



ZAMBIA INSTITUTE OF CHARTERED ACCOUNTANTS

CHARTERED ACCOUNTANTS EXAMINATIONS

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PROFESSIONAL LEVEL

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P2: ADVANCED MANAGEMENT ACCOUNTING

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SERIES: JUNE 2012

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TOTAL MARKS – 100 TIME ALLOWED: THREE (3) HOURS

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### **INSTRUCTIONS TO CANDIDATES**

1. You have fifteen (15) minutes reading time. Use it to study the examination paper carefully so that you understand what to do in each question. You will be told when to start writing.
2. This paper is divided into TWO sections:  
Section A: One compulsory question.  
Section B: Four Optional questions. Attempt any three (3).
3. Enter your student number and your National Registration Card number on the front of the answer booklet. Your name must NOT appear anywhere on your answer booklet.
4. Do NOT write in pencil (except for graphs and diagrams).
5. The marks shown against the requirement(s) for each question should be taken as an indication of the expected length and depth of the answer.
6. All workings must be done in the answer booklet.
7. Discount Factor tables/Present Value and Annuity Tables are attached at the end of the question paper.
8. Graph paper (if required) is provided at the end of the answer booklet.

## SECTION A

**This question is compulsory and must be attempted.**

### **QUESTION ONE**

Elephant Gaye Ltd manufactures and sells fabric to the Zambian clothing sector. Arising from competition from imported fabric from China, Elephant Gaye's management has recently noticed a significant drop in sales and is reporting significant adverse volume and profit variances. This means that the company now has excess production capacity and that the actual number of machine hours worked will be far lower than the budgeted machine hours. The significance of this is that Elephant Gaye Ltd currently absorbs its fixed manufacturing overheads using a plant-wide machine hour basis.

The result of this method of absorption is that the company has increased the product range and produces many varieties of customised fabric for customers that are sold in very small quantities. The management accountant who left the company a number of months ago had long campaigned that these products were not profitable and had unsuccessfully petitioned for the implementation of an activity based costing system. The managing director refused this request on the basis that the customer is always right, and there would be no difference in cost between these customised products and the high sales volume standard products, all of which are sold at the same price.

Due to the reduction in sales volumes the managing director has also decided not to recruit a replacement management accountant, and has handed these duties to a junior accounting technician whose primary expertise is in payroll. The accounting technician has prepared the following monthly report for one of the high volume standardised products. This report has been presented at the monthly senior management team meeting and was met with a mixed reaction as it was in a different format to that presented in previous months by the former management accountant.

	Original Budget	Flexible Budget	Actual
Units Produced and Sold	10,000	6,500	6,500
Revenue	200,000	130,000	123,175
Cost of Sales	105,000	77,000	85,000
Selling & Distribution overheads	<u>38,000</u>	<u>31,000</u>	<u>36,000</u>
Profit	<u>57,000</u>	<u>22,000</u>	<u>2,175</u>

The junior accounting technician reports that the actual variable cost of sale is K8.35 per unit and the actual variable selling and distribution overhead cost per unit is K2.20.

At the same meeting the managing director asked about the proposed launch of the new designer label 'Don't Kubambila'. The sales manager responded that before departing the management accountant had prepared the following costings:

Variable production cost	K20 per unit
Total fixed production costs	K100, 000 per month
Variable selling and distribution cost	K5 per unit
Total fixed selling and distribution costs	K40, 000 per month

The fixed costs are all product-specific and will not be incurred if the company doesn't proceed with the launch. The sales manager also presents the price and demand estimates of the market research company.

Price (K)	Annual Demand (units)
40.00	200,000
50.00	170,000
60.00	140,000

The managing director unilaterally declares that the highest price of K60 should be chosen to maximise profits. The sales manager is uncertain and remembers the management accountant previously talking about optimal price models.

The meeting adjourns with a certain amount of discord.

**Required:**

- (a) Explain why a company such as Elephant Gaye Ltd would consider implementing an activity based costing system. **[8 Marks]**
- (b) Describe the different steps that Elephant Gaye Ltd would need to undertake to develop and install a new activity based costing system. **[6 Marks]**
- (c) Explain the benefits that should accrue to Elephant Gaye Ltd following the implementation of the new activity based costing system. **[6 Marks]**
- (d) The purchasing manager has stated that she can acquire an identical product to the Don't Kubambila from China at a delivered cost of K6 per unit. Initial estimates are that this would result in a reduction of actual fixed production overheads of 85%. There would be no savings in selling and distribution costs. The sales manager has estimated that with these costs Elephant Gaye Ltd should permanently reduce the retail sales price to K18 per unit and that this would increase the sales volume back to the original monthly estimates of 10,000 units.

