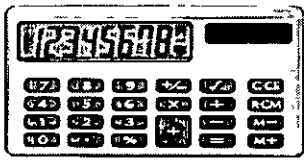
UNIVERSITY EXAMINATIONS



UNIVERSITEITSEKSAMENS

UNISA university of south africa

MNO202B (464849) October/November 2009

PRODUCTION AND OPERATIONS MANAGEMENT (BUSINESS MANAGEMENT 202)

Duration 2 Hours 70 Marks

EXAMINERS
FIRST PROF LP KRUGER
SECOND PROF RJ STEENKAMP

Use of a non-programmable pocket calculator is permissible

The paper consists of 9 pages plus instructions for the completion of a mark reading sheet

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Make sure that the following information appears on the cover of your answer book
- Your student number
- The module code (MNO202B)
- All the numbers of the questions you have answered

This examination paper consists of two sections Section A contains 10 multiple-choice questions which count only one mark each Section B consists of 3 essay-type questions of 30 marks each of which the student has to select any two of a particular PART and answer them for 60 marks out of 70 Section A and B together thus count 70 marks

SECTION A	STUDENTS MUST ALL ANSWER THIS SECTION	10 Marks
SECTION B	SELECT ANY TWO (2) OF THE THREE (3) QUESTIONS	60 Marks
	TOTAL	70 Marks

RECOMMENDATION PLEASE CAREFULLY CONSIDER THE ABOVE ALLOCATION OF MARKS AND TOTAL TIME LIMITATION (TWO HOURS) BEFORE DECIDING ON WHICH SECTION TO ANSWER FIRST

SECTION A

MUST BE ANSWERED BY ALL STUDENTS

ANSWER ALL 10 QUESTIONS

1 Operations management is important because certain advantages may result to the business

*Which **one** of the following statements **does not** embody a typical advantage associated with the operations of a business?*

1 It can reduce the costs of producing products or rendering services more efficiently

2 It can increase revenue by increasing customer satisfaction through good quality and service

3 It can reduce the capital employed by increasing the effective capacity of the operation

4 It can provide the basis for future innovation

5 It contributes to greater environmental impact awareness

2 Customer/clients influence the various performance objectives a business may strive to achieve The table below provides some customer/client needs or competitive factors which lead to certain performance objectives (eg low price → cost)

*Which **two** of the following are **incorrect**?*

Competitive factors (if the customers/clients value these)			Performance objectives (then the operation will need to excel at these)
a	low price	→	Cost
b	low variability	→	consistent quality
c	fast delivery	→	Quality
d	reliable delivery	→	Dependability
e	ability to change timing	→	flexibility (delivery)
f	wide range of products	→	flexibility (mix)
g	ability to adapt design	→	Speed

1 ag
2 cg
3 cb
4 be
5 df

3 The DPA (Deterministic Productivity Accountability) model illustrates how productivity levels affect profitability

*Which **three** of the following alternatives are **correct**?*

a A change in profit can be brought about through a change in product revenue (as influenced by product quantity and product price) and/or a change in resource value (as influenced by resource quantity and resource price)

b A change in profit is not only affected by product and resource quantities, but also by changes in price recovery

c An expected increase in the price of Company A's input resource will lead to an increase of its product price to counter the increase in the resource price and maintain profitability

d An unexpected increase in the price of Company B's input resource should rather force the operation to tighten up its process so that its resource value remains constant as does its profitability

e With reference to (c) and (d), should Company A's customer/clients choose to buy the product from Company B, the selling quantity will increase but profitability will decrease

1 abc
2 cde
3 abd
4 abe
5 ade

4 Match the type of process in manufacturing and services in column I with the appropriate example(s) in column II

COLUMN I	COLUMN II
(a) Batch process	(i) Shoe repair shop
(b) Mass process	(ii) Paint manufacturer
(c) Service shop	(iii) Beer producer
(d) Professional service	(iv) Optometrist

1 (a)-(iv) (b)-(iii) (c)-(ii) (d)-(i)

2 (a)-(i) (b)-(ii) (c)-(iii) (d)-(iv)

