

ANSWER ALL 30 QUESTIONS.

SECTION A

The examination paper consists of two sections. Section A contains 30 multiple-choice questions which count one mark each. Section B contains 3 essay-type questions of 20 marks each of which you have to select and answer any two for 40 marks out of 70. Section A and B together thus count 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.

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This paper consists of 17 pages plus instructions for completion of a mark reading sheet.

Use of a non-programmable pocket calculator permissible.

EXAMINERS :
FIRST :
SECOND :
EXTERNAL :

PROF RJ STEENKAMP
PROF LP KRUGER
PROF PWC DE WIT (PRETORIA - UP)

Duration : 2 Hours

70 Marks

BUSINESS MANAGEMENT (OPERATIONS) 301

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Which three of the following statements are correct?

- a All operations of all types of businesses produce goods or render services, or a mixture of the two, by a process of transformation.
- b Transformed input resources comprise the following: materials, information and customer/clients.
- c The difference between transforming and transformed input resources, respectively, lies in their position in relation to the output resources.
- d A dominant transformed material resource, such as a factory plant, would be found in all types of manufacturing operations.
- e After having gone through either materials, information or customer/client processing, outputs emerge in the form of goods or services which are generally different because of tangibility, storability, transportability and customer/client contact.

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Assign

2.

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 components: 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 is a person or group of people who over many years has/have reached the status of preferred trading party (ie VIP customer/client), while an internal supplier has also 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 in the external environment is the business's ability to significantly reduce stocks of input and output resources.

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3. Which one of the following statements is incorrect?

1 The performance objectives of the production/operation system embody what the expectations of the business towards this function are and what contribution it could make to the business's competitiveness or strategic direction.

2 Achieving the production/operations performance objectives of high quality, speed and cost and greater flexibility and dependability helps the business to exploit so-called "production/operations-based advantages".

3 Production/operations-based advantages may be seen as the result of something that the production/operations function did well and that contributes to the long-term survival of the business.

4 A flexibility rather than a speed advantage could be gained by the business if customers/clients receive their goods and services on the due dates as promised.

5 If the production/operations function of a business is able to reduce the total transaction time it takes to complete a purchase, the beneficial result could be regarded as speed advantage.

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QUALITY

4.

Which three of the following statements are correct?

a If you want to "do things nicely" then you should satisfy your customers/clients by providing error-free goods and services which are "fit for purpose". This is giving a dependability advantage to your customers/clients. ✓

b If you want to "do things right the first time" then you should satisfy your customers/clients by providing error-free goods and services which are "fit for purpose". This gives a quality advantage to its your customers/clients. ✓

c If you want to "do things on time" then you should satisfy your customers/clients by keeping to delivery promises. This is giving a dependability advantage to your customers/clients. ✓

d If you want to "do things fast" then you should satisfy your customers/clients by providing slow-free goods and services which are "fast for purpose". This is giving a JIT advantage to its customers/clients.

e If you want to "do things cheaply" then you should satisfy your customers/clients by providing "good value for money". This is giving a cost advantage to your customers/clients.

- 1 bce
- 2 bcd
- 3 cde
- 4 abe
- 5 acd

SPEED

5. Strategies are not mere objectives or goals. In this regard, which one of the following statements is correct? Business strategies

1 represent the end points toward which all production/operations control activities are aimed.

2 represent the starting points toward which all production/operations improvements are aimed.

3 reflect the large-scale, future oriented production and operations plans.

4 reflect the large-scale, future oriented business plans to optimise the achievement of business objectives or goals.

5 represent and reflect the large-scale, future oriented starting and ending points to optimise the achievement of production/operations goals.

6. Which one of the following statements is correct?

1 In order to understand the contribution of the production/operations function to the business, it is necessary to answer the following questions: What is the role of or what part is the function expected to play in the business and how much can personnel working in the production/operations section of the business influence its budget?

2 The role of the production/operations function in a business is threefold, namely to support, implement and drive the strategy of the business, and these roles correspond with the function of acting as a "follower", an "effector" and a "leader".

3 In stage 3 of Hayes and Wheelwright's four-stage model, the contribution of the production/operations function to a business's competitive position is neutral and principally attempts to avoid making mistakes in its production/operations processes.

4 If the production/operations function plays the role of an "effector", this is in line with Hayes and Wheelwright's competitive position of internal neutrality.

5 The "best" position or role that the production/operations function may attain is one where the function becomes both internally neutral and supportive and becomes the best in the marketplace.

page 21 SQ.

page 39

Which three of the following statements are correct?