Advise, with supporting financial analysis, whether the company should adopt the outsourcing arrangements for the Don't Kubambila and the qualitative factors that also need to be considered. **[8 Marks]**

- (e) Using the information from the scenario, calculate the selling price that will maximise profits and show how much greater the profit will be, compared with the profit at the selling price of K60 per unit (this will be more than the price recommended by the managing director.) **[8 Marks]**

Note: Formula for average revenue and marginal revenue are attached at the end of the question paper.

- (f) Explain the weaknesses of the optimal price model. **[4 Marks]**

**[Total marks 40]**

## SECTION B

Attempt any three out of four questions in this section.

### QUESTION TWO

A washing machine manufacturer is considering the replacement of existing equipment with new equipment for its production of the new range of industrial washing machines. The new equipment will cost K1, 620,000 and installation will cost another K73, 000. The new equipment's salvage value is estimated to be K315, 000 at the end of its useful life, which is 7 years. The old equipment was acquired 8 years ago for K1, 230,000. The company can sell the old equipment immediately for K255, 000.

With the new equipment, the manufacturer expects to reduce variable costs by 7% for the first 5 years and by 12% for the last 2 years. The company uses straight-line depreciation. The company's before-tax cost of capital is 20%, and the tax rate is 40%. The company sells 20 washing machines per year at K275, 000 each. The costs per washing machine are as follows:

#### **Costs per washing machine**

Direct materials	K 160,000
Direct labour	55,000
Overhead	30,000
Total costs	K 245,000

65% of overhead costs are fixed.

Capital allowances are available on the purchase of washing machines, excluding the cost of installation, at 20% per annum on a reducing balance basis. Tax is payable in the year in which the liability arises.

#### **Required:**

- Compute the net present value of the new equipment. Provide your calculations to the nearest Kwacha. Should the company acquire the new machine? [15 Marks]
- Calculate the payback period for this investment to 0.01 years. [2 Marks]
- Discuss three qualitative factors that the company should consider in deciding whether to buy the new machine or not. [3 Marks]

**[Total marks 20]**

### **QUESTION THREE**

Zinthu Limited is a new firm specialising in producing and selling energy saving bulbs for domestic use. There has been significant venture capital finance invested in the company and the board of directors is made up of the promoter and representatives from the venture capital finance companies. Currently the managing director is the promoter. The promoter is a medical doctor by profession and has no extensive experience working in this sector. The promoter has recently undertaken research and has been granted a patent for the new energy saving bulbs. This has helped to attract the capital investment. However, there have been two recent fractious board meetings with the venture capitalists unhappy with the pace of development and the lack of financial information being presented to the board. The board has recently engaged a consulting accountant to help with pricing and financial information. Following discussions with staff and potential customers, the accountant has put together the following pricing information.

Price	Demand (units)
K4,000	1,000
K3,500	1,500
K3,000	2,000

The cost of producing each bulb is expected to be as follows:

Variable production costs	K850 per unit
Fixed production costs	K1,000 per unit based on an annual demand of 1,000 units.
Variable selling costs	K200 per unit
Non production fixed costs	K500, 000 per annum.

The managing director has stated that the company should sell at the highest price point of K4,000 in order to maximise profits but this has been questioned by the other board members.

Following production of the first four models it has become apparent that there is a learning curve in operation that has reduced variable costs through time and material savings.

Units Produced	Cumulative Production Time (Hrs)
1	120
2	216
4	388.8

The managing director knows from previous experience that this learning will cease after completion of 16 units and will result in a variable production cost saving of approximately 15%.

The accountant has detailed these findings in her report to the board and a board meeting has been scheduled in order to discuss the report and make some decisions.

The Learning coefficient:

Learning co-efficient for 95% = -0.074

Learning co-efficient for 90% = -0.152

Learning co-efficient for 85% = -0.234

Learning co-efficient for 80% = -0.322

Learning co-efficient for 75% = -0.415

The formula for the learning curve is provided in the formulae sheet on page 9 of this question paper.

