CHARTERED ACCOUNTANTS EXAMINATIONS

PROFESSIONAL LEVEL

P2: ADVANCED MANAGEMENT ACCOUNTING

TUESDAY 16TH JUNE 2015

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

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 (1) compulsory question.
   Section B: Four (4) Optional questions. Attempt any three (3) questions.

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 is a compulsory question and it MUST be attempted.

QUESTION ONE

The Good Agriculture Group (GAG), which has a divisional structure, produces a range of fertilizers for the industry. Divisions X and Y are two divisions of the GAG based in Kitwe. Both divisions use similar accounting policies. Division X produces chemical ammonia (A) which is used by Division Y to produce a compound fertilizer (B). One unit of B needs one unit of A. Currently Division Y has the opportunity to purchase A from Division X but it is possible to purchase chemical A from an external supplier.

Forecast information of selling prices and costs for the current period are as follows:

	A K	B K	
Market Price	60	100	
Variable Costs:			
Direct material	16	10	
Direct Labour	10	6	
Variable Overheads	4	4	
Transfer cost of A	-	60	
	30	80	
Fixed costs per year (K)	1,000,000	450,000	
External market demand (Units)	100,000	25,000	
Maximum plant capacity (Units)	130,000	30,000	
Capital Employed (K)	13,250,000	2,500,000	

Division X transfers chemical A at the market price of K60 per unit and its manager argues that this price is justified because it is determined by the market and also that if internal sales were not made, he could increase external sales.

But Division Y manager is bitter because currently his ROCE is well below the minimum hurdle ROCE rate required by the GAG group. He contends that transfers should be at Division X's costs plus a reasonable mark-up.

The management team of GAG is worried about Division Y's low return rate and has been asked to come up with ways of improving the ROCE. He proposed that the management team should direct Division X manager to reduce the transfer price (TP) for chemical A. He further suggests that he rents a branch office in Chambeshi town and reckons that the market for product B will be enlarged by 5,000 units per year at the current price of K100 per unit. Establishment costs for the branch office would be K100,000 per year.

Required:

(a) Draft a report which advises the management team on the course of action it should take regarding the proposals suggested by Division Y manager. Your report should include the following calculations:

(i) Current revenues, costs and profits for each division and for the group.

(6 marks)

(ii) Current ROCE in each division and comment on the ROCEs' you have calculated. (3 marks)

(iii) ROCE's based on Division Y proposed transfer price. Revenues, costs and profits for GAG should be shown as well. Comment accordingly.

(9 marks)

(iv) ROCE's assuming the current TP continues and ROCE if the TP of K30 policy is adopted with a view of opening a new branch. Comment accordingly and make final conclusion. (10 marks)

(b) Division Z, another division of the GAG Plc, has developed a new product whose details are as follows:

Direct materials will cost K60 per unit and variable costs will be K16 per unit. Direct labour costs are expected to be K24 per hour, whilst fixed costs of K191,180 will be incurred throughout the product life cycle. The Production Director has indicated that the labour rate per hour, material costs per unit, variable cost per unit and total fixed costs will not change over the life cycle.

The number of units to be produced over the life cycle is 20,000 and will be sold at K150 but only up to 18,000 units. For the remaining 2,000 units the price is difficult to determine because there will be many players in the market.

Products will be produced in batches of 200 units. The initial batch will take 3,000 hours and a learning rate of 80% will apply up to 6,400 units. Thereafter all batches will take the same time as the 32nd batch.

Required:

(i) Calculate the expected time to be taken by the 32nd batch. (4 marks)

(ii) If Division Z wishes to earn a target profit of K250,000 from the product, calculate price that should be charged for the remaining 2,000 units. (8 marks)

[Total: 40 marks]

SECTION B

Attempt any THREE (3) questions out of FOUR (4).

QUESTION TWO

Taonga's research and development staff have recently completed design work on a new product (the HOOK), and a target costing exercise is now being carried out by a cross-functional team of management and staff. The researched market price would be K88 and the expected return 30% margin.