- a A general guideline for effective design is that the number of components of the product or operations of the service be minimised to reduce costs, improve on the quality of product/service and generally facilitate production or service.
- b General guidelines for effective design in production/operations management may be classified under the three main headings of: general guidelines; quality guidelines; and productivity/operability guidelines.
- c Avoidance of special complicated fasteners and/or connectors for products or off-line elements of the service that may interrupt it, is a productivity/operability guideline well worth pursuing.
- d A quality guideline holds that designs should concentrate on the robustness of the product (ie "should not break easily") and avoid designs that require a great deal of attention during manufacture or delivery (ie "one could make the product or provide the service with one's eyes closed").
- e Key questions in assessing the feasibility of a design for a product/service are as follows: Are the necessary skills or quality of resources available? Are the financial resources and financial return acceptable? Does the business have the organisational capacity or quantity of resources to cope with the specific design option?

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8. Which three of the following statements are incorrect?

assignment

- a Performance objectives of the design activity include producing: error-free designs, designs that are moved from concept to specification in as short time as possible, designs that do not consume excessive amounts of resources during the creation process, et cetera.
- b The primary purpose of the design activity is the requirement for a high degree of compatibility between the design of the product/service and the design of the processes for their manufacture or provision.
- c The overlap between the design of the product and the design of the process for its manufacture is generally greater than for the design and provision of services because in the case of manufacturing, the high degree of automation makes greater coordination necessary.
- d The design activity for high-volume, low-variety operations should emphasise the product/service design if the degree of standardisation is high, the process flow is continuous and the staff skills are task specific.
- e The aspects of the production/operations management system that need to be designed are: the design of the products/services themselves, the design of the production/operations network, the design of the layout and the work flow of the manufacturing or service provisioning facility, the choice and selection of process technology, and job design and work organisation.

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9. Which one of the following statements is correct?

1 The three general dimensions which are used to define all the types of process technology are the degree of automation; its scale of operation and its degree of integration.

2 Process technologies are the innovative techniques, materials, culture and attitudes that support the operation's strategic objectives.

3 PC's, fax machines, mobile telephones, robots, projectors, machine tools are examples of process technologies if the business is not a labour intensive operation.

4 The totally automated factory of the future is a pure and the most ideal example of customer/client processing technology.

5 Process technologies can be categorized as either materials processing, customer/client processing, information processing and transformation processing.

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99 271 BK

10. Which three of the following statements are correct? *assignment 2*

a 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/clients.

b The resources of the operation need to be planned and controlled to ensure their availability in the right quantity, at the right time and with the appropriate quality.

c The constraints placed on the planning and control task in operations include cost, quality and speed, which are the result of an infinite supply of resources which must be met by limited demand.

d Planning and control in operations go hand in hand. Long-term controls, however, more important than short-term planning because of the potential to influence decisions.

e Production/operations control is the process of coping with changes in the variables of the production/operations process.

a

b

c

d

e

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

QUESTION 2

11.

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

- a The nature of the decisions that are taken to plan and control an operation will largely depend on the extent of uncertainty in supply and demand.
- b 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.
- c The demand time D (length of time that customers/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.
- d The scheduling activity as part of the planning and control task in operations must determine which tasks must be performed before (or have priority over) others.
- e In the case of a hospital (a "triage system"), a strict FIFO sequencing and scheduling priority system is followed.

- 1 abc
- 2 abe
- 3 acd
- 4 bcd
- 5 bcd

12.

Items are received in the same periods as scheduled and a standard lot size of 30 is applicable. The forecast and booked orders for washing machines for a period of six weeks are:

On hand inventory = 20	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Forecast	25	30	10	16	20	25
Booked orders	10	25	12	12	25	20

The quantities available to promise for the six periods are:

- 1 10; 5; 6; 0; 5; 10
- 2 0; 0; 18; 2; 7; 12
- 3 10; 5; 0; 6; 5; 10
- 4 12; 20; 30; 10; 0; 0
- 5 10; 12; 0; 0; 5; 7

490
85
56

Which one of the following statements is incorrect?

1 MRP I is a dependant demand system. Here, demand is derived from some other decision taken within the operation.

2 Variation of sales orders makes the MRP I process very complex. Different types of operations have different profiles in terms of the mix between known orders and forecast orders.

3 The mix between known orders and forecast orders determines the MPS (master production schedule) which activates the MRP I-run.

4 The MRP I-run needs the bill of materials and the different inventory records before material plan can be finalized.

5 The MPS is a time-phased record of each end product which contains a statement of demand and stock available of each end item and component that goes into each item.

13.

