

**MNO3701**

(483888)

May/June 2012

MNO301D

(477339)

PRODUCTION AND OPERATIONS MANAGEMENT

Duration 2 Hours

70 Marks

EXAMINERS .
FIRST
SECOND
EXTERNAL
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 Use of a non-programmable pocket calculator is permissible.

This paper consists of 11 pages plus instructions for completion of a mark reading sheet

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This examination paper consists of two sections. Section A contains 10 multiple-choice questions of one mark each. Section B consists of three essay-type questions of 30 marks each of which you have to select any two to answer for a total of 60 marks. The grand total for section A and B is 70 marks.

SECTION A: ALL STUDENTS MUST ANSWER THIS COMPULSORY SECTION	[10]
SECTION B Essay type questions	[60]
TOTAL	[70]

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**ANSWER ALL 10 QUESTIONS.**

- 1 Which **two** of the following statements are **incorrect**?
- a Operations management is one of the three core functions of any organisation.
 - b Marketing can be categorized as one of the two “support functions” which enables the core functions to operate effectively
 - c Operations management’s responsibility to the support functions can be summarised as “this is what we want/need”. Its relationship with the other two core functions can be classified as “this is what we do – help us reconcile with broader business needs”
 - d Designing new furniture on the part of a furniture manufacturer forms part of the operations core function.
 - e A broad definition of operations constitutes the inclusion of all activities necessary for the fulfilment of customer requests
- 1 ab
2 cd
3 bd
4 de
5 be
- 2 Which **two** of the following statements are **correct**?
- a. The process of operations strategy is the specific decisions which set the operations role, objectives and activities. The content of operations strategy is the method that is used to make the specific process decisions
 - b There is no universal agreement on how an operations strategy should be described. Various pressures result in four perspectives from which operations strategy can be seen.
 - c When operations strategy involves translating market requirements into operations decisions, a strategy may develop gradually over time, known as an emergent strategy
 - d An order winning factor may not be the major competitive determinant of success but unsatisfactory performance in this area might result in a customer choosing to purchase a product elsewhere

[TURN OVER]

- e The impact on an organisation's 'operations resource' capabilities will be at least as great, if not greater, than that which it gets from its market position.

- 1 ae
- 2 bc
- 3 ce
- 4 be
- 5 bd

3 Which of the following statements are **correct**?

- a. Although technologies are categorised as either material processing technology, information processing technology or customer processing technology, combinations do occur. These technologies are called integrating technologies.
- b. Operations managers are continually involved in the management of process technology. They need to be able to articulate what the technology should be able to do, design the technology and manage its implementation into the operation.
- c. Different process technologies are associated with different volume-variety combinations. A low automation operation with high scalability is typically classified as having low volume and high variety.
- d. Amongst the factors operations managers should consider when selecting automated technology are the overall cost saving, safety, maintenance and new product possibilities.
- e. Scaleability is the ability to shift to a different level of useful capacity quickly and cost effectively while coupling is the means of linking together separate activities within a single process of process technology to form an interconnected processing system.

- 1 ade
- 2 ad
- 3 ae
- 4 cde
- 5 acd

4 Project management demands very specific competencies. Which **one** of the following alternatives is **not** associated with the basic project management processes as defined in the project management body of knowledge?

- 1 Project integration and scope management
- 2 Work breakdown management and network management
- 3 Risk management and procurement management

[TURN OVER]

- 4 Time management and quality management
- 5 Cost management and human resource management

5 **BABY PROJECTS** has recently won a tender for a small construction project consisting of four activities. The following information is given

- The durations of activities A, B, C and D are 2, 3, 1 and 2 days, respectively
- Activities B and C are immediate followers of activity A
- Activities B and C are immediate predecessors of activity D
- The earliest start time (ES) for activity A is day 0 and the latest start time (LS) for activity D is day 5

By using the above information, what is the earliest start time (ES) for activity B and the latest start time (LS) for activity C?

- 1 ES = day 2 and LS = day 5
- 2 ES = day 3 and LS = day 2
- 3 ES = day 3 and LS = day 5
- 4 ES = day 2 and LS = day 4
- 5 ES = day 4 and LS = day 2

6 Production/operations improvement is important no matter how well the operation is managed. Which **one** of the following in this regard is **incorrect**?