"Component A" for the HOOK would be bought from an outside supplier for K1.44 per unit and 25% of all units of this component purchased would be wasted. Each HOOK would require 7.5 units of Component A (before taking account of the wasted units). Each HOOK would also require one unit of "Component B", which would be produced in-house by Taonga. The production costs for Component B would be K6 per unit (variable) plus a set-up cost of K36,000 per 8,000 units of the component. Labour input per HOOK would be 1.5 direct labour hours at an hourly wage rate of K9. All production overhead costs are charged to products on a direct labour hour basis. Fixed and variable overheads are charged at separate hourly rates. The fixed overhead rate is determined on the basis of the normal monthly average activity level, which is 12,500 direct labour hours. The following data is available for the two months of last year which represented the highest and lowest levels of activity in that year:

	July	October
Direct labour hours	10,000	18,000
Production overheads	K252,500	K404,500

Required:

Prepare a memo for the Chief Executive Officer in which you:

(a) Identify the target cost gap in relation to the HOOK, on the basis of the target costing system in use at Taonga. (12 marks)

(b) (i) Make recommendations as to how the target costing system should be modified. (4 marks)

(ii) Assess the likely adverse implications for the Taonga business unit if the modifications which you recommend are not implemented (You may assume that you have ascertained that direct labour hours are the cost driver for only 50% of the production overhead costs, with the other 50% being driven by various non-volume-related cost drivers). (4 marks)

[Total: 20 marks]

QUESTION THREE

(a) Mwando Limited (ML) is a construction company that has been in existence for three years. The construction industry has been growing very rapidly and competitive. A potential customer, Newton Ltd (NL), a housing company, has asked for a quotation to build ten basic one bed roomed houses in the newly opened free economic zone. NL is not a current customer of ML, but the directors of ML are keen to try and win the contract as they believe that this may lead to more contracts in the future. As a result they intend to quote the minimum possible price.

The following information has been obtained:

(i) The manager for this contract is paid an annual salary equivalent to K26, 400 per month.

(ii) 10,000 bags of cement will be required. This is a material that is essentially used in all construction works by ML and there are 4,000 bags currently in inventory. These were bought at a cost of K65 per bag two months ago. Its current replacement cost is K72 per bag.

(iii) 300 litres of Termkill, a material used to treat the foundation will be required. This material will have to be purchased for the contract because it is not otherwise used by ML. The minimum order quantity from the supplier is 400 litres at a cost of K45 per litre. ML does not expect to have any use for any of this material that remains after this contract is completed.

(iv) 1200 metres of conforce wire will be required. These will be purchased from Hamudili Hardware, a well-known building materials supplier. The purchase price is K30 per metre.

(v) A total of 4,700 direct labour hours will be required. The current wage rate for the appropriate grade of direct labour is K11 per hour. Currently ML has 1500 direct labour hours of spare capacity at this grade that is being paid under a guaranteed wage agreement. The additional hours would need to be obtained by either (i) overtime at a total cost of K14 per hour; or (ii) recruiting temporary staff at a cost of K12 per hour. However, if temporary staff is used they will not be as experienced as ML's existing workers and will require 100 hours supervision by an existing supervisor who would be paid overtime at a cost of K18 per hour for this work.

(vi) 50 machine hours will be required. The block making machine to be used is already leased for a weekly cost of K1,200. It has a capacity of 80 hours per week. The machine has sufficient available capacity for the contract to be completed. The variable running cost of the machine is K14 per hour.

(vii) The company absorbs its fixed overhead costs using an absorption rate of K40 per direct labour hour.

Required:

Prepare a cost schedule, using relevant costing principles, showing the minimum price Mwando Limited (ML) would charge for the contract. You should also explain each

relevant cost value included in your schedule and why the values you have excluded are not relevant. (14 marks)

(b) Beverages Lovers Ltd is reviewing the selling price of one of its products. The current selling price of the product is K75 per unit and annual demand is forecast to be 30,000 units at this price. Market research indicates that the level of demand would be affected by any change in the selling price. Detailed analysis from this research shows that for every K1 increase in selling price, annual demand would reduce by 5,000 units and that for every K1 decrease in selling price, annual demand would increase by 5,000 units.

A forecast of the annual costs that would be incurred by Beverages Lovers Ltd in respect of this product at differing activity levels is as follows:

Annual production (Units)		25,000	40,000	50,000
		K'000	K'000	K'000
Direct materials		600	960	1,200
Direct labour		1,800	2,880	3,600
Overhead		2,640	3,684	4,380

The cost behaviour patterns represented in the above forecast will apply for the whole range of output up to 150,000 units per annum of this product.