**Required:**

- (a) Establish the rate of learning that applies to the production of the energy saving bulbs and calculate the length of time that each unit will take once learning ceases. Explain how this information should be used. **[10 Marks]**
- (b) Calculate the number of energy saving bulbs that the company must sell in order to achieve a target profit of K400,000 for the first full year of trading allowing for the learning curve effect reduction in variable cost and a set selling price of K2,000 per unit. **[3 Marks]**
- (c) The sales director has recommended increasing the sales commission that will increase variable selling cost by 10% but will also reduce fixed non-production costs by 20%. State the effect on the annual breakeven sales revenue if this proposal is implemented (assume selling price and unit variable costs as per part b). **[3 Marks]**
- (d) Discuss situations where the learning curve is best applied, how it may assist management accountants and explain any weaknesses associated with it. **[4 Marks]**

**[Total marks 20]**

## **QUESTION FOUR**

Njenge and Mbazoo Group Plc has two operating divisions whose managers' performance is judged using Return on Investment (ROI) ratios. The company uses Non-Current Assets plus Net Current Assets as part of the measure for ROI. Njenge and Mbazoo Group has a minimum acceptable ROI of 15% a year and uses the straight line method of depreciation for non-current assets. Extracts from the divisional budgets for the coming year are as follows:

	Division A K'million	Division B K'million
Divisional Profit	520	100
Non-Current Assets at cost	1,880	2,400
Net Current Assets	780	360

Two new investment projects have since been identified and are presented as follows to the divisional managers.

1. Divisional Manager A has been authorised to buy new equipment costing K600m with a useful economic life of five years and expected savings of K180m per annum for the five years.
2. A new product has been identified for Division B which will increase sales revenue by K500m each year over the next five years. This will necessitate an increase in advertising costs by K120m per year and inventories held will increase by K180m. The contribution margin for this new product will be 30% of sales.

### **Required:**

- (a) Calculate the expected return on investment (ROI) for each division assuming:
  - (i) the investment opportunities are not taken up;
  - (ii) the investment opportunities are taken up. **[8 Marks]**
- (b) Comment on the results obtained in (a) and state how the divisional managers and senior group / head office managers might view the investment opportunities. **[4 Marks]**
- (c) Explain how the concept of back-flush accounting relates to standard costing and where it might be used. **[2 Marks]**
- (d) "A lot of firms are using the wrong measures, many of which they incorrectly term Key Performance Indicators (KPIs). In my experience, few organisations really monitor their true KPIs, because they haven't explored what a KPI actually is." Parmenter, D., Financial Management, February 2007.

Discuss the above statement explaining how the choice of performance measures is critical to ensuring business success. **[6 Marks]**

**[Total marks 20]**

## **QUESTION FIVE**

- (a) "The balanced scorecard is not a valid management accounting tool and is just another fad". - Anonymous accounting student

Discuss the above statement, explaining what a balanced scorecard is, how it may be used by an organisation and discuss with reasons whether you agree with the opening statement. **[6 Marks]**

- (b) Discuss how the use of traditional performance measures such as return on capital employed (return on investment, accounting rate of return) may encourage dysfunctional decision making in a company with a number of separate divisions. **[8 Marks]**

- (c) Deebee is a decentralized car manufacturer with two divisions, Dee and Bee, both operating as profit centres. Both are operating below full capacity and in the same country. Division Dee produces a car component called "Mutima" that is used by Bee in its operations.

Dee has a capacity to produce 10,000 units of Mutima. It currently produces 7,000 units of Mutima, which it sells to Bee at K4, 800,000 per unit. Bee has just realized that it could buy a comparable component from another company for K4, 500,000 per unit. Division Dee has variable operating costs of K4, 700,000, which include 20% of selling and administrative expenses. Division Dee also has fixed operating costs of K1, 500,000. On inter-divisional sales, 75% of the selling and administrative expenses can be avoided.

### **Required:**

- (i) Could division Dee reduce its transfer price for the Mutima component? If yes, what would be the minimum transfer price accepted by division Dee. Explain and show all your calculations **[2 Marks]**
- (ii) Explain the motivations of division Dee to sell the Mutima component at full cost plus a profit margin. **[2 Marks]**
- (iii) Assume that there is an external market demand for 4,000 units of Mutima. What would be the minimum transfer price demanded by division Dee? **[2 Marks]**