- 1 The whole improvement process should be supported through the TQM approach.
- 2 Incremental continuous improvement places a high value on creative solutions and radical rethinking of systems
- 3 The PDCA cycle, benchmarking, BPR and performance standards are terms associated with operations improvement
- 4 Four kinds of standards are used, namely competitor performance standards, absolute performance standards, historical standards and target performance standards
- 5 Quality, speed, dependability, flexibility and cost are composites of many smaller measures

7 Which **two** of the following statements are **correct**?

- a TQM can be viewed as a logical extension of the way in which quality related practice has progressed from inspection to QC to QA to TQM

- b. A change in quality anywhere in an organisation has an effect everywhere in the organisation because every person and every activity affects, and in turn is affected, by others
- c. TQM covers all parts of the organisation except the quality of working life (QWL) of the internal client/customer
- d. Quality can be "free" if appraisal costs and failure costs can be balanced
- e. ISO 9000 is a QA model framework for SPC and continuous improvement

- 1 ab
- 2 bc
- 3 ac
- 4 ad
- 5 be

8 Failure prevention and recovery is part of the TQM philosophy. Some refer to TQM as organisation-wide prevention of defects/waste and organisation-wide improvement of products/processes. Which **one** of the following statements regarding failure prevention and recovery is **incorrect**?

- 1 Failures are like "enemies". They are classified as design failures, facilities failures, staff failures, supplier failures and customer/client failures.
- 2 The three main ways of measuring failure are reliability, availability and failure rates
- 3 To seek out failures in a proactive way can be done by focus groups, in-process checks and different surveys
- 4 Coping when things go wrong is certainly the most important activity which relate to failures
- 5 FMEA is an analysis and means of identifying failures before they happen

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

- a. Control charts are used as a means within statistical process control to get processes back in control after significant problems have been identified
- b. Control charts differentiate between uncommon causes and assignable causes. Assignable causes will typically result in control charts falling either above or below the upper and lower control limits respectively
- c. Process capability is a measure of the acceptability of the variation of the process. The simplest measure of capability (C_p) is given by the ratio of the specification range to the 'natural' variation of the process

[TURN OVER]

- d. The only acceptable means of setting control limits is based on the probability that the mean of a particular sample will differ by more than a set amount from the mean of the population from which it is taken.
- e. In statistical process control, a typical example of a type I error would be stopping a process when a process is in control. A typical example of a type II error would be leaving a process to continue when the process is actually out of control.

- 1 abc
- 2 abd
- 3 bcd
- 4 bce
- 5 bde

10 Consider the following statements with regards to operations challenges and the area of job design. Which **one** of the following statements is **incorrect**?

- a. With respect to globalisation, an issue to consider in the area of job design could be the cost of labour.
- b. With respect to corporate social responsibility, an issue to consider in the area of job design could be staff safety.
- c. With respect to environmental considerations, an issue to consider in the area of job design could be the selection of appropriate working hours.
- d. With respect to technology, an issue to consider in the area of job design could be the use of communication technology to work away from the work location.
- e. With respect to knowledge management, an issue to consider in the area of job design could be the anthropometric requirements to perform jobs.

- 1 a
- 2 b
- 3 c
- 4 d
- 5 e

10 questions x 1 mark = [10]

[TURN OVER]

SECTION B

SELECT AND ANSWER ANY TWO OF THE FOLLOWING THREE ESSAY-TYPE QUESTIONS

EACH QUESTION COUNTS 30 MARKS.

QUESTION 1

- 1.1 Define the term “benchmarking” and indicate what type of benchmarking would be applied in the following situations.
- where a company’s operations practices (ways of doing things) are benchmarked against those adopted by another operation
 - benchmarking between different levels of achieved performance in different operations
 - benchmarking between an operation and other operations in a different organisation
 - benchmarking between operations or part of operations in the same organisation
- (6)
- 1.2 A furniture retailer stocks a particular type of table. Although sales of this table outperform sales of other tables on the shop floor, sales vary from month to month and the store manager is never entirely sure how many to order on his monthly schedule. The manufacturer receives these monthly orders and produces according to the orders received from his retail partners downstream.
- With reference to the above scenario and the uncertainty in supply and demand, differentiate between the two types of demand
- (4)