Yes 4498

Which two of the following statements are correct?

a JIT or just-in-time refers to both a philosophy behind production and operations management and a distinct method of production/operations planning and control.

b Just-in-time production/service means that products/services are manufactured/provided only a few days before they are needed by a customer/client - not too many days beforehand because they then become inventory - and not too many days late because then the customer/client has to wait too long.

c The JIT approach differs from the more traditional approaches to manufacturing where inventory is kept at each successive stage rather than delivery on request.

d Reducing the level of inventory, means that production and operations management must deal with an increased amount of work-in-process, fewer defective deliveries, more scrap and rework/less downtime.

e JIT as a philosophy holds that all forms of waste should be eliminated, all employees should be involved, improvements should continuously be made, and high utilisation of production/operating capacity should be maintained.

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

QUESTION 15

Which one of the following statements is correct?

- 1 Quality today is everybody's business. Most businesses now realise that high-quality products and services can give the organisation a considerable competitive edge.
- 2 The operator's view of quality is primarily manufacturing-based and focuses on "error-free" products.
- 3 The most significant quality gap and the one that the production/operations management function is primarily responsible for preventing, is the customer's/client's specification-operation's specification gap where there is a mismatch between what the customer/client thinks he/she is getting and what the operation thinks the customer/client wants.
- 4 The organisational responsibility for closing the actual quality-communicated image gap lies with the production/operations function because it is not providing the quality of product/service that the customers/clients expect.
- 5 Quality is like beauty - it lies in the eyes of the beholder.

16. Which one of the following regarding Garvin's approaches to quality is correct?

- 1 the operations based approach; the product-based approach; the value-based approach; the user-based approach and the durability approach.
- 2 the manufacturing-based approach; the product-based approach; the value-based approach; the user-based approach and the transcendent approach.
- 3 the operations based approach; the service/product-based approach; the value-based approach; the user-based approach and the Rolls Royce approach.
- 4 the manufacturing based approach; the product-based approach; the value-based approach; the supplier-based approach and the aesthetics approach.
- 5 the operations based approach; the product-based approach; the value-based approach; the user-based approach and the functionality approach.

17. Which two of the following statements are correct?

- a The extent to which customers/clients feel well treated by staff is an attribute measure for this quality characteristic.
- b The colour specification of a car is a variable measure for this quality characteristic.
- c The predicted useful life of the car is an attribute measure for this quality characteristic.
- d The percentage defective of a sample light bulbs is a variable measure for quality.
- e The number of airline seats not cleaned satisfactorily is a variable measure for this quality characteristic/dimension.

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109

18. ELECTRO-ALARMS manufactures electronic components for a burglar alarm system. The business uses SPC to ensure the quality of the components. The table below shows the inspection results of five samples of 400 components. Which of the following statements are correct?

SAMPLE NUMBER	NUMBER OF DEFECTIVE COMPONENTS
1	40
2	20
3	25
4	10
5	15

$$\frac{40-10}{4} = \frac{30}{4} = 7.5$$

The process is "in control"

The average fractional defective is equal to 0,055.

The upper control limit is equal to 0,1056.

Sample number 3 falls outside the upper control limit.

The lower control limit is equal to 0,0208.

- a) ab
- b) cd
- c) abc
- d) be
- e) ace

P9 609

19. The capability of the RICE FILLING process is a measure of the acceptability of the variation of the process. If the process average is 210 grams, the standard deviation is 2 grams and the tolerances are set as = 214 gram and LTL = 198 gram, then the capability index will be set as:

- 1) 2,00 which indicates the process is capable
- 2) 0,750 which indicates the process is capable
- 3) 0,666 which indicates the process is not capable
- 4) 0,750 which indicates the process is not capable
- 5) 0,666 which indicates the process is capable

P9 613

$$C_p = \frac{UPL - LTL}{6\sigma} = \frac{214 - 198}{6 \times 2} = \frac{16}{12} = 1,333$$

$$C_{pu} = \frac{214 - 210}{4 \times 2} = \frac{4}{8} = 0,5$$

$$C_{pl} = \frac{210 - 198}{12 \times 2} = \frac{12}{24} = 0,5$$

20. 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
- 4 Time management and quality management
- 5 Cost management and human resource management

59
128
P9

21. 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 (ES) for activity A is day 0 and the latest start (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

P9
59

22.

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

- a The improvement of the production/operations management system follows after the system has been designed and its activities planned and controlled.
- b Improvement activities of production/operations management may be treated as a process involving three stages, namely to understand the approaches and techniques used for improvement, to prevent failure but know how to recover when failures occur, and to support the whole improvement process through the TQM approach.
- c The performance objectives of quality, speed, dependability, flexibility and cost, are the main performance standards for the improvement of the production/operations management system.
- d A disaggregated, partial measure for the performance objective of high quality is: the level of customer/client complaints.
- e A performance standard is much the same as a performance measure, that is, it describes how to measure the performance of the production/operations management system against which criteria.