Required:

Calculate the optimum selling price and the forecasted profits of the product. (6 marks)

[Total: 20 marks]

QUESTION FOUR

(a) Mansa Ltd manufactures a drink concentrate called Munkoyo by mixing three ingredients. The ingredients are X and Z. A standard mix of these ingredient inputs result in 45 litres of munkoyo concentrate as indicated below:

X: 10 Litres x K62.50 = K625
Y: 15 Litres x K50.00 = K750
Z: 25 Litres x K37.50 = K937.50

In the period October to December, 1,000 litres of munkoyo ingredients were mixed to produce 955 litres of munkoyo concentrate. Details of the inputs were as follows;

X: 205 Litres x K67.50 = K13,837.50
Y: 280 Litres x K53.00 = K14,840.00
Z: 515 Litres x K35.00 = K18,025.00

Required:

(i) Calculate the total material ingredient mix and yield variances for the October to December period. (3 marks)

(ii) Calculate the material usage variances for X, Y and Z and show that the usage variances of X + Y + Z = materials mix + materials yield variances (N.B. work to the nearest K1) (2 marks)

(b) Mansa Ltd also uses opportunity cost approach to variance analysis to control operations in the production of Kadoli corn puffs. Budgeted and actual results relating to these corn puffs are as follows:

	Budget	Actual
• Production units (Kadoli Corn Puffs)	1,200	1,360
• Material Cost/kg	K15	K16
• Materials (Maize)	1,800kg	2,140kg

With the benefit of hindsight, it has been realised that the standard price of maize should have been K15.60.

Required:

(i) Calculate the materials price planning variance and materials price operational variance. (2 marks)

(ii) Prove that the traditionally calculated material price variance (standard cost – actual cost) is equal to materials price planning variance plus materials price operational variance. (1 mark)

(iii) Explain the main advantage of analysing variances into planning and operational. (2 marks)

(c) Haabenzu Hamoya operates Manzi-O-Tunya lodges. He uses financial and non-financial performance measures to monitor and control performance in his lodges.

Required:

(i) Define the term Non Financial Performance Indicators (NFPI). (1 mark)

(ii) State three (3) benefits and three (3) disadvantages of NFPI's. (3 marks)

(d) Explain **two** general problems of management in Not-For-Profit Organisations (NFPO's). (2 marks)

(e) Big Musa makes Product 'P' and operates an Activity Based Costing (ABC) system. He has forecast the following information for Product 'P'.

Direct materials per unit: K50

Direct labour: 0.5hrs @ K30 per hour

Batch size: 100 units per batch

Number of component orders: 75

Budgeted production for product P: 20,000 units

Musa's production activity, budgeted activity cost and cost drivers are as follows:

Cost Pool	Cost	Cost Driver	No. of Drivers
	K		
Production set ups	400,000	Number of set ups	400
Product testing	240,000	Number of inspections	800
Component supply & storage	960,000	Number of components	3,600

Machines are re-set after each batch. Product tests are executed on every batch.

Required:

Using ABC calculate the total manufactured cost per unit for product P. (4 marks)

[Total: 20 marks]

QUESTION FIVE

Mwiza Ltd is a company producing finger prints detector (FPD). The company has always maintained a 10% cost of capital.

The CEO of Mwiza Ltd solely prepares the company's budgets and forecasts without the involvement of senior staff, a practice that has attracted criticism from the members of the board.

The company's management team has been debating on the replacement strategy for particular machines used in the manufacturing of the FPD particularly Machine A and Machine B. The costs associated with the purchase and maintenance of these two machines is as follows:

Machine Type	Useful Life	Purchase Price	Maintenance cost per year		
	Years		Years 1-5	Years 6-10	Years 11-15
		K	K	K	K
A	10	90,000	6,200	10,600	-
B	15	120,000	4,000	5,600	7,800

The residual value of each machine drops by one-third of its purchase price during the first year of its ownership and thereafter declines by 6% of purchase price (machine A) and 4% of purchase price (machine B) per year.

A new machine A can be rented on the following terms:

1. Annual rentals (including maintenance costs) paid in advance of K20, 400 (first year), K20, 500 (subsequent four years) and K21, 990 (final five years); the machines are returned to the leasor at the end of ten years.