**[Total marks 20]**

**END OF PAPER**

## Formulae Sheet

### 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 ( $\log LR / \log 2$ )

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  $Q = 0$

$$MR = a - 2bQ$$

$$\text{Average Revenue} = \frac{TR}{Q}$$

### Present Value Table

Present value of 1 i.e.  $(1 + r)^{-n}$

Where  $r$  = discount rate  
 $n$  = number of periods until payment

Periods (n)	Discount rate (r)										
	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	1
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826	2
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751	3
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683	4
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621	5
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564	6
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513	7
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467	8
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424	9
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386	10
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350	11
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319	12
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290	13
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263	14
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239	15
(n)	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%	
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833	1
2	0.812	0.797	0.783	0.769	0.756	0.743	0.731	0.718	0.706	0.694	2
3	0.731	0.712	0.693	0.675	0.658	0.641	0.624	0.609	0.593	0.579	3
4	0.659	0.636	0.613	0.592	0.572	0.552	0.534	0.516	0.499	0.482	4
5	0.593	0.567	0.543	0.519	0.497	0.476	0.456	0.437	0.419	0.402	5
6	0.535	0.507	0.480	0.456	0.432	0.410	0.390	0.370	0.352	0.335	6
7	0.482	0.452	0.425	0.400	0.376	0.354	0.333	0.314	0.296	0.279	7
8	0.434	0.404	0.376	0.351	0.327	0.305	0.285	0.266	0.249	0.233	8
9	0.391	0.361	0.333	0.308	0.284	0.263	0.243	0.225	0.209	0.194	9
10	0.352	0.322	0.295	0.270	0.247	0.227	0.208	0.191	0.176	0.162	10
11	0.317	0.287	0.261	0.237	0.215	0.195	0.178	0.162	0.148	0.135	11
12	0.286	0.257	0.231	0.208	0.187	0.168	0.152	0.137	0.124	0.112	12
13	0.258	0.229	0.204	0.182	0.163	0.145	0.130	0.116	0.104	0.093	13
14	0.232	0.205	0.181	0.160	0.141	0.125	0.111	0.099	0.088	0.078	14
15	0.209	0.183	0.160	0.140	0.123	0.108	0.095	0.084	0.074	0.065	15

### Annuity Table

Present value of an annuity of 1 i.e.  $\frac{1 - (1 + r)^{-n}}{r}$

Where  $r$  = discount rate  
 $n$  = number of periods

Periods (n)	Discount rate (r)										
	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	1
2	1.970	1.942	1.913	1.886	1.859	1.833	1.808	1.783	1.759	1.736	2
3	2.941	2.884	2.829	2.775	2.723	2.673	2.624	2.577	2.531	2.487	3
4	3.902	3.808	3.717	3.630	3.546	3.465	3.387	3.312	3.240	3.170	4
5	4.853	4.713	4.580	4.452	4.329	4.212	4.100	3.993	3.890	3.791	5
6	5.795	5.601	5.417	5.242	5.076	4.917	4.767	4.623	4.486	4.355	6
7	6.728	6.472	6.230	6.002	5.786	5.582	5.389	5.206	5.033	4.868	7
8	7.652	7.325	7.020	6.733	6.463	6.210	5.971	5.747	5.535	5.335	8
9	8.566	8.162	7.786	7.435	7.108	6.802	6.515	6.247	5.995	5.759	9
10	9.471	8.983	8.530	8.111	7.722	7.360	7.024	6.710	6.418	6.145	10
11	10.37	9.787	9.253	8.760	8.306	7.887	7.499	7.139	6.805	6.495	11
12	11.26	10.58	9.954	9.385	8.863	8.384	7.943	7.536	7.161	6.814	12
13	12.13	11.35	10.63	9.986	9.394	8.853	8.358	7.904	7.487	7.103	13
14	13.00	12.11	11.30	10.56	9.899	9.295	8.745	8.244	7.786	7.367	14
15	13.87	12.85	11.94	11.12	10.38	9.712	9.108	8.559	8.061	7.606	15
(n)	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%	
1	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833	1
2	1.713	1.690	1.668	1.647	1.626	1.605	1.585	1.566	1.547	1.528	2
3	2.444	2.402	2.361	2.322	2.283	2.246	2.210	2.174	2.140	2.106	3
4	3.102	3.037	2.974	2.914	2.855	2.798	2.743	2.690	2.639	2.589	4
5	3.696	3.605	3.517	3.433	3.352	3.274	3.199	3.127	3.058	2.991	5
6	4.231	4.111	3.998	3.889	3.784	3.685	3.589	3.498	3.410	3.326	6
7	4.712	4.564	4.423	4.288	4.160	4.039	3.922	3.812	3.706	3.605	7
8	5.146	4.968	4.799	4.639	4.487	4.344	4.207	4.078	3.954	3.837	8
9	5.537	5.328	5.132	4.946	4.772	4.607	4.451	4.303	4.163	4.031	9
10	5.889	5.650	5.426	5.216	5.019	4.833	4.659	4.494	4.339	4.192	10
11	6.207	5.938	5.687	5.453	5.234	5.029	4.836	4.656	4.486	4.327	11
12	6.492	6.194	5.918	5.660	5.421	5.197	4.988	4.793	4.611	4.439	12
13	6.750	6.424	6.122	5.842	5.583	5.342	5.118	4.910	4.715	4.533	13
14	6.982	6.628	6.302	6.002	5.724	5.468	5.229	5.008	4.802	4.611	14
15	7.191	6.811	6.462	6.142	5.847	5.575	5.324	5.092	4.876	4.675	15