3 (a)-(iii) (b)-(ii) (c)-(iv) (d)-(i)

4 (a)-(ii) (b)-(iii) (c)-(i) (d)-(iv)

5 (a)-(iv) (b)-(ii) (c)-(iii) (d)-(i)

5 Which **three** of the following statements are **correct**?

a The supply network consists of all the customer-supplier relationships that exist both on the demand and the supply side of the operation

b The total supply network consists exclusively of all the first-tier, second-tier and other tier suppliers

c Strategic decisions that need to be taken in relation to the supply network include the following the configuration of the network itself (shape and extent of vertical integration), the location of the operation, and the long-term capacity of each part of the network

d The whole supply network needs to be considered in design decisions because it helps the business to understand how it can compete effectively, helps to identify the particularly significant links in the network, and helps the business to focus on its long-term position within the network

e The supply network design includes both the product/service design and the process design

1 abc
2 acd
3 cde
4 bde
5 abe

6 The layout of an operation is concerned with the physical location of the transforming resources and also focuses on the way transformed resources flow through the whole operation

*Which **one** of the following matches of layout types to the description/advantage/disadvantage and example is **correct**?*

Basic layout type	Description/advantage/disadvantage	Example
1 Fixed-position layout	Can mean much movement of plant and staff, scheduling of space and activities can be difficult	Open-heart surgery
2 Process layout	Transformed resources entering the operation are pre-selected to move to one part of the operation which may either be a process or a product layout	Maternity unit in hospital
3 Cell layout	The needs of the transforming resources dominate the layout decision	General ward in a hospital
4 Product layout	Each transforming resource is unique and requires different actions and therefore follows a different route	Mass-immunisation programme
5 Functional layout	The flow is clear, predictable and relatively easy to control and results in low unit cost for high volume	Self-service cafeteria in the hospital

7 Which **three** of the following statements are **incorrect**?

a The elements of job design include determining what the task is, where it should be performed, who is responsible for supervising the execution and when it should be completed

b From a historical perspective, the approaches to job design practice have become more and more human oriented

c The division of labour reduces the monotony of work, increases flexibility among the workforce, and promotes faster learning by specialization

d Method study is a scientific management approach which concentrates on determining and speeding up the time an average worker takes to carry out a specific task

e Ergonomic designs have the advantage that they pay specific attention to and aim to improve the interface between the worker and the physical aspects of the workplace

1 abc
2 abd
3 acd
4 cde
5 bcd

8 Which **three** of the following statements are **correct**?

a On the one hand, the dilemma of inventory management is the high cost and other disadvantages of holding stock, and on the other, the security they provide in complex operations

b Inventories are a practical necessity and exist because of an imbalance between the timing of supply and demand for material resources

c To manage the inventory system, decisions of volume (how much to order), timing (when to order) and place (where to order) need to be taken regularly

d The EOQ (economic order quantity) of an item with a yearly demand of 2 000, order cost of R25 per order, purchase price of R60 per item and inventory holding cost of 20 percent of the purchase cost is approximately R91,00

e Seasonal items may be held in anticipation inventory and encompass stock that is produced ahead of actual demand

1 abc
2 cde
3 bde
4 abe
5 bcd

9 Which of the following statements are **incorrect**?

a Supply chains represent the channels or strands of linked operations through which goods and services flow into the operation (on the supply side) and out of the operation (on the demand side)

b Materials management as an integrated concept refers to the management of the flow of materials and information through the immediate supply chain and includes both purchasing and physical distribution management

c Logistics, as an extension of the concept of physical distribution management, refers to the total flow of finished goods downstream from the operation, through distributions channels to the end customer

d Supply chain management is a much broader, more ambitious and strategically significant concept which views the entire supply chain as a system to be managed, even across company boundaries, for the benefit of the end customer

e Integrated concepts such as materials management, merchandising, logistics and supply chain management focus upon managing the flow of materials across the traditional functional boundaries of purchasing, production/operations and physical distribution

