

Production and operations management gets as close as one can get in the business world to "the act of creation". Which one of the following statements is incorrect? Production and operations management

encourages other business functions to suggest ways in which it can improve its service to the rest of the business.

views a micro operation as an internal customer/client and is the most important area of employee know-how, and further arranges the resources which are devoted to the production/delivery of its goods (products) and services.

views all managers as production and operations managers and sees them as holding the key to either satisfying or disappointing customers/clients.

focuses on the transformation model and entails information processing and customer/clients processing.

regards the design and improvement of its services as an indirect responsibility.

In the feedback for activity 1.3 in your study guide, the term "effective" was explained. Within the context of production and operations management this means that products and/or services must be manufactured or rendered that will satisfy the needs of the customers/clients. The key issues of this goal are .... Which two of the following are correct?

a

High impact on the market

b

Quick response time

c

The effective and efficient management of the production/operations function

d

Profitability

e

Low production costs

1-ab

2-be

3-cd

4-de

5-ce

20  
418

48  
57

86  
12

3.

In terms of capacity planning and control, efficiency is the ratio of:

1

actual output to effective capacity

2

actual output to design capacity

3

effective capacity to actual output

4

design capacity to effective capacity

5

design capacity to actual capacity

$$\text{efficiency} = \frac{\text{actual output}}{\text{effective capacity}}$$

4. The four important measures which can be used to distinguish between the different types of operations are:

- a Volume of output
- b Variation in demand
- c Variety of output
- d Degree of customer/client contact
- e Capital intensity

- 1 acde
- 2 abde
- 3 **abcd**
- 4 bcde
- 5 abce

323  
24178

5. Which two of the following statements are incorrect?

- The inputs to material requirements planning (MRP) are customer orders and sales.
- Demand management is defined as the management of customer orders and sales forecasts.
- A master production schedule (MPS) can only be useful in the manufacturing industries.
- Material requirement planning does not only plan for each order, but also allows the re-planning of orders.

~~5. The main files kept in MRP systems that help manage inventory are the transaction, the bills of materials, and the location file.~~

- 1 ac
  - 2 ab
  - 3 cd
  - 4 **ce**
  - 5 be
- CE
- to the location file  
to the transaction file  
to the location file?

Customer/clients influence the different performance objectives. 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?

Performance objectives (then the operation will need to excel at these ...)	Competitive factors (if the customers/clients value these ...)
cost	low price
consistent quality	low variability
quality	fast delivery
dependability	reliable delivery
flexibility (delivery)	ability to change timing
flexibility (mix)	wide range of products
speed	ability to adapt design

- ag
- cg ✓
- cb
- be
- df

Which one of the following statements is correct?

- "Doing things on time" in a business translates into a speed advantage. *fast delivery*
- "Doing things cheaply" in a business usually results in having to do things over and thus nullifies the quality advantage. *cost advantage*
- Being able to change things quickly in a business also brings about a dependability advantage. *flexible*
- "Doing things right the first time" in a business has definite flexibility advantages. *flexibility*
- "Doing things fast" has direct benefits in terms of speed and indirectly leads to cost advantages because the business can respond to customer/client needs more quickly.

7. 18



10. Which three of the following statements are incorrect?

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.

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.

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.

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.

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

- abc
- bcd
- cde
- abc
- acd

11. Which three of the following statements are incorrect?

High variety means producing the same product a great many times.

Customer contact means that customers are able to see and touch the product.

A bread bakery is example of high-variation operation.

Operations can be classified along four dimensions, namely according to the level of their volume, variety, variation and degree of customer contact.

One of the direct responsibilities of production/operations management is planning and controlling the operation.

- abc
- bde
- bed
- ade
- bce

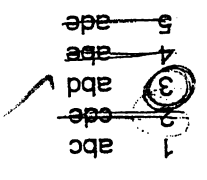
12. Which three of the following statements are correct?

- a. Productivity management may be viewed from two levels: macro-economic and micro-economic.
- b. A broad measure of "productivity" for the country as a whole comprises outputs divided by inputs.
- c. The GDP (gross domestic product) per capita comprises the total value of the total output of a country divided by its total population and, in effect, reflects the relative wealth of the country.
- d. South Africa is regarded as internationally unique when it comes to productivity performance because of its ethnic differences and the contrast between the advanced and backward sectors of the economy.
- e. When compared to other countries with comparable developing economies, like Argentina, Brazil, Chile, Greece and Mexico, South Africa stands out as the best performer with regard to productivity growth from 1988 to 1994.