## P2 SUGGESTED SOLUTIONS

### QUESTION 1

**(a)** Reasons for ABC

- (i) Changing economic circumstances
- (ii) Increased range of product
- (iii) Increase in number of low sales volume products
- (iv) Greater customisation in products leading to increased complexity in manufacturing processes.
- (v) Reliance on outdated overhead absorption rate
- (vi) Need for better product costing information to ensure prices that are being charged for custom products are correct.
- (vii) Need to reduce costs.
- (viii) Other relevant points.

**[8 x 1 Mark]**

**(b)** ABC Implementation

The Stages required to implement ABC are:

1. Initiation: gather data and information about various activities
2. Adoption: establish cost drivers for each activity and quantify the same and apply to product costing.
3. Adaptation: check how system is operating and make changes as appropriate. It may require re-looking at activities and drivers
4. Acceptance: ensure that all managers are aware of the new system
5. Routinisation: ensure regular use for all cost reports
6. Infusion: infuse the ABC system throughout all the processes and try to identify non-value added activities and reduce costs.

Alternative methods will be marked.

**6 x 1 Mark]**

**(c)** Benefits

- Better product costing and more accurate inventory valuation
  - Identification of non-value added activities
  - Cost reduction
  - Better information for pricing and decision making
  - Development of ABB and ABM
  - Can be used as part of value analysis and value engineering
- Other Relevant points.

**[6 x 1 Mark]**

**(d)**

Sales volume	
Outsourcing Proposal:	10,000
	K
Sales price	18
Variable cost of sale	6
Variable S&D	<u>2</u>
Contribution	<u>10</u>
Total Contribution	100,000
Less Fixed Costs	
Cost of sales	(15,362)
S & D	<u>(18,000)</u>
Profit	<u>66,638</u>

**[3 Marks]**

The proposal should be adopted on a financial basis as profits are higher than the original budgeted profit.

**[1 Mark]**

**Qualitative factors**

- Quality of component
- Quality of logistical arrangements
- Redundancy costs and ethical considerations
- Use of freed up space and resources

Other relevant information

**[4 x 1 Mark]**

**(e)** Pricing Model

$$P = a - bQ$$

$$a = \text{price where quantity is zero } 60 + (140000/30000 \times 10) = 106.67$$

$$b = \text{is the rate of change } 10/30000 = 0.000333$$

$$P = 106.67 - 0.000333Q$$

$$TR = P \times Q = 106.67Q - 0.000333Q^2$$

$$MR = 106.67 - 0.000667Q$$

$$TC = 25Q + 140,000 \times 12$$

$$MC = 25$$

**[2 Marks]**

Optimal profitability where  $MR = MC$

$$106.67 - 0.000667Q = 25$$

$$106.67 - 25 = 0.000667Q$$

$$81.67 = 0.000667Q$$

$$Q = 81.67 / 0.000667$$

$$Q = 122443.78 = \text{optimal quantity}$$

$$P = 106.67 - (0.000333 \times 122443.78)$$

$$P = 106.67 - 40.77 = 65.90$$

**[2 Marks]**

Operating Statements	Optimal	Managing Directors
Sales volume	122,443.78 K	140,000 K
Sales Revenue [ K65.90 X 122443.78/K60 X 140,000]	8,069,045	8,400,000
Less variable Cost [K25 X 122.443.78/K25 X 140,000]	<u>(3,061,094)</u>	<u>(3,500,000)</u>
Contribution	5,007,951	4,900,000
Less Fixed Costs [K140,000 X 12 Months]	<u>(1,680,000)</u>	<u>(1,680,000)</u>
Profit	<u>3,327,951</u>	<u>3,220,000</u>
		<b>[4 Marks]</b>

Profit will be greater by K3,327,951 – K3,220,000  
= K107,951

- (f) Weaknesses of optimal pricing model
- Assumes that price demand relationships are accurate
  - It ignores competitors pricing
  - Ignores packaging distribution channels, marketing etc
  - Ignores market share considerations

**[4 Marks]**

## QUESTION TWO

(a)