1 none
2 abc
3 de
4 ac
5 acde

10 Which **three** of the following statements are **incorrect**?

a The activities of production/operations management encompass five direct responsibilities, namely to understand the operation's strategic objectives, to develop a production/operations strategy, to design, to plan and control, and to improve the production/operations system

b The general model of production/operations management consists of two ideas an input-transformation process-output model which has a management overlay consisting of the direct and indirect responsibilities of production/operations managers

c The production/operations system hierarchy consists of the internal reporting relationships between high-level, middle-level and low-level managers, supervisors and shop-floor workers

d An internal customer/client represents a person or group of people who over many years have reached the status of preferred trading party (ie VIP customer/client) while an internal supplier similarly has reached preferred trading status and acts as an extension of the primary business

e One of the advantages of buffering the production/operation system against disruptions originating from the external environmental lies in the ability of the business to significantly reduce stocks of input and output resources

1 abc
2 bcd
3 cde
4 abe
5 acd

Section A 10 questions x 1 mark = 10 marks

SECTION B

SELECT AND ANSWER ANY TWO (2) OF THE FOLLOWING THREE (3) ESSAY-TYPE QUESTIONS. EACH QUESTION COUNTS 30 MARKS

QUESTION 1

1 1 The authors of your prescribed book, Slack, N Chambers,S and Johnston, R (2007 12) conclude that in essence ***operations management is about managing processes*** Use the examples of a large Departmental store such as Woolworths and a Government department such as the SAPS (South African Police Service) to **substantiate** this statement You need to identify and describe the **inputs**, the **transformation process(es)** and the **outputs** of the two operations

(6)

1 2 **Illustrate** with the aid of a diagramme, the potential internal and external effects (or benefits) of the five operations **performance objectives** Which performance objective is internally affected by all other – **justify** your answer

(6)

1 3 **Outline** South Africa's **productivity performance** for the period 1996 – 2004 as illustrated by Productivity SA (former NPI) in terms of the four largest % contributing sectors to its 2004 GDP figures (ie Finance and insurance, Manufacturing, Wholesale and retail, Transport and storage) What is your **overall impression** regarding real output and productivity growth for the country over the aforementioned period and sectors

(8)

1 4 The operations manager of Amalgamated Beverages needs to determine the most economic batch quantity (EBQ) for various of its the well-known soft drinks Demand is constant at 80 000 bottles per month (each month has 160 production hours) and the bottling line fill the bottles at a rate of 3 000 bottles per hour The cost (of labour and lost production) to make a change-over from one type of a soft drink to another is estimated to be around R100 per hour Stock holding costs are counted at 10c per bottle per month **Calculate** the **EBQ**? Should the change-over time be halved – what would the effect be on the batch quantity?

(5)

1 5 What are the **differences in the planning and control activities** for "resource-to-order", "make-to-order" and 'make-to-stock", and how would their total throughput time (P) and demand time (D) differ?

(5)

[30]

QUESTION 2

2 1 South Africa's **competitive position** is illustrated by the International Institute for Management Development (IMD) in their World Competitiveness Yearbook (WCY) for 2006 **Outline** the country's overall world ranking in terms of the four main competitiveness factors on which the report is based What "positive" and "negative" aspects regarding South Africa's position can you identify?

(8)

2 2 A reconditioned copying machine has recently been installed at your work place The machine can operate for 7 days a week and 24 hours a day Should the machine not operate for 59 hours a week due to planned occurrences (unavoidable) and also not for 58 hours due to unplanned stoppages (avoidable), what is the **utilisation** and **efficiency ratios** of the machine?

(6)

2 3 The "essence" of POM is the effective and efficient management of this function in a business Which five (5) typical **operations "induced" failures** may occur, and how may they be prevented?

(5)

2 4 The table below indicates the processing times (in minutes) for six jobs in two different work centres (panel beating and painting) The work centre **sequence** is from **Y → X**

JOB	PROCESSING TIME WORK CENTRE X	PROCESSING TIME WORK CENTRE Y
A	2	3
B	6	4
C	1	3
D	0	5
E	4	2
F	3	1

Using **Johnson's rule (algorithm)**, **determine** the optimal job processing sequence

(6)

2 5 A partially completed **master production schedule** (MPS) for 20MvA generators is illustrated in the table below A demand chase MPS policy is adopted throughout and the aim is to keep the available inventory to 0 (zero) Lead time is 0

	Week					
	1	**2**	**3**	**4**	**5**	**6**
Demand	10	15	25	10	20	35
Available						
MPS						
On hand 30						

Required

- **Complete the MPS schedule** for weeks 1 to 6
- Should a new buyer request an additional 40 generators in week 4, what should the **total MPS quantity** for week 4 be?

