

# **The Institute of Finance Management**



## **Department Accounting and Finance**

### **Tutorial Questions**

#### **Management Accounting**

#### **Throughput Accounting**

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### QUESTION 1

BM manufactures four products, A, B, C and D. Details of sales prices, costs and resource requirements for each of the products are as follows.

	Product <b>A</b>	Product <b>B</b>	Product <b>C</b>	Product <b>D</b>
Sales price	1.4	0.8	1.2	2.8
Materials cost	0.6	0.3	0.6	1
Direct labour cost	0.4	0.2	0.4	1
	Minutes	Minutes	Minutes	Minutes
Machine time per unit	5	2	3	6
Labour time per unit	2	1	2	5
	Units	Units	Units	Units
Weekly sales demand	2,000	2,000	2,500	1,500

Machine time is a bottleneck resource and the maximum capacity is 400 machine hours each week. Operating costs, including direct labour costs, are shs 5,440 each week. Direct labour costs are shs 12 per hour, and direct labour workers are paid for a 38hour week, with no overtime.

#### REQUIRED

- Determine the quantities of each product that should be manufactured and sold each week to maximise profit and calculate the weekly profit.
- Calculate the throughput accounting ratio at this profit maximising level of output and sales.

### QUESTION 2

GM Ltd has 2 production departments: assembly and finishing department. It makes 2 products: GA and GB. Through Ltd operates a JIT manufacturing system. Processing capabilities are shown below:

	Processing time in hours per unit	
	Assembling	Finishing
Product GA	0.5	0.75
Product GB	0.5	1
Hours Available	12,000	12,000

Factory overhead and direct labour expense for the period is Shs 180,000.

Cost data is as follows:

	Product GA	Product GB
Unit Selling Price	Shs. 20	Shs. 15
DM cost per unit	Shs. 11	Shs. 9

#### REQUIRED:

- Identify the bottleneck process.
- Calculate TPAR for each product.

- c) Calculate the throughput accounting ratio at this profit-maximizing level of output and sales.
- d) Interpret the TPAR and suggest how GM Ltd can improve the TPAR.

### QUESTION 3

Jambo makes and sells two products A and B, each of which passes through the same automated production operations. The following estimated information is available for period 1:

Product unit data	A	B
Selling price per unit (shs)	6,000	7,000
Direct material cost per unit (shs)	200	4,000
Variable production overhead cost (shs)	2,800	400
overall hours per product unit (hours)	0.25	0.15

#### The additional information is provided below

- 1) Budgeted production/sales of products A and B are 120,000 units and 45,000 respectively.
- 2) Maximum demand for each product is 20% above the budgeted sales levels.
- 3) Total fixed production overhead cost is shs 147,000,000. This is absorbed by products A and B at an average rate per hour based on the estimated production levels.
- 4) One of the production operations has a maximum capacity of 3,075 hours which has been identified as a bottleneck that limits the overall production/sales of products A and B. The bottleneck hours required per product unit for products A and B are 0.02 and 0.015 respectively.

### REQUIRED

- a) Calculate the mix (units) of products A and B that will maximize net profit and the value (Shs) of the maximum net profit.
- b) The bottleneck situation detailed in (a) still applies. Jambo has decided to determine the profit-maximizing mix of products A and B based on the throughput accounting principle of maximizing the throughput return per production hour of the bottleneck resource. All other information detailed in (a) still applies, except that the variable overhead cost as per is now considered to be fixed for the short/intermediate term, based on the value (shs) that applied to budgeted production/sales.
  - i) Calculate the mix (units) of products A and B that will maximize net profit and the value of that net profit.
  - ii) Calculate the throughput accounting ratio for product B
  - iii) Comment on the interpretation of throughput accounting ratios and their use as a control device. You should refer to the ratio for product B in your answer.

### QUESTION 4

Bingo Ltd is engaged in the manufacturing and marketing of bicycles. Two bicycles are produced. These are the 'Roadster' which is designed for use on roads and the 'Everest' which is

a bicycle designed for use in mountainous areas. The following information relates to the year ending 31 December 2018:

- (1) Unit selling price and cost data is as follows:

	Roadster	Everest
	Shs	Shs
Selling price	200	280
Material cost	80	100
Variable production conversion costs	20	60

- (2) Fixed production overheads attributable to the manufacture of the bicycles will amount to Shs 4,050,000.

- (3) Expected demand is as follows:

Roadster	150,000 units
Everest	70,000 units

- (4) Each bicycle is completed in the finishing department. The number of each type of bicycle that can be completed in one hour in the finishing department is as follows:

Roadster	6.25
Everest	5.00

There are a total of 30,000 hours available within the finishing department.

- (5) Bingo Ltd operates a just-in-time (JIT) manufacturing system with regard to the manufacture of bicycles and aims to hold very little work-in-progress and no finished goods stocks whatsoever.