2. The rental may be terminated at any time on payment of a penalty – this would be K20,000, declining by K2, 000 per year with each year of the rental agreement completed.

Required:

(a) Advise Mwiza Ltd on:

(i) Which of the options (purchase Machine 'A', purchase Machine 'B', rent Machine 'A') is most economic, assuming that FPD production is to continue for at least 20 years. (6 marks)

(ii) Which of the options is most economic, assuming that FPD production is to continue for only five years. (6 marks)

(b) Explain the non-financial factors that might be relevant to decision making in this case.

(4 marks)

(c) Explain the potential disadvantages to Mwiza Ltd if it were to involve the senior staff in the budget preparation process. (4 marks)

[Total: 20 marks]

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/log2)
LR = the learning rate as a decimal

Demand curve

$P = a - bQ$

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

a = price when Q = 0

$MR = a - 2bQ$

Modified Internal Rate of Return

$$MIRR = \left[\frac{PV_R}{PV_I}\right]^{\frac{1}{n}}\left(1 + r_e\right) - 1$$

Present Value Table

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

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

Discount rate (r)

Periods (n)	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

Discount rate (r)

Periods (n)	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

SOLUTIONS

SOLUTION ONE

a) REPORT

To: Management Team of the GAG group
From: Management Accountant
Subject: Impact of Proposed Adjustment to Transfer Pricing System
Date: 20th November, 2014

1.0 INTRODUCTION

This report seeks to advise the management team of the GAG group on the response that it should make to the plans and proposals made by Division Y manager. The report has incorporated current and revised ROCE's including the effect on performance if a new branch is opened.

2.0 Current Transfer Price (TP) Policy of K60

With a TP of K60, the follow are performance results

	Division X	Division Y	GAG Group
	K'000	K'000	K'000
External Sales Revenue (100,000 x K60/ 25,000 x K50)	6,000	2,500	8,500
Transfer Sales Revenue (25,000 x K60)	1,500	-	-
	7,500	2,500	8,500
Less: Variable Cost			
– Transfer Costs		(1,500)	
– Own costs (125,000 x K30/ 25,000 x K20)	(3,750)	(500)	-4,250
Fixed costs	(1,000)	(450)	(1,450)
Divisional Controllable Profit	2,750	50	2,800
ROCE $\frac{2,750}{13,250} X\ 100 / \frac{50}{2,500} X\ 100$	20.75%	2%	

Comment

Division X's performance is much better than Division Y's. This is due to the use of market price as a transfer price for chemical A.

3.0 Division Y Proposed Transfer Price.

Since Division X has spare capacity (30,000 units) after fully satisfying the external market demand, the TP should be at standard variable cost. The general TP rule is standard variable cost + opportunity cost. In this case the opportunity cost is nil. The performance results would change as follows if TP = K30

Note the table below is in thousand kwacha

	Division X	Division Y	GAG Group
External Sales Revenue	6,000	2,500	8,500
Transfer Sales Revenue 25,000 x K30	750	–	–
	6,750	2,500	8,500
Less: Variable Costs			
– Transfer Costs	–	(750)	–
– Own costs (125,000 x K30/ 250,000 x K20)	(3,750)	(500)	(4,250)
Fixed costs	(1,000)	(450)	(1,450)
Divisional Controllable Profit	2,000	800	2,800
ROCE $\frac{2,000}{13,250}$ X 100/ $\frac{800}{2,500}$ X 100	15.10%	32%	

Comment

Division X's ROCE has reduced from 20.75% to 15.10% and Division Y's ROCE has increased from 2% to 32%. This clearly gives Division Y enormous advantage. Division X manager will argue that this TP system is not fair.

4.0 Opening of New Branch Proposal

4.1 Current TP Policy continues

An incremental gain or loss approach is taken here. If the new branch is opened in Chambeshi, the impact will be:

- Incremental sales revenue 5,000 x K100 = K500,000
- Incremental variable cost 5,000 x K20 [K10 + 6 + 4] = (K100,000)
- Incremental Fixed costs (K100,000)

K300,000

Transfer costs from Division X (5,000 x K60 per unit) (K300,000)

Incremental profit from Division Y 0

Comment

If no adjustment is made to the transfer price, Division Y would not benefit from this expansion. Instead all the profit will go to Division X, increasing current profit from K2,750,000 to K2,900,000 i.e. by K150,000 (5,000 units x K30 contribution per unit). Division X's ROCE will then be 21.89% ($\frac{2,900,000}{13,250,000}\ X\ 100\%$)