(5)

[30]

QUESTION 3

3 1 The Unisa library has adopted a policy whereby there should never be more that 10 students waiting at the counter where library books are issued It takes the library assistant on average 3 minutes to issue the books to the student The library policy further makes provision that a student should not wait longer than 6 minutes in the queue Using **Little's Law**, **calculate how many** library assistants should be at the counter issuing books Also **explain** the concept itself and **show** all your calculations

(5)

3 2 **Distinguish** between the following three basic layout types by drawing a simple diagram and **illustrating** an appropriate practical example of each

- product layout
- process layout
- fixed-position layout

(6)

3 3 A new training company **AZZA** is to start with specialised training for first-line and middle managers The company must decide where to locate is training facilities in South Africa Generally, which factors should be taken into consideration when making **location decisions** and how may they broadly be classified? Which **category of factors** will probably weigh the heaviest is the case of the training company?

(8)

3 4 Job design involves six key job-related elements As the owner of a stone quarry in an area with midday temperatures of 35°C, **illustrate with practical examples** of how you can incorporate the six job design elements when you design the jobs at your quarry The quarry delivers about 100 blocks per day and employs both low-skilled labourers and highly skilled stone dressers Large machines and noisy equipment are used in the quarry

(6)

3 5 **Multidesign Posters** has five jobs to be processed by a particular work centre The processing time, date received and due date for each job are given Today is day 66 on the production/operations calendar

Jobs in work centre

Job number	Processing Time	Date received	Due date
367	3	58	67
356	5	55	70
370	4	61	71
366	6	57	69
375	2	63	68

What will the processing sequence be of the five jobs if the following sequencing priority rules are followed?

- the FIFO (first-in-first-out)
- the earliest due date first
- the SOT (shortest operation time first)

(5)

[30]

Section B Any 2 questions x 30 marks = 60 marks

TOTAL NUMBER OF MARKS (SECTIONS A AND B) = [70]

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EXAMINATION MARK READING SHEET EKSAMEN-MERKLEESBLAD

PART 1 (GENERAL/ALGEMEEN) DEEL 1

STUDY UNIT e g PSY100-X
STUDIE EENHEID bv PSY100 X — 1

PAPER NUMBER
VRAESTELNOMMER — 2

INITIALS AND SURNAME
VOORLETTERS EN VAN — 3

DATE OF EXAMINATION
DATUM VAN EKSAMEN — 4

EXAMINATION CENTRE (E G PRETORIA)
EKSAMENSENTRUM (BV PRETORIA) — 5

STUDENT NUMBER
STUDENTENOMMER — 6

UNIQUE PAPER NO
UNIEKE VRAESTEL NR — 8

For use by examination invigilator
Vir gebruik deur eksamenopsiener

7 — 9

IMPORTANT

1 USE ONLY AN HB PENCIL TO COMPLETE THIS SHEET
2 MARK LIKE THIS
3 CHECK THAT YOUR INITIALS AND SURNAME HAS BEEN FILLED IN CORRECTLY
4 ENTER YOUR STUDENT NUMBER FROM LEFT TO RIGHT
5 CHECK THAT YOUR STUDENT NUMBER HAS BEEN FILLED IN CORRECTLY
6 CHECK THAT THE UNIQUE NUMBER HAS BEEN FILLED IN CORRECTLY
7 CHECK THAT ONLY ONE ANSWER PER QUESTION HAS BEEN MARKED
8 DO NOT FOLD