**REQUIRED:**

- Using marginal costing principles, calculate the mix (units) of each type of bicycle which will maximize net profit and state the value of that profit.
- Calculate the throughput accounting ratio for each type of bicycle and briefly discuss when it is worth producing a product where throughput accounting principles are in operation. Your answer should assume that the variable overhead cost amounting to Shs 4,800,000 incurred as a result of the chosen product mix in part (a) is fixed in the short term.
- Using throughput accounting principles, advise management of the quantities of each type of bicycle that should be manufactured which will maximize net profit and prepare a projection of the net profit that would be earned by Bingo Ltd in the year ending 31 December 2018.

- (d) Explain two aspects in which the concept of ‘contribution’ in throughput accounting differs from its use in marginal costing.

### QUESTION 5

BM Co is a hairdressing salon that provides both ‘cuts’ and ‘treatments’ to clients. All cuts and treatments at the salon are carried out by one of the salon’s three senior stylists. The salon also has two salon assistants and two junior stylists.

Every customer attending the salon is first seen by a salon assistant, who washes their hair; next, by a senior stylist, who cuts or treats the hair depending on which service the customer wants; then finally, a junior stylist who dries their hair. The average length of time spent with each member of staff is as follows:

	Cut Hours	Treatment Hours
Assistant	0.1	0.3
Senior stylist	1.0	1.5
Junior stylist	0.5	0.5

The salon is open for eight hours each day for six days per week. It is only closed for two weeks each year. Staff salaries are Shs 40,000 each year for senior stylists, Shs 28,000 each year for junior stylists and Shs 12,000 each year for the assistants. The cost of cleaning products applied when washing the hair is Shs 0.60 per client. The cost of all additional products applied during a ‘treatment’ is Shs 7.40 per client. Other salon costs (excluding labour and raw materials) amount to Shs 106,400 each year. BM Co charges Shs 60 for each cut and Shs 110 for each treatment.

The senior stylists’ time has been correctly identified as the bottleneck activity.

#### REQUIRED:

- Briefly explain why the senior stylists’ time has been described as the ‘bottleneck activity’, supporting your answer with calculations.
- Calculate the throughput accounting ratio (TPAR) for ‘cuts’ and the TPAR for ‘treatments’ assuming the bottleneck activity is fully utilized.

### QUESTION 6

Dar Systems Co makes two types of solar panels at its manufacturing plant: large panels for commercial customers and small panels for domestic customers. All panels are produced using the same materials, machinery and a skilled labour force. Production takes place for five days per week, from 7 am until 8 pm (13 hours), 50 weeks of the year. Each panel has to be cut, moulded and then assembled using a cutting machine (Machine C), a moulding machine (Machine M) and an assembly machine (Machine A).

As part of a government scheme to increase renewable energy sources, Dar Co has guaranteed not to increase the price of small or large panels for the next three years. It has also agreed to

supply a minimum of 1,000 small panels each year to domestic customers for this three-year period.

Due to poor productivity levels, late orders and declining profits over recent years, the finance director has suggested the introduction of throughput accounting within the organisation, together with a 'Just in Time' system of production. Material costs and selling prices for each type of panel are shown below.

	Large panels	Small panels
	Shs	Shs
Selling price per unit	12,600	3,800
Material costs per unit	4,300	1,160

Total factory costs, which include the cost of labour and all factory overheads, are Shs 12,000,000 each year at the plant.

Out of the 13 hours available for production each day, workers take a one hour lunch break. For the remaining 12 hours, Machine C is utilized 85% of the time and Machines M and A are utilized 90% of the time. The unproductive time arises either as a result of routine maintenance or because of staff absenteeism, as each machine needs to be manned by skilled workers in order for the machine to run. The skilled workers are currently only trained to work on one type of machine each. Maintenance work is carried out by external contractors who provide a round the clock service (that is, they are available 24 hours a day, seven days a week), should it be required.

The following information is available for Machine M, which has been identified as the bottleneck resource:

	Large panels	Small panels
	Hours per unit	Hours per unit
Machine M	1.4	0.6

There is currently plenty of spare capacity on Machines C and A. Maximum annual demand for large panels and small panels is 1,800 units and 1,700 units respectively.

**REQUIRED:**

- Calculate the throughput accounting ratio for large panels and for small panels and explain what they indicate to Dar Co about production of large and small panels.
- Assume that your calculations in part (a) have shown that large panels have a higher throughput accounting ratio than small panels.

**REQUIRED:**

Using throughput accounting, prepare calculations to determine the optimum production mix and maximum profit of Dar Co for the next year.

- (c) Suggest and discuss THREE ways in which S Co could try to increase its production capacity and hence increase throughput in the next year without making any additional investment in machinery.