4.2 **TP Policy Adopted**

If the project went ahead on the TP of K30, i.e. at variable cost, then Division Y's contribution will increase by K150,000. Consequently, its ROCE will be 38% ($\frac{800+150}{2,500}$)

4.3 The conclusion is that both the current and proposed TP are not fair. A compromise between the two extreme transfer prices is desirable. An average TP will be K60 + K30 ÷ 2 = K45 or roughly say K40. The results will then be as follows:

	Division X	Division Y
External Sales Revenue 100 x K60/ 30 x K100	6,000	3,000
Transfer Sales Revenue (30 x K40)	1,200	–
	7,200	3,000
Less: Variable Costs		
– Transfer Costs	–	(1,200)
– Own costs (130 x K30/ 30 x K20)	(3,900)	(600)
Fixed costs	(1,000)	(550)
Divisional Controllable Profit	2,300	650
ROCE ($\frac{2,300}{13,250}$X 100/ $\frac{650}{2,500}$X 100)	17.36%	26%

Signed: Management Accountant

b) (i)

Total Time for 32 batches	Hours
$(0.8^{5} \times 3{,}000 \times 32) =$	31,457.28
Total Time for 31 batches	
$(0.8^{4.9542} \times 3{,}000 \times 31) =$	(30,787.31)
∴ Time for 32nd batch	669.97

b) (ii)

	K
• Material costs (20,000 units x K60)	1,200,000
• Labour cost (W.1)	1,848,366
• Variable overheads (20,000 x K16)	320,000
• Fixed costs	191,180
• Total costs	3,559,546
• Target Profit	250,000
• Total revenue from 20,000 units	3,809,546
Less: Revenue from 18,000 (18,000 x K150)	(2,700,000)
∴ Revenue from 2,000 units	1,109,546
	÷
	2,000
Price to be charged	**K554.77**

Working 1:

Labour Costs

31,457.28 hrs X K24 = 754,974.72

669.97 hrs X K24 = 1,093,391.04

K1,848,365.76

SOLUTION TWO

(a) Target cost = K88 less 30% = K61.60.

Estimated cost:

Component A: (7.5 / 0.75) * K1.44 = K14.40

Component B: K6 + (K36,000 / 8,000) = K10.50.

Direct labour: 1.5 * K9 = K13.50

Variable overheads:

Per DLH: K152K / 8,000 = K19

Per HOOK: 1.5 * K19 = K28.50.

Fixed overheads:

Per Month: K404,500 – (K19 * 18,000) = K62,500

Per DLH (absorption rate) = K62,500 / 12,500 = K5

Per HOOK: 1.5 * K5 = K7.50.

Total =K74.40.

Target cost gap = K74.40 - K61.60 = K12.80.

(b) In its present form, the target costing system will have the effect of closing the target cost gap by (K9 + K19 + K5 = K33) for every 1 hour reduction in DLH.

This creates the impression that (for example) a reduction in the labour content by one-third (i.e., 0.5 DLH) would be more than enough to close the target cost gap, since it would reduce the estimated cost of the product by K16.50.

In reality, for each 1 hour reduction in DLH, costs would fall by only K9 + 0.5*(K19+K5) = K21. A reduction of 0.5 DLH would not be enough to close the target cost gap since it would reduce costs by only K10.50.The target costing system should be modified so as to reflect the underlying cost drivers, so that the target costing team can accurately estimate the cost saving arising from reductions in the level of any cost driver. At present, the target costing system overstates the cost savings arising from eliminating DLH from the product and understates the cost savings arising from reducing the level of any non-volume-related cost driver.

If this problem is not rectified, then the target costing team is in danger of making bad decisions as to which product designs are consistent with achieving the required profit margin.

Rationale

Purpose of question: To assess candidates on the implementation of a target costing exercise and on their ability to identify the changes which are necessary in order to remedy the deficiencies in a target costing system (including identifying the practical difficulties if those difficulties are not made.

Options: Calculations are not strictly essential in part (b). What is essential is that candidates present their argument thoroughly and unconvincingly.

Essential components: Candidates need to be able to perform the calculations necessary in order to identify the target cost gap. They also need to make clear recommendations as to the changes which are necessary to the target costing system. They must also identify the adverse practical implications if those changes are not made.

