AFRICA UNIVERSITY
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"Investing in Africa's future"

COLLEGE OF BUSINESS, PEACE, LEADERSHIP AND GOVERNANCE

NMMS 402: PRODUCTIONS AND OPERATIONS MANAGEMENT

FINAL EXAMINATIONS

NOVEMBER 2022

LECTURER: MR T. NEMAUNGA

TIME: 3 HOURS

INSTRUCTIONS

Answer ALL of the following **QUESTIONS.**

The marks allocated to **each** question are shown at the end of the section.

Marks will be awarded for showing all your workings.

SECTION A

Answer **ALL** Questions

1) Explain the principle behind the "learning curve" concept? [2]
2) What is the, "optimal output level"? [1]
3) According to Philip Crosby, briefly explain the concept of "**zero defects**"? What two advantages can be associated with using this concept in production? [2]
4) Which departments of the organization are involved in **Total Quality Management**? [1]
5) Can facilities layout affect capacity utilization of equipment? Explain? [1]
6) What advantage can a firm enjoy with the use of a **perpetual inventory counting** system? [1]
7) Identify any four characteristics or practices found in an organization that has adopted lean operations as a mode of production? [2]
8) With regards to process selection and facilities layout: between product layout and process layout, which one has higher capacity utilization? [1]
9) With regards to process selection, why is it discouraged to use continuous processing in the production of food and beverages? [1]
10) Define the concept "concurrent engineering"? Explain how it is of benefit to a modern organization? [2]
11) Why is forecasting an important technique in operations management? [1]

SECTION B

Answer **All** Questions

1) Answer the following:

   a) The consumer loan division of a major bank wants to determine the size of the staff it would need to process up to 200 loan applications per day. It estimated that each loan officer can process a loan application in approximately 20 minutes. If the efficiency of a loan officer is 80% and each loan officer works seven hours

each day, how many loan officers would be needed to handle that volume of business? [3]

b) A manager checked production records and found that a worker produced 160 units while working 40 hours. In the previous week, the same worker produced 138 units while working 33 hours. Using the Productivity Growth formula show whether worker's productivity increase, decrease, or remain the same? [2]

c) From your computations in question (b), comment on productivity versus production? [1]

2) Samsung plans to begin production of a new smart phone, called the "G-20". The management must decide whether to purchase the micro-processors, for the new smart phone, from a third party at $12 each or to produce the micro-processors on their own. Either of two processes could be used for in-house production; one would have an annual fixed cost of $150 000 and a variable cost of $4 per unit, and the other would have an annual fixed cost of $180 000 and a variable cost of $3 per unit. Determine the range of demand for which each of the alternatives would be best?[3]

3) A manager of a car wash must decide whether to have one or two lines. One line will mean a fixed cost of $9 000 a month, and two lines will mean a fixed cost of $11 500 a month. Each line would be able to process 15 cars an hour. Variable costs will be $3 per car, and revenue will be $5,95 per car. The manager projects an average of between 14 and 17 cars an hour. Would you recommend one or two lines, and why? The car wash is open 300 hours a month. [3]

4) Pizza Inn wants to build a satellite outlet, from which only home deliveries will be made, in a suburb. The suburb is partitioned into four customer zones. The table below shows the population figures and travel times between the zones and three potential sites. Which site would be best? [3]

		Average Travel Times (mins)		
Customer Zone	Population	**Site A**	**Site B**	**Site C**
1	800	4	9	13
2	1200	5	4	8
3	1500	9	6	3
4	500	8	5	12

5) Management has come up with six site factors, the most important one being drainage of the site. About half as important as drainage of the site are soil texture and slope of

the land. Half as important as these two factors are site access and the strength of the bed rock. Space on site is also a factor, although a relatively unimportant one, rating one half as important as the bedrock strength. The tables below indicate the scores of each of these site factors as judged by the company's senior management.

FACTOR	**SITE**		
	A	**B**	**C**
Drainage	6	5	5
Soil Texture	7	6	8
Slope	3	8	7
Site Access	5	6	4
Strength of Bedrock	4	8	9
Space	9	6	7

a) Using the Factor rating method, choose the best site? [3]

6) An automobile transmission-assembly plant ideally operates one shift per day five days per week. During each shift, 400 transmissions are completed. Over the next four weeks (month), the plant has actually scheduled the following shipments to their customers. NB: the plant only produces exactly what is demanded per month by customers.

Week	1	2	3	4
Shipments	1800	1700	2000	2100

a) What is the theoretical capacity of the plant? [3]
b) At what percentage of design capacity is the plant actually operating? [3]
c) How will it be possible to deliver 2100 transmissions in week four? [2]

7) The demand for an item of raw materials is 4500 units and the purchase price is expected to be $90 per unit. The incremental cost of processing an order is $100 and the cost of storage is estimated to be $10 per unit. The firm operates 300days a year
a) What is the EOQ? [2]
b) What is the length of the order cycle time? [1]
c) If the lead time is **5days**, what is the reorder point? [1]

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