BELANGRIK

1 GEBRUIK SLEGS N HB POTLOOD OM HIERDIE BLAD TE VOLTOOI
2 MERK AS VOLG
3 KONTROLEER DAT U VOORLETTERS EN VAN REG INGEVUL IS
4 VUL U STUDENTENOMMER VAN LINKS NA REGS IN
5 KONTROLEER DAT U DIE KORREKTE STUDENTENOMMER VERSTREK HET
6 KONTROLEER DAT DIE UNIEKE NOMMER REG INGEVUL IS
7 MAAK SEKER DAT NET EEN ALTERNATIEF PER VRAAG GEMERK IS
8 MOENIE VOU NIE

PART 2 (ANSWERS/ANTWOORDE) DEEL 2

10

1	c1 c2 c3 c4 c5	36	c1 c2 c3 c4 c5	71	c1 c2 c3 c4 c5	106	c1 c2 c3 c4 c5
2	c1 c2 c3 c4 c5	37	c1 c2 c3 c4 c5	72	c1 c2 c3 c4 c5	107	c1 c2 c3 c4 c5
3	c1 c2 c3 c4 c5	38	c1 c2 c3 c4 c5	73	c1 c2 c3 c4 c5	108	c1 c2 c3 c4 c5
4	c1 c2 c3 c4 c5	39	c1 c2 c3 c4 c5	74	c1 c2 c3 c4 c5	109	c1 c2 c3 c4 c5
5	c1 c2 c3 c4 c5	40	c1 c2 c3 c4 c5	75	c1 c2 c3 c4 c5	110	c1 c2 c3 c4 c5
6	c1 c2 c3 c4 c5	41	c1 c2 c3 c4 c5	76	c1 c2 c3 c4 c5	111	c1 c2 c3 c4 c5
7	c1 c2 c3 c4 c5	42	c1 c2 c3 c4 c5	77	c1 c2 c3 c4 c5	112	c1 c2 c3 c4 c5
8	c1 c2 c3 c4 c5	43	c1 c2 c3 c4 c5	78	c1 c2 c3 c4 c5	113	c1 c2 c3 c4 c5
9	c1 c2 c3 c4 c5	44	c1 c2 c3 c4 c5	79	c1 c2 c3 c4 c5	114	c1 c2 c3 c4 c5
10	c1 c2 c3 c4 c5	45	c1 c2 c3 c4 c5	80	c1 c2 c3 c4 c5	115	c1 c2 c3 c4 c5
11	c1 c2 c3 c4 c5	46	c1 c2 c3 c4 c5	81	c1 c2 c3 c4 c5	116	c1 c2 c3 c4 c5
12	c1 c2 c3 c4 c5	47	c1 c2 c3 c4 c5	82	c1 c2 c3 c4 c5	117	c1 c2 c3 c4 c5
13	c1 c2 c3 c4 c5	48	c1 c2 c3 c4 c5	83	c1 c2 c3 c4 c5	118	c1 c2 c3 c4 c5
14	c1 c2 c3 c4 c5	49	c1 c2 c3 c4 c5	84	c1 c2 c3 c4 c5	119	c1 c2 c3 c4 c5
15	c1 c2 c3 c4 c5	50	c1 c2 c3 c4 c5	85	c1 c2 c3 c4 c5	120	c1 c2 c3 c4 c5
16	c1 c2 c3 c4 c5	51	c1 c2 c3 c4 c5	86	c1 c2 c3 c4 c5	121	c1 c2 c3 c4 c5
17	c1 c2 c3 c4 c5	52	c1 c2 c3 c4 c5	87	c1 c2 c3 c4 c5	122	c1 c2 c3 c4 c5
18	c1 c2 c3 c4 c5	53	c1 c2 c3 c4 c5	88	c1 c2 c3 c4 c5	123	c1 c2 c3 c4 c5
19	c1 c2 c3 c4 c5	54	c1 c2 c3 c4 c5	89	c1 c2 c3 c4 c5	124	c1 c2 c3 c4 c5
20	c1 c2 c3 c4 c5	55	c1 c2 c3 c4 c5	90	c1 c2 c3 c4 c5	125	c1 c2 c3 c4 c5
21	c1 c2 c3 c4 c5	56	c1 c2 c3 c4 c5	91	c1 c2 c3 c4 c5	126	c1 c2 c3 c4 c5
22	c1 c2 c3 c4 c5	57	c1 c2 c3 c4 c5	92	c1 c2 c3 c4 c5	127	c1 c2 c3 c4 c5
23	c1 c2 c3 c4 c5	58	c1 c2 c3 c4 c5	93	c1 c2 c3 c4 c5	128	c1 c2 c3 c4 c5
24	c1 c2 c3 c4 c5	59	c1 c2 c3 c4 c5	94	c1 c2 c3 c4 c5	129	c1 c2 c3 c4 c5
25	c1 c2 c3 c4 c5	60	c1 c2 c3 c4 c5	95	c1 c2 c3 c4 c5	130	c1 c2 c3 c4 c5
26	c1 c2 c3 c4 c5	61	c1 c2 c3 c4 c5	96	c1 c2 c3 c4 c5	131	c1 c2 c3 c4 c5
27	c1 c2 c3 c4 c5	62	c1 c2 c3 c4 c5	97	c1 c2 c3 c4 c5	132	c1 c2 c3 c4 c5
28	c1 c2 c3 c4 c5	63	c1 c2 c3 c4 c5	98	c1 c2 c3 c4 c5	133	c1 c2 c3 c4 c5
29	c1 c2 c3 c4 c5	64	c1 c2 c3 c4 c5	99	c1 c2 c3 c4 c5	134	c1 c2 c3 c4 c5
30	c1 c2 c3 c4 c5	65	c1 c2 c3 c4 c5	100	c1 c2 c3 c4 c5	135	c1 c2 c3 c4 c5
31	c1 c2 c3 c4 c5	66	c1 c2 c3 c4 c5	101	c1 c2 c3 c4 c5	136	c1 c2 c3 c4 c5
32	c1 c2 c3 c4 c5	67	c1 c2 c3 c4 c5	102	c1 c2 c3 c4 c5	137	c1 c2 c3 c4 c5
33	c1 c2 c3 c4 c5	68	c1 c2 c3 c4 c5	103	c1 c2 c3 c4 c5	138	c1 c2 c3 c4 c5
34	c1 c2 c3 c4 c5	69	c1 c2 c3 c4 c5	104	c1 c2 c3 c4 c5	139	c1 c2 c3 c4 c5
35	c1 c2 c3 c4 c5	70	c1 c2 c3 c4 c5	105	c1 c2 c3 c4 c5	140	c1 c2 c3 c4 c5