SOLUTION THREE

(a)

	Note	K
Production director – meeting	1	NIL
Cement	2	72,000
Termkill	3	18,000
Floor tiles	4	36,000
Direct labour	5	40,200
Machine hours	6	700
Fixed overhead	7	NIL
Total relevant cost		166,900

Notes:

1. The Manager salary is a fixed cost, therefore the relevant cost is NIL. Even if it were future the manager's annual salary is not incremental cost to ML.
2. Cement is in regular use by ML and consequently its relevant value is its replacement cost. The historical cost is not relevant because it is a past cost and the resale value is not relevant since ML is not going to sell it since the material is in regular use and therefore must be replaced.
3. Termkill is to be purchased for the contract therefore its purchase cost is relevant. Although only 300 litres are required for the work the minimum order quantity is 400 litres and as ML has no other use for this material and there is no indication that the unused 100 litres can be sold, the full cost of purchasing the 400 litres is the relevant cost.
4. The conforce wire is to be purchased from Hamudilii at a cost of K30 each. This is a relevant cost because it is future expenditure that will be incurred as a result of the work being undertaken.
5. Since 1500 hours of spare capacity are available which have a zero relevant cost, the relevant cost relates only to the other 3200 hours. ML has two choices: either use its existing employees and pay them overtime at K14 per hour which is a total cost of K44,800; or engage the temporary staff which incurs their cost of K38,400 plus a supervision cost of K1,800 which equals K40,200. The relevant cost is the cheaper of these alternatives which is to use the temporary employees.
6. The machine is currently being leased and it has spare capacity so it will either stand idle or be used on this work. The lease cost will be incurred regardless so the only relevant cost is the incremental running cost of K14 per hour.
7. Fixed overhead costs are incurred whether the work goes ahead or not so it is not a relevant cost.

(b)

The optimum selling price occurs where marginal cost = marginal revenue.
Marginal cost is assumed to be the same as variable cost. From the data it can be determined that the costs of direct materials and direct labour are wholly variable and total K96 per unit. [(K600,000 + K1,800,000) / 25,000]
The overhead costs appear to be semi-variable and will be analysed using the High Low method:

	Units	K'000
High	50,000	4,380
Low	25,000	2,640
Difference	25,000	1,740

Thus the variable overhead cost per unit is K1,740,000 / 25,000 = K69.60
The total variable cost per unit is therefore K165.60

The price at which there is zero demand can be calculated to be K75 + ((30,000 / 5,000) x K1)) = K81
There is a change in demand of 5,000 units for every K1 change in selling price so the equation of the selling price is:

K81 – 0.0002x

And thus the equation for marginal revenue is:
K81 – 0.0004x
Equating marginal cost and marginal revenue gives:
165.60 = 81 – 0.0004x

$$x = \frac{165.60-81}{0.0004}$$

x = - 211,500
If x = - 211,500 then the optimum selling price is:
K81 – (0.0002 x 211,500) = K38.70

NB: Examiner wanted the approach, for it is practically impossible to have negative quantity (x) and the variable cost per unit (K165.60) can never be higher than the price (K81) at which demand is zero

SOLUTION FOUR

a) (i) Materials Mix Variance

Ingredient	Standard mix (10:15:25)	Actual mix	Variance in litres	Cost per litre	Variance in K
X	200	205	5 (A)	K62.5	312.50 (A)
Y	300	208	20 (F)	K50.0	1,000 (F)
Z	500	515	15 (A)	K37.5	562.5 (A)
	1,000	1,000	–		125 (F)

ii) Materials Yield Variance

	Litres
Standard Yield: 1,000 litres should have yielded ($1{,}000\ x \frac{45}{50}$)	900
Actual Yield: 1,000 litres yielded	955
	55kg (F)
	x K2,312.5
	45 kg
	K2,826.4 (F)

Working: Standard weighted average cost

X: 10 litres x K26.50 = K625

Y: 15 litres x K50.00 = K750

Z: 25 litres x K37.50 = K937.5

K2,312.5
÷
45kg
= K51.39 per litre

Material Usage Variance

	X	Y	Z
	Litres	Litres	Litres
Std Usage ($\frac{45}{50}/\frac{15}{45}/\frac{25}{45}$) x 955 litres	212.22	318.33	530.56
Actual usuage	205.00	280.00	515.00
	7.22 (F)	38.33 (F)	15.56 (F)
	x	x	x
	K62.5	K50	K37.50
	K451.25 (F)	K1,916.67 (F)	K583.33 (F)
Total		K2,951.25	