- 1 ace
- 2 bce
- 3 abd
- 4 bcd
- 5 abe

ASSIGN 3

thula.maphumulo@engeniol.com

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1 abc
2 cde
3 adc
4 bce
5 abc

24. Which three of the following statements are correct?

a TQM is a good example of a continuous improvement technique which together with cause-effect diagrams may significantly help diagnose quality-related problems.

b TQM may have a great impact on businesses, which goes way beyond its current fashionability because it inherently has a great intuitive attraction to many people since most of them want "high quality" products and services, and the approach has proved in many cases that it can lead to dramatic increases in operational effectiveness.

c Without the contributions of the "quality gurus" such as Feigenbaum, Deming, Juran, Ishikawa, Taguchi and Crosby, TQM as an improvement philosophy and as an organisational approach to manage improvement efforts, would never have materialised.

d Crosby's contribution to "quality thinking" may be traced back to the phrases of "zero defects" as an absolute performance standard, measuring the "price of nonconformance" and "fitness for use" as a user-based approach to quality.

e TQM may be viewed as a managerial philosophy, "a way of thinking and doing", primarily concerned with meeting the needs and expectations of customers/clients. It moves the focus and responsibility for quality away from merely the production/operations function to a major concern for the whole business or organisation.

23. 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.

25. 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 "free" if appraisal costs and failure costs can be balanced.
- e ISO 9000 is a QA model framework for SPC and continuous improvement.

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26. Which three of the following statements are correct?

- a Any TQM improvement programme in a business will have only a one out of two chance of immediate success if it is not implemented effectively, and furthermore, if it is not continuously supported by top management.
- b A factor that appears to influence the eventual success of a TQM improvement programme is recognising any success formally and rewarding the effort and initiative.
- c The heart of a TQM improvement programme is training. Not only should the programme have an appointed training manager as the prime mover but all the staff of a business also need to learn of quality techniques.
- d TQM loses its effectiveness when the initial enthusiasm wears off after the "levelling off" phase of the programme and needs to be either "rebooted" or again "kick started" with more motivational slogans and exhortations such as "Quality is life - make sure you get yours!".
- e The Deming Prize and Malcolm Baldrige National Quality Award serve as examples of how quality awareness and improvement may be stimulated in countries and their businesses.

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Q6
Q5
Q3

Q27 no 8

27. Which two of the following statements are incorrect?

a When measuring failure in a production/operations systems, the focus could be on failure rates (the number of failures divided by the total operating time), reliability (ie own component's reliability multiplied by each of the other interdependent components of the system) and availability (ie MTE divided by MTBF + MTTR).

b Three specific activities of production/operations managers relating to failure are (i) finding out what is going wrong and (ii) stopping things from going wrong and (iii) repairing and coping with things that have gone wrong.

c The purpose of failure detection and analysis is to check whether the customer/client is "happy with the product or service and if not, find out how it may be improved.

d The causes and effects of failure must first be understood by production/operations managers, that measures can be taken to prevent them from occurring in the first place. Failures may however, be prevented if the reliability of the operation itself is improved.

e Designing-out fail points, building redundancy into the operation, fail-safeing and maintenance a examples of methods whereby an operation may recover from failure in the most cost effective manner.

1 ab
2 bc
3 cd
4 ae
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28. 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 failure 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.

692

1988

29. Which one of the following statements regarding the production/operations challenge is incorrect?

1 Strategies must be ethical.

2 Strategies must be innovative.

3 Strategies must be implemented.

4 Strategies must be international.

5 Strategies must be creative.

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30. Production/operations managers should see the quality of working life (QWL) of the internal customer/client as an ethical and moral management challenge. Which one of the following statements regarding this production/operations challenge is incorrect?

- 1 Layout of facilities and job design implies staff safety.
- 2 Process technology implies fume and noise pollution.
- 3 TQM addresses customer/client safety, staff safety and workplace stress.
- 4 Project inventory planning refers to warehouse occupational safety and stress.
- 5 Failure prevention implies environmental impact of pollution and safety.

30 Questions x 1 mark = [30]

SECTION B

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

QUESTION 1

- 1.1 Illustrate the nature of the operations of a project-driven business by using the transformation model. Identify the transforming resources, the transformed resources, the type of transformation process and the outputs from the transformation process. (4)
- 1.2 Distinguish between the volume and variety characteristics of a shoe repair shop and a large shoe manufacturer. (4)
- 1.3 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 motor vehicle manufacturer. (4)
- 1.4 What does production/operations improvement entail? When would it be necessary to improve a production/operations process and how should a production/operations manager go about doing it? (3)
- 1.5 Johnson SA manufactures needles that are subjected to a bend test. They use statistical process control (SPC) and the results (measured in grams) are plotted on a \bar{X} 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 \bar{X} chart and explain whether an investigation for an assignable cause should be undertaken given that one sample average is 26.08? (5)

[20]

[TURN OVER]