



**FACULTY OF ENGINEERING AND THE BUILT ENVIRONMENT  
SUPPLEMENTARY EXAM**

**DEPARTMENT OF QUALITY AND OPERATIONS MANAGEMENT**

<b>PROGRAMME</b>	:	NATIONAL DIPLOMA OPERATIONS MANAGEMENT
<b>SUBJECT</b>	:	OPERATIONS MANAGEMENT 2B
<b>CODE</b>	:	OPM22B2
<b>DATE</b>	:	6 <sup>TH</sup> JANUARY 2020
<b>DURATION</b>	:	3 HOURS
<b>TIME</b>	:	11H30-14H30
<b>TOTAL MARKS</b>	:	100
<b>WEIGHTS</b>	:	50%
<b>EXAMINER</b>	:	MR EM BAKAMA
<b>(Internal) MODERATOR</b>	:	MR NELSON MADONSELA
<b>NUMBER OF PAGES</b>	:	7 pages (Including cover page)

---

**INSTRUCTIONS TO CANDIDATES:**

- Answer ALL questions.
- This is a closed book assessment.
- Leave margins and spaces between the questions.
- Show all your calculations.
- Number your answers clearly.
- Unless otherwise indicated, express your answers correct to two (2) decimal places.
- Use Annexure and B to answer question c and d in section B
- Where appropriate, indicate the units of your answer. (e.g. Hour, R )
- The general University of Johannesburg policies, procedures and rules pertaining to written assessments apply to this assessment.

**SECTION A: THEORY****[50 MARKS]**

1.	In your own word, explain the importance of Short-Term Scheduling.	(12)
2.	What is the difference between finite and infinite loading? Provide for each one of them an advantage and a disadvantage	(8)
3.	Mention and explain the criteria for a correct scheduling technique	(8)
4.	Explain the following as far as capacity planning is concerned: a. Design capacity b. Effective capacity c. Efficiency d. Utilization	(8)
5.	Name all the tactics used for matching capacity to demand	(12)
6.	Define the term capacity	(2)

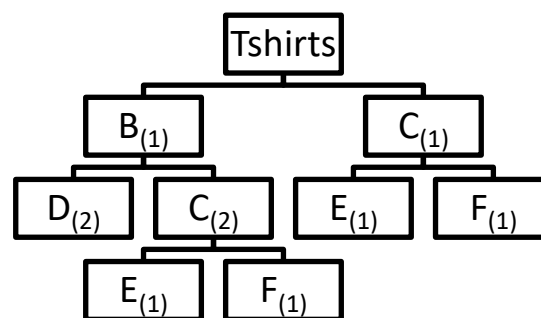
**SECTION B: MATERIAL REQUIREMENT PLANNING****[50 MARKS]****Case study: MRP at Artconscient Pty**

With an estimated quarterly aggregate demand of 5000 units, Artconscient Pty is a new clothing brand that has been on the market for less than three years. The company manufactures different types of products (Caps, bracelets, hoodies and T-shirts). For the past five months, sales have been steady and the company has placed itself in a so good financial position that an expansion is under consideration by the management team. All thanks to the marketing team led by Miss Sibanyoni since the company opened its doors. The company has placed most of its resources in online advertisement since the business is done online on the company's website and the target market is mostly made of young people. The operation process is quite simple: The Company holds no inventory (not even a bracelet), once a customer places an order and makes the payment, the company needs a maximum of five working days to proceed it. The operations department receives a notification via email with the customer's order details (Product size and color), then a notification is sent back to the customer for confirmation purpose and the manufacturing process begins. The raw materials (fabrics) are collected from a suppliers in Johannesburg north by the procurement department, then the material is sent to the design department

where fashion designers make the requested product that will be sent later on to the printing department that will add the final touch on the product.

Finally, the product is ready for delivery, a notification is sent to the customer to confirm the collection time and delivery arrangements. Working with no stock on hand and by outsourcing most of the activities has recently placed the company in a difficult position on the long run as one of the suppliers could not always deliver the material on time. Hence the company has decided to make some products on its own. Last month the managing director Mr Ruan Kruger has heard that the University of Johannesburg is organizing an international festival on the 20th of September 2019 and would like his company to partner with the University to produce some T-shirts for the participating countries. Thus, he (the manager) was contacted by the Nigerian Society to manufacture 100 t-shirts for the performers and would like them to be ready a week before the festival (WEEK 10 from now). Excited by this order, Mr Ruan Kruger agreed to work with the Nigerian Society and realized that in order to manufacture the 50 units he will need to contact some of his suppliers to help him with some materials.