13. The DPA 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.



15. The sequence of the design activity in products and services is as follows:
- |   |   |
|---|---|
| 1 | Concept generation → Specification → Preliminary marketing  |
| 2 | Specification → Test marketing → Final design   |
| 3 | Concept generation → Screening → Preliminary design → Evaluation and improvement → Prototyping and final design           |
| 4 | Ideas → Concept generation → Package Development → Process development  |
| 5 | Concept generation → Test marketing → Idea screening → Preliminary marketing → Specification → Prototyping → Final design |

- |   |           |           |           |          |
|---|-----------|-----------|-----------|----------|
| 1 | (a)-(iv)  | (b)-(iii) | (c)-(ii)  | (d)-(i)  |
| 2 | (a)-(i)   | (b)-(iii) | (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)  |

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

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

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

(H)

Product and service design involves turning ideas for a new products or services into a detailed specification.

The concept generation includes both internal sources and external sources.

The ideas from competitors cannot be considered during the design of a product or service.

When the product is designed, the only department that is involved is production/operations management.

The first stage in design entails coming up with the idea for a product or service.

18. Indicate which two of the following statements are incorrect.

Process types in service operations includes professional services, mass production and shopping malls.

The construction of a big bridge is an example of a project process.

Volume and variety do not affect the design activity.

Product/service design and process design are independent of each other.

Product designers are more concerned about the quality of the product than the needs of customers/clients.

17. Choose the correct alternative.

- 5 de
- 4 bcde
- 3 bcd
- 2 ab
- 1 d

The three broad categories of design criteria are: feasibility, acceptability and dependability.

Professional services are defined as high contact organisations where customers/clients spend some time in the service process.

Batch processes and jobbing processes are basically one and the same, the only difference is that jobbing processes do not have such a high degree of variety.

For the fact that jobbing processes produce more and usually smaller items than a project process, the degree of repetition is high.

A project process in manufacturing usually deals with high volume and high variety.

16. Which statement(s) regarding the process type in manufacturing and service operations is/are correct?



- 5 abc
- 4 bde
- 3 cde
- 2 acd
- 1 abc

20. Which three of the following statements are correct?

a The production/operations 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 of all the first-tier, second-tier and other tier suppliers.

c Strategic decisions that need to be taken in relation to the production/operations network include the following: the position of the operation in the network itself, the extent of vertical integration, the location of the operation, and the capacity of each part of the network.

d The whole production/operations 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 production/operations network design includes both the product/service design and the process design.

- 1 b
- 2 ac
- 3 d
- 4 cbe
- 5 ce

19. Products and services are usually one of the first things which customers "see" of a company. Which of the following statement(s) is/are correct?

a Screening becomes less important if concept generation was done very well.

b Concepts comprise a package of products and services.

c Ideas from customers/clients are not important during the design of a product/service.

d The process flow chart only indicates operation, inspection and storage activities, movement of material.

e The purpose of value engineering is to see whether all machines are producing in accordance with the plan. *Why? reduce costs & prevent any unnecessary cost at production process.*

21. The NPI offer valuable suggestions regarding some specific policies for productivity growth. They are explained under the following headings:

Business aggression and quality education

Investment and savings and good service.

The labour market and large macro enterprises.

Education and skills, trade and high taxation.

A market-friendly social environment, technology, research and development.

22. Which two of the following statements are incorrect?

The sequence of the layout procedure of an operation involves the following: selecting the process type → selecting the basic layout type → doing the detailed design of the facility.

The process layout type involves locating the transforming resources along the sequence of the process or flow lines.

The fixed position layout type is used where the transformed resources move between the transforming resources.

The cell layout type is appropriate to operations where regular flow is both more important and feasible, as in the case of the product layout type.

The choice of basic layout type becomes more important when the flow of the manufacturing or service processes is greater in volume and less in variety.

