DEGREE EXAMINATIONS

JUNE 2023

OPERATIONS MANAGEMENT

BEC 214/BEC 214E

TIME: 2 HOURS

MARKS: 75

INTERNAL EXAMINERS

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This paper consists of 9 pages including the cover page.

INSTRUCTIONS

1. The examination paper comprises a total of SEVENTY-FIVE (75) marks
2. SECTION A: Question 1 (25 marks), is compulsory.
3. SECTION B: Question 2 (25 marks), is also compulsory.
4. SECTION C: Answer only ONE ADDITIONAL QUESTION (25 marks); either question 3 or 4.
5. Failure to obey the instructions will negatively impact your results.
6. Please indicate all questions answered clearly and correctly on the answer sheet.
7. Questions can be answered in any order.

SECTION A: (COMPULSORY) – QUESTION 1 [25 MARKS]

1. Business forecasting occurs when forecasting is used to predict _____. (1)
   a) Demand
   b) Supply
   c) Product design
   d) Budgets
   e) All of the above.

2. Which of the following is <u>not</u> a feature common to all forecasts? (1)
   a) The underlying system of the past will be present in the future
   b) No precise prediction can be made
   c) The shorter the time horizon the less reliable the forecast
   d) Forecasts for groups of items are more accurate
   e) All of the above options are features common to all forecasts.

3. A medium-range time horizon is a time period spanning: (1)
   a) a few days
   b) a few weeks
   c) 1-12 months
   d) 1 - 5 years
   e) More than 5 years.

4. In the course of operations management process design and aggregate planning are _____ term and _____ term forecasts, respectively. (1)
   a) Short/medium
   b) Long/short
   c) Long/medium
   d) Short/short
   e) Medium/long.

5. Which of the following is not a situational factor to be considered when forecasting? (1)
   a) Accuracy
   b) Cost
   c) Data
   d) Decision factors
   e) All of the above.
6. Which of the following is not a requirement for an accurate consumer survey: (1)
   a) Sample accuracy
   b) Unbiased questions
   c) Non-representative of data
   d) Reliable analysis
   e) Valid conclusions.
7. Time is: (1)
   a) Trend, seasonality, regular variations
   b) Trend, seasonality, random variations
   c) Trend, seasonality, predictable variations
   d) Trend, seasonality, presumed variations
   e) All of the above.
8. Identify the incorrect statement: (1)
   a) Capacity is a critical resource
   b) Capacity is an infinite resource
   c) Capacity is never constant
   d) Capacity can be defined as a dimension of time
   e) None of the above are incorrect.
9. Exponential sothing is characterised by all but one of the following: (1)
   a) Sophisticated method
   b) Smoothing constant
   c) Actual demand
   d) Previous forecast
   e) Regression.

10. In using the simple linear regression method, the formula $Yc = a + bx$ is used. The 'b' reto: (1)

a) The dependent predicted variable value
b) The independent predictor variable value
c) The intercept
d) The slope of the regression line
e) None of the above.

11. APICS refers to: (1)

a) African Production and Inventory Control Society
b) American Production and Inventory Control Society
c) African Production and Investment Control Society
d) American Produce and Inventory Control Society
e) African Production and Invention Control Society.

12. MRP II has come to mean: (1)

a) Material Requirements Planning
b) Material Requirements Projects
c) Manufacturing Resource Planning
d) Manufacturing Requisite Planning
e) None of the above.

13. MPS is the: (1)

a) Major Production Schedule
b) Minor Production System
c) Major Production System
d) Master Production Schedule
e) None of the above.

14. A BOM is: (1)

a) Bill of Materials
b) Billl of Mass sale
c) Bill of Manufacture
d) All of the above
e) None of the above.

15. Which of the following is not an MRP system file? (1)
    a) Item master file
    b) Transaction file
    c) Location file
    d) Audit file
    e) All of the above are correct.

16. Lot sizing is selecting the _____ size of a batch of products to be manufactured to meet the _____ of the process. (1)
    a) Smallest/demand
    b) Largest/supply
    c) Required/requirements
    d) Optimal/requirements
    e) None of the above.

17. Pegging involves: (1)
    a) Upward tracing of materials
    b) Downward tracing of materials
    c) Upward tracing of costs
    d) Downward tracing of stock
    e) None of the above.

18. ERP refers to: (1)
    a) Enterprise Resource Programming
    b) Enterprise Resource Planning
    c) Enterprise Retail Program
    d) Enterprise Retail Planning
    e) None of the above.

19. Which of the following statements regarding ERP is incorrect? (1)
    a) ERP can provide a strategic advantage over competitors
    b) ERP improves the response rate
    c) ERP creates commonality of databases
    d) ERP facilitates the availability of data in real time
    e) ERP is inexpensive.

20. DI is: (1)

a) Electronic data interchange
b) Electronic data interface
c) Electronic data index
d) All of the above
e) None of the above.

21. Identify which one of the following is not a type of capacity measurement: (1)

a) Design
b) Actual
c) Input
d) Output
e) Efficient.

22. Which type of capacity measure is likely to be largest? (1)

a) Design
b) Actual
c) Input
d) Output
e) Efficient.

23. Which type of capacity is utlised by processes that are involved in customisation? (1)

a) Design
b) Actual
c) Input
d) Output
e) Efficient.