Proof: Materials Usage Variance = Materials Mix Variance + Materials yield Variance

K2,951.00 (F) = K125 (F) + K2,826 (F)

a) (ii)

Materials Price Planning Variance		Operational Price Variance
Revised Std. Price	15.60	15.60
Original Std. Price	15.00	16.00
	K0.60 (A)	K0.40 (A)
	x	x
	2,140 kg	2,140 kg
	= K1,284 (A)	K856 (A)

Total K2,140 (A)

Proof: Traditional Materials Price Variance

Standard cost: 2,140kg Should have cost (2,140 x K15) = K32,100
Actual Cost 2,140kg cost x K16 = K34,240
K2,140 (A)

(ii) The major benefit of analyzing the variances into planning and operational components is that the revised standard should provide a realistic standard against which to measure performance. In other words they help to clarify variances into those caused by planning errors and those caused by operational efficiencies. Any variances should then be a result of operational management efficiencies and inefficiencies and not faulty planning (planning errors)

b (i) Non- financial performance indicators (NFPI's) are measures of performance based on non-financial information which may originate in and be used by operating departments to monitor and control their activities without any accounting input. They include market share, capacity utilization, labour turnover, quality of services, level of morale, comfort, cleanliness, courtesy, production units, levels of waste, etc.

(ii) Benefit of NFPI's include

- They are easy to calculate and understand/use, particularly by non-financial managers
- Unlike traditional financial reports, NFPI information can be provided quickly to manager (e.g. per shift, daily, hourly).
- They are less likely to be massaged/manipulated compared to traditional performance measure. To this extent NFPI's counteract short termism.
- NFPI's can be quantitative (e.g. production units) or qualitative (e.g. friendliness).
- They provide better information about key areas such as quality, customer satisfaction, employees.
- They are better indicator of future prospects (they are forward-looking measures) than financial indicators (backward-looking: they focus on short term)

Disadvantages of NFPI's include:

- They may lead managers to follow detailed operational goals at the expense of overall long-term strategy.
- To be really useful, they have to be linked to financial measures (as a balanced score card), i.e. on their own they may not be useful.
- There is need to develop them and refine them over time to ensure that they remain relevant.
- Too many measures can lead to information overload for managers, providing information which may not be truly useful.

(iii) Problems of management in not-for-profit organisations (NFPO's) include

<u>Multiple objectives</u>

NFPO's tend to have multiple objectives. Thus, it may be impossible to say which one is overriding. Objectives may be diverse and ill-defined.

Measuring outputs

- Data collection can be a problem. For example, unreported crimes are not included in the data used to measure the performance of the police force.
- Outputs can rarely be measured in a way that is generally agreed to be meaningful, e.g. do good examination results per se imply excellent teaching?

Lack of profit measure

Financial measures such as return on capital employed or residual income are meaningless because NFPO's have no sales or are not expected to make a profit.

Political, social, and legal considerations

- Objectives may be regularly changed through the political process, e.g. changed Governments (new political party in power. For example, when the Patriotic Front (PF) came into power, Zamtel and Zambia Railways were re-natonalised), i.e. unlike commercial organisations, public sector organisations are subject to political interferences.

Financial constraints

- Financial constraints are more pronounced in NFPO's than commercial organization. Borrowing by a local authority (e.g. Mufulira Municipal Council) is strictly controlled by the Zambian Government and general funding of local authorities is dictated by the Government via the Ministry of Local Government and Housing.

(c) Product cost per unit-product P

	K
Direct material	50
Direct labour (0.5hrs x K30)	15
Overheads (W.1)	
- Set-ups	10
- Product testing	3
- Component supply and storage	2
	80

Working 1

- No. of batches = $\frac{10{,}000 \text{ units}}{100 \text{ units/ batch}}$ = 100 batches
- Set-up costs = K $\frac{400{,}000}{400}$ = K1000 × 100 batches ÷ 10,000 units = K10
- Product testing = K 240,000 ÷ 800 = K300 ×100 batches÷ 10,000 units = K3

– Component supply =

K960,000 = K266.67 × 75 components = K20,000 ÷ 10,000 units = K2
3,600

SOLUTION FIVE

a) The approach taken will be to calculate the equivalent annual costs of each option.