- 1 ab
- 2 bc
- 3 cd
- 4 bc
- 5 ac

Handwritten scribbles

24. Which one of the following enterprises uses a fixed position layout in its production/operations facility?
- 5 Shipbuilding fixed ✓
  - 4 Engen service stations cell/mixed ✓
  - 3 Edgars clothing store cell/mixed ✓
  - 2 Ellispark sport stadium ✓
  - 1 Nissan assembly line process ✓

23. 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. ✓

Handwritten notes and diagrams:

- abc
- abd
- acd
- ade
- bcd

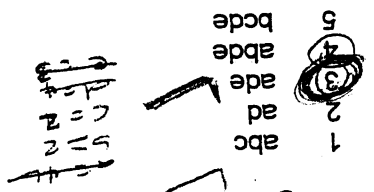
Handwritten numbers: 1, 2, 3, 4, 5

Handwritten notes: Pg 313, Pg 308, Pg 307, Pg 307

540,000

1	40 units
2	35 units
3	70 units
4	90 units
5	105 units

26. Determine the re-order level (ROL) if safety stock for a purchased part is five units, demand for the item is ten per day, the lot size is 40 and the purchase lead time is three days.

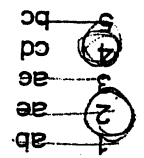


- Work study is applied in the investigation of all aspects of human labour and is aimed at improving efficiency and productivity.
- Work study is a management tool based on method study, work measurement and various other specialized techniques.
- Work study is aimed at increasing inputs with accompanying financial savings, such as a decrease in input costs.
- Method study strives for more effective methods to obtain optimal use of material resources and human resources.
- Method study is the part of scientific management which makes the most direct contribution to job design.

25. Which of the following statements are correct?

18  
311-35

27. Which two of the following statements are incorrect?  
 The nature of the decisions that are taken to plan and control an operation will depend largely on the extent of uncertainty in supply and demand.  
 Dependent demand planning and control can only be exercised where the demand for the item based on some other known factor is reasonably certain and predictable.  
 The demand time D (length of time that customer/clients must wait for the product) will always be greater than the throughput time P (the time it takes the operation to deliver the product to the customer/client) in "make-to-stock" operations.  
 The scheduling activity as part of the planning and control task in production/operations management must determine which tasks must be performed before (or take priority over) others.  
 The planning and control activities in production/operations management reconcile the supply of the operation's products or services with the demand for them by customers/clients.



28 The ABC system ...

- 1 teaches the "ABC basics" of the production/operations system.
- 2 classifies the different types of items kept in an inventory by their usage value.
- 3 is also known as the Pareto law.
- 4 allows inventory managers to concentrate their efforts on the production/operations system.
- 5 is an improvement on the mechanical MRP I-run.

2.3 The table below indicates the processing times (in minutes) for six jobs in two work centres (panelbeating and painting). The work centre sequence is from X to Y.

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

(4) By using Johnson's algorithm, determine the optimal job processing sequence.

(5) What are the elements and objectives of job design and work organisation? Why is this function important for quality of working life (QWL)?

**QUESTION 3**

3.1 The NPI offer some valuable suggestions regarding specific policies for productivity growth. List three of these policies.

3.2 Distinguish between the following basic layout types by drawing a simple diagram and naming a practical example of each:

- product layout
- process layout

3.3 A research company has decided to set up a new laboratory in Australia to provide analysis services for mineral extraction companies. The table below shows the three locations it is considering and the criteria it is using to make the decision. If the first two factors are twice as important as the rest, which location do you think is most suitable for the new laboratory?

FACTOR	PERTH	SYDNEY	DARWIN
Closeness to customer/clients	80	50	90
Closeness to universities	70	90	20
Attractiveness of city	70	90	50
Climate	60	80	60
Schools	70	80	60
Housing costs	60	20	100
Availability of sites	70	50	100

(5) [TURN OVER]

30 Questions x 1 mark = [30]

- 5 acde
- 4 ac
- 3 de
- 2 abc
- 1 none

5192 03  
1331  
20.10

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.

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.

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

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.

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).

30. Which of the following statements is/are incorrect?

- 5 bed
- 4 abe
- 3 bde
- 2 cde
- 1 abc

$$\frac{20 \times 25 \times 0.20}{100} = 1.00$$

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

The EOQ 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.

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.

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

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.

29. Which three of the following statements are correct?

SELECT AND ANSWER ANY TWO OF THE FOLLOWING THREE ESSAY-TYPE QUESTIONS. EACH QUESTION COUNTS 20 MARKS.