Year	0	1	2	3	4	5	6	7
Initial outlay	(1,620,000)							
Installation Costs	(73,000)							
Old machine scrap	255,000							
Sales Revenue(K275,000 x 20)		5,500,000	5,500,000	5,500,000	5,500,000	5,500,000	5,500,000	5,500,000
Variable costs (w.1)		(4,194,300)	(4,194,300)	(4,194,300)	(4,194,300)	(4,194,300)	(3,968,800)	(3,968,800)
Fixed costs		(390,000)	(390,000)	(390,000)	(390,000)	(390,000)	(390,000)	(390,000)
Pre-tax cashflow		915,700	915,700	915,700	915,700	915,700	1,141,200	1,141,200
Tax at 40%		(366,280)	(366,280)	(366,280)	(366,280)	(366,280)	(456,480)	(456,480)
Scrap value								315,000
Tax savings (w.2)		129,600	103,680	82,944	66,355	53,084	42,467	43,870
Net cash flow	(1,438,000)	679,020	653,100	632,364	615,775	602,504	727,187	1,043,590
DF @ 12%	1.0	0.892	0.797	0.712	0.636	0.567	0.507	0.452
PV	(1,438,000)	605,686	520,521	450,243	391,633	341,620	368,684	471,703

NPV= K1,712,090

Decision: Yes. The company should acquire the machine on a financial basis because it gives a positive NPV.

Workings: W.1 Variable costs

	K
Direct materials	160
Direct labour	55
v/Overheads (35% x K30)	<u>10.5</u>
∴ Variable cost per unit	<u>225.5</u>
	X
Total machines per annum	20
Total variable costs (K'000)	<u>4,510</u>
Net costs	
Years 1 – 5 [93% x K4,510] =	<u>4,194.3</u>
Years 6 – 7 [88% x 4510] =	<u>3,968.8</u>

\*Fixed costs per annum

$$65\% \times K30,000$$

$$= K19,500 \times 20$$

$$= K390,000$$

\*Fixed costs are assumed to be product specific and, therefore relevant.



(b) Payback period

Year	Cash flow	Cumulative cashflow
0	(1,438,000)	(1,438,000)
1	K679,020	(756,980)
2	K653,100	(105,880)
3	K632,364	526,484

Payback Period:  $2 + \frac{105,880}{632,364}$   
= 2.17 years

(c) Qualitative factors

- Quality of the production
- Time of production
- Training

### **SOLUTION THREE**

(a) (i) Learning Curve

Energy saving bulb	Cum Time	Avg time per unit	% Learning
1	120	120	-
2	216	108	$\left[ \frac{108}{120} \right]$ 90%
4	388.8	97.2	$\left[ \frac{97.2}{108} \right]$ 90%

**[4 Marks]**

(a)(ii) Learning effect is 90% with learning stopping after the first 16 units

Time for 16 units =  $Y = 120(16)^{-0.152}$  78.73  
 x 16  
 Total time for 16 units 1,259.72

**[3 Marks]**

Time for 15 units =  $Y = 120(15)^{-0.152}$  79.51  
 x 15  
 1,192.63  
 Time for 16th unit and each unit thereafter [1,259.72 – 1,192.63] 67.09 hours per unit

**[3 Marks]**

(b)

Total Fixed costs

Total fixed production costs	1000 x K1000	1,000,000
Total fixed non-prod o/h		500,000
Total Fixed costs		1,500,000
Selling Price	2000	
Variable costs 850 + 200	(1050)	
Contribution per unit	950	
Target Profit + TFC (K1,500,000 + K400,000)	1,900,000	

Number of Energy Saving Bulbs =  $K1,900,000/950 = 2000$ .

**[3 Marks]**

(c)

	Old		Proposal
	K		K
Selling Price	2000		2000
Variable costs 850 + 200	<u>(1050)</u>	(850 x 200 x 110%)	<u>(1070)</u>
Contribution per units	<u>950</u>		<u>930</u>
B/E units(K1,500,000 ÷ K950)	1,579	(1,400,000 ÷ 930)=	1,505
	Units		Units
B/e Revenue	3,157,895		3,010,753

The proposal should be introduced as it has a lower effect on breakeven revenues

**[3 Marks]**

(d) How it might assist management.

- Enable management to set up a Standard Costing system.
- A budget will need to incorporate a learning cost factor until the plateau is reached.
- A budgetary control system incorporating labour variances will have to make allowances for the anticipated time changes.
- Identification of the learning curve will permit the company to better plan its marketing, work scheduling, recruitment and material acquisition activities.
- The decline in labour costs will have to be considered when estimating the overhead apportionment rate.
- As the employees gain experience they are more likely to reduce material wastage.