24. In the formula for efficiency, what does AO stand for? (1)

a) Aggregate output
b) Actual output
c) Average output
d) Alternative output
e) None of the above.

25. Which of the following is not a factor that influences effective capacity? (1)

a) Facility issues
b) Process issues
c) Employee issues
d) Operational issues
e) All of the above are correct.

SECTION B:QUESTION 2 COMPULSORY [25 MARKS]

Read the passage below and answer the questions that follow

Ford SA invests heavily in fixing faults and improving quality in their cars

In February this year, Ford Motor Company announced a US$ 1.05 billion investment in the South African operation. This investment will see the annual installed capacity increase from 168 000 to 200 000 vehicles supporting the production of the all-new Ford Ranger bakkie for the South African market and over 100 global markets. The plant will also manufacture Volkswagen bakkies as part of the Ford-VW strategic alliance.

While increased production is necessary, the plant has also implemented several measures to improve the quality of the vehicles they produce sustainably.

"To achieve increased volumes at an improved level of quality, the plant has been changed to produce a single model on a single line. This also helps bring down the cost per unit of manufacture, which is critical in remaining globally competitive," says Kevin Heunis, Quality Director at Ford South Africa.

Upgrades to the plant include a new stamping plant, which will allow for the pressing of body panels and an in-house chassis manufacturing facility. Interestingly, the automation in the body shop is currently at 86%.

"In the past, many of these functions were outsourced, but Ford has elected to bring a variety of these integral functions in house. This allows us to react to any issues or changes as quickly as possible," says Heunis.

Currently, the Ford Silverton plant builds Ranger, Everest and Raptor models with approximately 50% of the components locally sourced. With the next generation of vehicles, they are hoping to increase local content substantially.

The increased localisation will be achieved by bringing a lot of the processes in-house. Thanks to international suppliers who have chosen to establish local operations in the Special Economic Zone alongside the Ford factory.

This will also allow for refining the just-in-time parts supply process, where parts arrive on the line shortly before they are installed on that particular vehicle.

"The benefit of the just-in-time system is that fewer parts need to be stored in the short and medium-term, while damage to parts while in storage has also been a cause of faults in the past," adds Heunis.

Two types of faults

Faults identified as a result of a process within the plant can be defined as issues or concerns where the component does not meet intent due to product development, supplier part or plant-related quality. Most commonly, these include issues such as body, paint, and fit and finish.

Market-related faults focus on concerns where the component or subsystem meets design intent but not market or customer expectations and usually only occurs after a certain period or once the vehicle is used.

"What makes the latter tricky is that vehicles produced at the Silverton plant are shipped to markets across the world. For example, Switzerland applies a lot of salt on their roads, and Saudi Arabia is extremely sandy. Each of these markets is unique in their local conditions, climate and fuel quality, and all these factors need to be considered during the design process. Sometimes aftermarket solutions need to be employed to solve the issues for that specific market and the volume they procure," adds Heunis.

Have these changes made a difference?

Ford tracks their quality across several categories based on faults per 1000 units and has steadily been improving since, with the figure dropping below ten faults per 1000 in February this year. June 2021 was the plants best month to date when they recorded just 4.88 faults per 1000 vehicles produced.

Fixing faults

Mistakes happen, but how a manufacturer deals with those issues can mean the difference between a non-event and a catastrophe.

Recently, Ford has implemented several systems to ensure that they are handled and repaired sufficiently and proficiently when on-the-road faults are identified.

Usually, a customer would take their vehicle to a dealer who would identify the fault as best possible and then submit a warranty claim for the required parts and labour.

These days every warranty claim is checked by a team of engineers at head office before it is approved, allowing Ford to react to all warranty concerns.

If these engineers identify recurring problems, they will institute a recall or Field Service Action depending on the commonality and severity of the issue at hand.

This also allows Ford to be proactive and react to known issues quicker than in the past and institute fixes on all affected vehicles before a failure occurs.

2.1 Using the case study above, formulate a discussion on the that must be taken into account whn the critical decisions are made (15)

2.2 Quality has become a priority because of changes in the business world. Using the case study above, formulate a discussion on the factors evident in the case study which contribute to quality becoming a prioerity. (10)

SECTION C: ANSWER ONLY ONE QUESTION FROM THIS SECTION

QUESTION 3 (OPTIONAL) **[25 MARKS]**

3.1 Distinguish between order qualifiers and order winners. (3)

3.2 Discuss the reasons for impementing MRP System (6)

3.3 Using a produt of your choice as an example, discuss the four stage of the prodyct life cycle. (8)

3.4 Discuss with examples four important situational factors to be considered when developing a forecast. (8)

OR

QUESTION 4 (OPTIONAL) **[25 MARKS]**

4.1 Provide a concise exposition of the drivers within the supply chain with examples (12)

4.2 Provide a concise exposition of the four factors that must be taken into account when critical capacity decision are being made (8)

4.3 A manufacturer produces 650 television for a specific order. The quality controller found 15 with errors and discarded these . The manufacturer was able to ship 630bof the televisions on time and sent the remaining televisions two(2) days later.

a) What is the percentage of the order that are error free (2)

b) Calculate the on-time shipping rate (3)