**SECTION B**

**QUESTION 1**

1 Describe the nature of the production/operations processes of a la carte restaurant like PACHAS. Use the transformation model to identify the transforming resources, the transformed resources, the type of transformation process and the outputs from the transformation process.

1.2 What is/are probably the most important performance objective(s) of a super market like SPAR? Note: Ignore possible price differences or strategies with competitors.

1.3 What are the indirect responsibilities of production/operations managers and why are these also considered important?

1.4 Explain the implications (in terms of inventory costs, customer service, etc) of a level capacity plan which meets demand at all times during the year

A wholesale building materials stockist obtains its cement from a single supplier. Demand for cement is reasonably constant throughout the year. Last year the company sold 2 000 tonnes of cement. It estimates the costs of placing an order at around R25 each time an order is placed, and charges inventory holding at 20 per cent of purchase cost. The company purchases cement at R60 per ton. How much cement should the company order at a time? Also indicate when to use EOQ and when to use EBO (EMQ).

QUESTION 2

$$EOQ = \sqrt{\frac{2 \times 2000 \times 25}{0.2 \times 60}} = 2000$$

$$EBO = \sqrt{\frac{2 \times 2000 \times 25}{0.2 \times 60}} = 2000$$

2.1 Define the macro perspective of productivity management and explain how it could be improved in South Africa. Is the DPA model applicable? Justify your answer.

2.2 Without the ability to design the products/services that will meet the real needs of its customers or clients, including the processes for their manufacture and delivery, no business will manage to survive. The manufacturing plant of BMW (SA) Rosslyn Pretoria is a good example of this. List five design objectives of the design activity.

- 1 Health & Safety
- 2 Reliability
- 3 Maintainability
- 4 Repairability
- 5 Cost

[TURN OVER]



2.3 The table below indicates the processing times (in minutes) for six jobs in two work centres (panelbeating and painting). The work centre sequence is from X to Y.

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	6

(4) By using Johnson's algorithm, determine the optimal job processing sequence.

2.4 What are the elements and objectives of job design and work organisation? Why is this function important for quality of working life (QWL)?

[20]

3.1 The NPI offer some valuable suggestions regarding specific policies for productivity growth. List three of these policies. *SUG P3 60-67*

3.2 Distinguish between the following basic layout types by drawing a simple diagram and naming a practical example of each:

- product layout *Pg 223, 227, 244 Pg 7-6*
- process layout *Pg 217, 227, 235 Pg 7-4*



[TURN OVER]

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Doppel-  
Laminieren

TOTAL [70]

2 x 20 marks = [40]

[20]

(3)

3.6 Briefly explain the following statement: "Supply chain management covers the whole production/operations network" and then indicate which part(s) of the supply chain does (a) logistics and (b) materials management encompass.

(2)

What will the processing sequence of the five jobs be if (a) the LIFO (last-in-first-out) and (b) the earliest due date first, sequencing priority rules are followed?

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

Jobs in work centre

(3)

3.5 LITHO Printers 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.

3.4 What components of a product or service are designed?

2 x 20 marks = [40]  
TOTAL [70]

[20]

- (3) Briefly explain the following statement "Supply chain management covers the whole production/operations network" and then indicate which part(s) of the supply chain does (a) logistics and (b) materials management encompasses. [9.5/5 TR3]
- (2) What will the processing sequence of the five jobs be if (a) the LIFO (last-in-first-out) and (b) the earliest due date first, sequencing priority rules are followed?

Job number	Processing time	Date received	Due date
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356	5	55	70.68
370	4	61	71.69
366	6	57	69.70
375	2	63	68.71

Jobs in work centre

- 3.5 Werkman & Reyneke 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.
- 3.4 What components of a product or service are designed? [5/5] *example, packaging, process*

(5)

FACTOR	PRETORIA	CAPE TOWN	DURBAN
Closeness to customer/clients	80	50	90
Closeness to universities	70	90	20
Attractiveness of city	70	90	50
Climate	60	80	60
Schools	70	80	60
Housing costs	60	20	100
Availability of sites	70	50	100

- 3.3 A research company has decided to set up a new laboratory in South Africa to provide analysis services for mineral extraction companies. The table below shows the three locations it is considering and the criteria it is using to make the decision. If the first two factors are twice as important as the rest, which location do you think is most suitable for the new laboratory?

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370  
375

pg 358

447  
pg 233