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Your mark reading sheet is marked by computer and should therefore be filled in thoroughly and correctly

USE ONLY AN HB PENCIL TO COMPLETE YOUR MARK READING SHEET

PLEASE DO NOT FOLD OR DAMAGE YOUR MARK READING SHEET

Consult the illustration of a mark reading sheet on the reverse of this page and follow the instructions step by step when working on your sheet

Instruction numbers ❶ to ⓾ refer to spaces on your mark reading sheet which you should fill in as follows

❶ Write your paper code in these eight squares for instance

P	S	Y	1	0	0	-	X

❷ The paper number pertains only to first-level courses consisting of two papers

WRITE | 0 | 1 | for the first paper and | 0 | 2 | for the second If only one paper then leave blank

❸ Fill in your initials and surname

❹ Fill in the date of the examination

❺ Fill in the name of the examination centre

❻ WRITE the digits of your student number HORIZONTALLY (from left to right) Begin by filling in the first digit of your student number in the first square on the left, then fill in the other digits each one in a separate square

❼ In each vertical column mark the digit that corresponds to the digit in your student number as follows [-]

❽ WRITE your unique paper number HORIZONTALLY

NB Your unique paper number appears at the top of your examination paper and consists only of digits (e g 403326)

❾ In each vertical column mark the digit that corresponds to the digit number in your unique paper number as follows [-]

⓾ Question numbers 1 to 140 indicate corresponding question numbers in your examination paper The five spaces with digits 1 to 5 next to each question number indicate an alternative answer to each question The spaces of which the number correspond to the answer you have chosen for each question and should be marked as follows [-]

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