[TURN OVER]

- 1 3 **Material requirements planning (MRP)** is used to plan and control material requirements. The master production schedule (MPS) for three sizes of screwdriver is given in the table below. All three screwdrivers (2 mm, 7 mm and Star 5) use the same handle. The MPS requirements are

Item	Week				
	1	2	3	4	5
2 mm	15			10	
7 mm	10		18		17
Star 5	10	10	7	5	9
MPS	35	10	25	15	26

The inventory record (item master file) shows the following planning factors: batches are set at quantities of 20, safety stock is set at two handles, the available inventory is 70 and the lead time for orders is two weeks. When will the **first order** be issued (ie in which week) and what will the **available inventory** be in week 2 and 5 (ie quantity of items)?

(6)

- 1 4 "Failures are rarely the result of random chance, their root cause is usually human failure." Define the term "customer failure" and explain the **three** main methods used to measure failure.

(4)

- 1 5 Study unit 11, namely "Project planning and control" of the Study guide for MNO3701 demanded that you should be able to demonstrate your understanding of certain aspects. Do the following in this regard

- Describe what a project entails.
- Explain how to achieve successful project management
- Describe what each of the stages of the project planning and control process involves.

(10)

[30]

QUESTION 2

- 2.1 Distinguish between the various **strategic roles** which the production and operations function must fulfil in a business. How could these different roles be linked to with the **Hayes and Wheelwright Four-Stage Model** for evaluating the competitive role and contribution of the POM function?

(4)

- 2.2 The XR GAUTENG PROMOTIONS office relocation project "**PROJECT: GROWTH**", consisting of eight activities, is described as follows.

Description of project

Activity	Activity time (days)	Immediate followers
A	7	B, C
B	2	D
C	4	D
D	4	E
E	4	F, G
F	3	H
G	5	H
H	0	-

Draw a **CPM network** and **only** indicate the ES, EF, LS and LF times of activities C, E and G.

(6)

- 2.3 The **JIT philosophy** has certain key aspects which in effect define the core of **JIT**. How would the JIT basic working practices support these key aspects?

(5)

- 2.4 How does a wider view of corporate social responsibility influence operations management?

(5)

- 2.5 Identify the two study units in topic 6 on quality planning and control and explain the following perceived quality gaps

- gap 1: the customer's specification-operation's gap
- gap 2: the concept-specification gap
- gap 3: the quality specification-actual quality gap
- gap 4: the actual quality-communicated image gap

(10)

[30]**[TURN OVER]**

QUESTION 3

- 3 1 The **nature of the operations** of a **project-driven business** such as NORTHERN CAPE ENGINEERING and those of a **mass service provider** such as Kulula Airlines will differ from one other. Explain what such differences entail by identifying the (1) transforming resources, (2) the transformed resources, (3) the type of transformation process and (4) the outputs from the transformation process of each. (4)
- 3 2 What do the following concepts with regard to **quality planning and control** entail and why should they be considered important in any operation?
- the production/operation's **view of quality**
 - the difference between **process capability** (with process tolerance limits) and **process control charts** (with control limits)
- (4)
- 3 3 The design of a process also involves selecting the appropriate **process technology**. Explain which aspects or **categories of process technology(ies)** need to be considered for a hotel (3)
- 3 4 Once the priority of improvement has been achieved, an operation must consider the specific approach or strategy it will take for the improvement process. Two particular strategies represent different, and to some extent opposing philosophies. Describe these opposing philosophies, providing examples in each instance (4)
- 3.5 **Gibbs Pharmaceuticals** manufacture needles that are subjected to a bend test. They use **statistical process control (SPC)** and the results (measured in grams) are plotted on a chart
- If the process average is 26,1 and the average range is 5, what will the control limits be if the sample size $n = 8$? The factor for calculation of control limits is 0,373 for sample size $n=8$
 - Draw a chart and explain whether an investigation for an assignable cause should be undertaken given that one sample average is 26,08?
- (5)
- 3 6 Explain the concept of total quality management (TQM) and distinguish between the four (4) main components of the cost of quality (10)

[30]

[TURN OVER]

2 x 30 marks = [60]
TOTAL [70]