**[6 x 1 Mark; maximum 2 marks**

**i.e. reward any two correct points]**

**Weaknesses/ Limitations:**

- The stable conditions necessary for the learning curve to take place may not be present – unplanned changes in production techniques or labour turnover will cause problems and affect the learning rate.
- The employees need to be motivated, agree to the plan and keep to the learning schedule, these assumptions may not hold.
- Accurate and appropriate learning curve data may be difficult to estimate.
- Inaccuracy in estimating the initial labour requirement for the first unit.
- Inaccuracy in estimating the output required before reaching a 'steady state' time rate.
- It assumes a constant rate learning factor.

**[6 x 1 Mark; maximum 2 marks]**

**Reward any 2 correct points**

## **SOLUTION FOUR**

**(a)**

### **Division A**

(i) 000  $\frac{K520}{K2660}$   
 $= \underline{19.55\%}$  [2 Marks]

(ii) Increase in Profit  $K180 - K120$   
 $= 60$   
New Profit  $\underline{K580}$   
New total Assets  $K3260$   
New ROI  $\underline{17.79\%}$  [2 Marks]

(i) **Division B**  
 $100 / 2760$   
ROI = 3.62% [2 Marks]

(ii) Contribution from new sales  $K150$   
Less Advance -120  
Extra profit  $K30$   
ROI  $\frac{K130}{(K2760 + K180)}$   
 $= \underline{4.42\%}$  [2 Marks]

**(b)** Commentary

Division A project is acceptable to the group but Division A manager may reject as it reduces the divisions overall profit.

Division B project return is below the group ROI of 15% but it does increase the

Division B ROI so manager may accept the profits

[2 x 2 Marks]

[4 Marks]

**(c)** Backflush costing is used where large volume of products that have highly standardised bill of materials that can have standard costs attached are being produced. Backflush accounting can then be used to track costs back to the accounting system at specific trigger points in the production process. It allows accounts to be prepared speedily based on standard costs. Cost controllers must ensure actual costs are compared to standard regularly and standards adjusted to reflect changes.

[4 Marks]

**(d)** KPI

What are KPIs?

Key Performance Indicators are quantifiable measurements, agreed to before-hand, that reflect the critical success factors of an organization. They will differ depending on the organization.

Why are they important?

- In any business, it is vital that you can measure things. But just because there are some variables that rise positively or there are factors in your company that work, it does not mean that you are on your way to success - at least not a hundred percent. Your organization has to look into different factors in order for you to confidently say that your business is booming. The secret is to define key performance indicators. This is because the KPIs can actually keep the number small in order for the business to just set their eye and focus on these factors in order for them to figure out what they should do.
- The key to success of a business is dependent on good management information. Thus while monitoring profitability and cash flows, a business also needs to keep its Key Performance Indicators (KPI) under a tight check.

How do they feed into performance measurement?

- Define the company values and priorities. Clearly state what your business is about. Identify what it takes for the company to be successful. For example, if you own a publishing company that specializes in publishing gardening books, the goal may be increasing books sales by 10 percent.
- Identify how your area of business (e.g., human resources, sales) impacts the company. Identify the most important service or product that you deliver to customers. For example, maintenance of inventory management minimizes cost management and delivers reliable products and/or services to customers such as full process rates and up time.
- Choose metrics that measure direct results. Metrics basically assign a numerical value to a specific outcome. For example, a maintenance management program may set a goal for 85 percent schedule compliance.
- Inform management and your business area of the metrics target and goals. Post the metric target and goals in high traffic areas of the company where everyone can see them. This serves as a reminder of how company employees impact the metric.
- Maintain the KPI process. Analyze how far you have come in satisfying each metric. Create a plan focused on continued improvement. Highlight and reward progress.

Examples of KPIs

- A business may have as one of its Key Performance Indicators the percentage of its income that comes from return customers.
- A school may focus its Key Performance Indicators on graduation rates of its students.
- A Customer Service Department may have as one of its Key Performance Indicators, in line with overall company KPIs, percentage of customer calls answered in the first minute.
- A Key Performance Indicator for a social service organization might be number of clients assisted during the year.

Possible mention of Balanced Scorecard as example to demonstrate how they encompass entire business.

Other relevant points.

## **SOLUTION FIVE**

### (a) Balanced scorecard

The balanced scorecard is a strategic planning and management system that is used extensively in business and industry, government, and nonprofit organizations worldwide to align business activities to the vision and strategy of the organization, improve internal and external communications, and monitor organization performance against strategic goals. It was originated by Dr. Robert Kaplan (Harvard Business School) and David Norton as a performance measurement framework that added strategic non-financial performance measures to traditional financial metrics to give managers and executives a more 'balanced' view of organizational performance.

