performance to standard is acceptable. Today's business environment is more focused on continuous improvement.

vii) Most standard costing systems produce control statements weekly or monthly. The modern manager needs much more prompt control information in order to function efficiently in a dynamic business environment.

e) A standard costing system may be adapted for use in the modern business environment as follows.

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

ii) 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.

iii) 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.

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

v) 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.