Purchase A

Time	Cashflow	K	10% discount factor	PV
0	Purchase	(90,000)	1	(90,000)
1-5	Maintenance	(6,200)	3.791	(23,504)
6-10	Maintenance	(10,600)	2.354	(24,952)
10	Residual value (W2)	11,400	0.386	4,400
				(134,056)

Equivalent Annual Cost = (K21,815)

Rent B

Time	Cashflow	K	10% discount factor	PV
0	Rental	(20,400)	1	(20,400)
1-4	Rental	(20,500)	3.170	(64,985)
5-9	Rental	(21,990)	2.401	(52,974)
Equivalent Annual Cost =				(138,359)

The option to purchase machine A is the most economic, having the lowest equivalent annual cost.

If valve production is to continue for only five years, the five year PV of cost calculations would be:
Purchase B: K(120,000) + K(7,210) + K30,400 (W1) × 0.567 = K(49,973)
Purchase A: K(90,000) + K(11,176) + K19,200 (W2) × 0.567 = K(45,290)
Rent A: K(20,400) + K(31,129) + K(5,000) × 0.567 = K(44,164)

Thus the option to rent machine A would now be the most economical.

Workings

(W1) Residual values – machine A

	K
Purchase price	90,000
First year drop (1/3)	(30,000)
Next 4 years drop (K5,400 pa)	(21,600)
Residual value after 5 years	38,400
Next 5 years drop (K5,400 pa)	(27,000)
Residual value after 10 years	11,400

(W2) Residual values – machine B

	K
Purchase price	120,000
First year drop (1/3)	(40,000)
Next 14 years drop (K4,800 pa)	(67,200)
Residual value after 5 years	60,800
Next 10 years drop (K4,800 pa)	(48,000)
Residual value after 15 years	12,800

Purchase B

Time	Cashflow	K	10% discount factor	PV
0	Purchase	(120,000)	1	(120,000)
1-5	Maintenance	(4,000)	3.791	(15,164)
6-10	Maintenance	(5,600)	6.145-3.791	(13,182)
11-15	Maintenance	(7,800)	7.606-6.145	(11,396)
15 Residual value (W1)		12,800	0.239	3,059
NPV (Cost)				(156,683)

Equivalent Annual Cost = NPV/AF = K (20,600)

(b)

In the above evaluation the decision on which machine to buy/hire has been based upon expected cash flows and possible lifetimes – the latter being one of the most significant non-financial factors influencing the decision. As the above analysis shows, over the short time span envisaged by the directors for the use of current production facilities (5 to10 years) the option to rent the machine A is the most economical for the majority of the time. It would therefore appear to be the most suitable choice.

Other non-financial factors that may influence the decision include:

Flexibility – in view of the uncertainty over the length of time the machines will be needed, before new technology makes the process redundant, it may be considered that renting is the most flexible option. Extraction from a rental agreement will be easier and more certain.
It may also be possible to swap to renting alternative plant/equipment developed under the new technology.
Certainty of costs – the costs associated with the rental option will generally be more predictable; own maintenance costs and residual values involved in the purchasing options can only be estimates, and could vary considerably – the latter in particular if the machines are being disposed of following technological development, when they will be virtually obsolete.
Productivity – the relative efficiencies of the two machines (A and B) over their lifetimes, in terms of valve production rates, should be taken into account.
Reliability – breakdown/repair frequencies for the two machines need to be established if possible (from own/other users' experience, independent tests etc.)
Alternative uses for purchased machines – it may be possible to use machines A or B for other products, making their purchase a worthwhile investment.

(c)

Potential disadvantages include:

- Senior staff may be excellent academically but could lack the knowledge and skills required to formulate their budget and to work together to form the budget.
- Senior staff may spend a great deal of time arguing with each other.
- Senior staff may agree among themselves to include unnecessary expenditure (budgetary slack) so that it is easier for them to achieve the cost targets they have set.
- Senior staff may underestimate the expected revenue in order to make their final target more achievable.
- The participative process can be very time consuming, thus delaying the availability of the budget for the forthcoming year.

END OF SOLUTIONS