The balanced scorecard suggests that we view the organization from four perspectives, and to develop metrics, collect data and analyze it relative to each of these perspectives:

#### **The Learning & Growth Perspective**

This perspective includes employee training and corporate cultural attitudes related to both individual and corporate self-improvement. In a knowledge-worker organization, people -- the only repository of knowledge -- are the main resource. In the current climate of rapid technological change, it is becoming necessary for knowledge workers to be in a continuous learning mode. Metrics can be put into place to guide managers in focusing training funds where they can help the most. In any case, learning and growth constitute the essential foundation for success of any knowledge-worker organization.

#### **The Business Process Perspective**

This perspective refers to internal business processes. Metrics based on this perspective allow the managers to know how well their business is running, and whether its products and services conform to customer requirements (the mission). These metrics have to be carefully designed by those who know these processes most intimately; with our unique missions these are not something that can be developed by outside consultants.

#### **The Customer Perspective**

Recent management philosophy has shown an increasing realization of the importance of customer focus and customer satisfaction in any business. These are leading indicators: if customers are not satisfied, they will eventually find other

suppliers that will meet their needs. Poor performance from this perspective is thus a leading indicator of future decline, even though the current financial picture may look good.

### **The Financial Perspective**

Kaplan and Norton do not disregard the traditional need for financial data. Timely and accurate funding data will always be a priority, and managers will do whatever necessary to provide it. In fact, often there is more than enough handling and processing of financial data. With the implementation of a corporate database, it is hoped that more of the processing can be centralized and automated. But the point is that the current emphasis on financials leads to the "unbalanced" situation with regard to other perspectives. There is perhaps a need to include additional financial-related data, such as risk assessment and cost-benefit data, in this category. **[5 Marks]**

Argument/discussion of statement **[1 Mark]**

(b) Performance measures in Divisional structure

Decisions in which the benefit to one sub-unit is more than offset by the costs or loss of benefits to the organization as a whole. **[1 Mark]**

Discuss different group structures and cost centres, profit centres and investment centres.

Cost centres

It focuses almost entirely on short-term cost minimisation which may be at odds with other objectives, for example, quality or delivery time. Also, it is important to be clear about who is responsible for which variance - is the production manager or the purchasing manager (or both) responsible for raw material price variances? There is also the problem with setting standards in the first place - variances can only be as good as the standards on which they are based.

Profit centres

When assessing the performance of a manager we should only consider costs and revenues under the control of that manager, and hence judge the manager on controllable profit. In assessing the success of the division, our focus should be on costs and revenues that are traceable to the division and hence judge the division on traceable profit. For example, depreciation on divisional machinery would not be included as a controllable cost in a profit centre. This is because the manager has no control over investment in fixed assets. It would, however, be included as a traceable fixed cost in assessing the performance of the division.

Investment centres

In an investment centre, managers have the responsibilities of a profit centre plus responsibility for capital investment. **[3 Marks]**

Explanation of how measures can lead to competition between divisions and cause dysfunctional decision-making.

- Identifying controllable (traceable) profits and investment can be difficult.
- If used in a short-term way they can both overemphasize short-term performance at the expense of long-term performance. Investment projects with positive net present value can show poor ROI and residual income figures in early years leading to rejection of projects by managers.
- If assets are valued at net book value, income figures generally improve as assets get older. This can encourage managers to retain outdated plant and machinery.
- The techniques attempt to measure divisional performance in a single figure. Given the complex nature of modern businesses, multi-faceted measures of performance are necessary.
- Most measures require an estimate of the cost of capital, a figure which can be difficult to calculate.
- Divisional managers can make decisions that may not suit overall company objectives, e.g. Division A may withhold materials from Division B
- ROI and ARR are based on profits which can be manipulated
- If rewards are made based on these measures companies may not invest in fixed assets and the % returns will increase even though profits may remain static
- NPV may bring in long term returns to benefit business but in the short term may lead to managers rejecting viable projects as these may impact on ROI and ROCE.

**[5 relevant points x 1 Mark]**

- (c) (i) Yes, Dee could reduce the transfer price for the engine component.

$$\text{Minimum} = K4,700,000 - (K4,700,000 \times 20\% \times 75\%) = K3,995,000$$

The minimum transfer price for Dee is equal to its variable costs because division Dee operates below its full capacity. **[2 Marks]**

- (ii) Manager's compensation is likely to increase the division's performance because the divisions are evaluated as profit centres. **[2 Marks]**

- (iii) Minimum transfer price on the first 6,000 units = K3,995,000 per engine.

Transfer price on the next 4,000 units at the market prices. However, Division Bee may seek to buy at a price of K4,500,000 if the market price is higher than K4,500,000. **[2 Marks]**