Because the job will require a good planning, he contacted Miss Bolipombo a fresh graduate from the University of Johannesburg in the department of quality and operations to help him plan the production. The product structure and quantities of each component needed for each assembly are noted in parentheses as per the product structure below. He first started by identifying all the material that will be required and gave them a specific notation to help her easily build the product structure as follow:



In addition to the above information, Miss Bolipombo tells you that the lead time for a T-shirt is a week, for B is two weeks, for C is three weeks and a week for the each one of the remaining items. Before the whole production process, it is important to mention that they are ten Tshirts in stock, twenty B(s) in stock, no stock for C, hundred units for D, ten for D and finally fifty for F. With all the

information collected, Miss Bolimpobo approached you since you are an intern in the company and would like you to find out the following:

1.	Redraw the diagram to determine the low-level coding, identify all levels, parents and kids (Mention them).	(11)																												
2.	Use the table below to fill the quantities of each component necessary to produce 10 units of the assembly of the Tshirts. <table><tr><th>Levels</th><th>Item</th><th>Quantity per unit</th><th>Total Requirements for 10 Tshirts</th></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr></table>	Levels	Item	Quantity per unit	Total Requirements for 10 Tshirts																									(12)
Levels	Item	Quantity per unit	Total Requirements for 10 Tshirts																											
3.	Determine the gross quantities needed of each item if you are to assemble the 50 Tshirts by Week 10	(12)																												
4.	Construct a net material requirement	(12)																												
5.	Based on your net material requirement plan, when should the production start?	(3)																												

---

**GOODLUCK**

---

# ANNEXTURE A: GROSS MATERIAL REQUIREMENT SHEET

Student number: \_\_\_\_\_ Surname and Initial \_\_\_\_\_

ITEM	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Lead time
Order Release											
Order Release											
Order Release											
Order Release											
Order Release											
Order Release											
Order Release											
Order Release											

## ANNEXTURE B: NET REQUIREMENT SHEET

Student number: \_\_\_\_\_ Surname and Initial \_\_\_\_\_

Master Schedule	1	2	3	4	5	6	7	8	9	10	11	12	13
Product:	Product Parent:			Level		Lot Size:			Lead Time				
Week	1	2	3	4	5	6	7	8	9	10	11	12	13
Gross Requirements													
Schedule receipts													
On hand inventory													
Net requirements													
Planned order receipt													
Planned order release													
Product:	Product Parent:			Level		Lot Size:			Lead Time				
Week	1	2	3	4	5	6	7	8	9	10	11	12	13
Gross Requirements													
Schedule receipts													
On hand inventory													
Net requirements													
Planned order receipt													
Planned order release													
Product:	Product Parent:			Level		Lot Size:			Lead Time				
Week	1	2	3	4	5	6	7	8	9	10	11	12	13
Gross Requirements													
Schedule receipts													
On hand inventory													
Net requirements													
Planned order receipt													
Planned order release													
Product:	Product Parent:			Level		Lot Size:			Lead Time				
Weeks	1	2	3	4	5	6	7	8	9	10	11	12	13
Gross Requirements													
Schedule receipts													
On hand inventory													
Net requirements													
Planned order receipt													
Planned order release													
Product:	Product Parent:			Level		Lot Size:			Lead Time				
Weeks	1	2	3	4	5	6	7	8	9	10	11	12	13
Gross Requirements													
Schedule receipts													
On hand inventory													
Net requirements													
Planned order receipt													
Planned order release													
Product:	Product Parent:			Level		Lot Size:			Lead Time				
Weeks	1	2	3	4	5	6	7	8	9	10	11	12	13
Gross Requirements													
Schedule receipts													
On hand inventory													
Net requirements													
Planned order receipt													
Planned order release													
Product:	Product Parent:			Level		Lot Size:			Lead Time				
Weeks	1	2	3	4	5	6	7	8	9	10	11	12	13
Gross Requirements													

Schedule receipts													
On hand inventory													
Net requirements													
Planned order receipt													
Planned order release													
Product:	Product Parent:			Level		Lot Size:			Lead Time				
Week	1	2	3	4	5	6	7	8	9	10	11	12	13
Gross Requirements													
Schedule receipts													
On hand inventory													
Net requirements													
Planned order receipt													
Planned order release													