AFRICA UNIVERSITY

(A United Methodist-Related Institution)

"Investing in Africa's Future"

FACULTY OF MANAGEMENT AND ADMINISTRATION

COURSE TITLE: MMS 506 – OPERATIONS MANAGEMENT

MODULE 5 : FINAL EXAMINATION

LECTURER: MR. T NEMAUNGA

TIME: 3 HOURS

INSTRUCTIONS

Answer <u>all</u> questions in **section** A.

Answer <u>all</u> questions in **section** B.

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

Credit will be awarded for logical, systematic and neat presentations.

SECTION A
Answer **ALL** Questions

1) Companies are constantly battling to decide whether to product <u>standard products</u> or <u>customized products</u>. Identify and explain any two advantages of producing **Standard** products?   [1]

2) What is the Naïve approach to forecasting? What two advantages are associated with this approach?   [2]

3) What is safety stock, and what is its purpose?   [1]

4) What is ISO 9000, and why is it important for a modern business to have ISO 9000 certification?   [2]

5) What is the difference between Partial Productivity and Multi-Factor Productivity?   [2]

6) Give two reasons why might some managers resist a change from a more traditional mode of production to Lean production?   [2]

7) Draw a simple diagram showing the **Product Life Cycle**, highlighting the main stages? [3]

8) Explain the concept of **reverse engineering**. Identify one advantage of this concept? [2]

9) Identify and explain three Behavioral Approaches to job design that are used to reduce monotony and boredom at the workplace?   [3]

10) There are three methods of evaluating location alternatives, identify any two?   [2]

11) Explain the concept of concurrent engineering. Identify one advantage of this concept? [2]

12) What is the ultimate goal of a Just-in- Time (JIT) system?   [1]

13) What is forecasting? Why is it important in business?   [2]

SECTION B

1) A manufacturing firm is considering developing a new product for commercial use. During the economic analysis phase of the product- development process, analysts developed two alternatives for manufacturing the product: Alternative A: Expand current manufacturing facilities and make the product at one of the firm's manufacturing plants. Fixed cost of the expansion is estimated at $200 000. Variable manufacturing costs are projected to be $15 per unit. Alternative B: Púrchase the primary component of the product from suppliers and assemble the product at one of the firm's manufacturing plants. Since this alternative would not require facilities expansion, its fixed manufacturing, selling, and administrative expenses are estimated at only $48 000. The purchased primary component would cost $13 per unit, and there would be an additional $5 variable cost per unit to assemble the final product.
   a) Conduct a break-even analysis for the new product under both alternatives for a selling price of $20 per unit? [2]
   b) If the projected volume for the new product were 30 000 units, which production alternative, if any would you recommend? [2]
   c) What would the projected volume need to be before the alternative not recommended in part (b) would be the preferred alternative? [2]

2) A toy manufacturer produces toys in five locations throughout the country. Raw materials (primarily barrels of powdered plastic) will be shipped from a new, centralized warehouse whose location is to be determined. The monthly quantities to be shipped to each location are the same. A coordinate system has been established, and the coordinates of each location have been determined as shown below.
   a) Determine the coordinates of the centralized warehouse? [3]
   b) Identify, any, one weakness associated with the Centre of Gravity method? [1]

(x; y)	Location
(3; 7)	A
(8; 2)	B
(4; 6)	C
(4; 1)	D
(6; 4)	E

3) Answer the following:
   a) An operation has a 10 percent scrap rate. As a result, 72 pieces per hour are produced. What is the potential increase in labor productivity that could be achieved by eliminating the scrap? [1]
   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]

d) Coca Cola Company maintains production facilities in several provinces around the country. Average monthly cost data and output levels are as follows.

Units (in 000s)	Maputo	Nampula	Sofala	Manica
Finished Goods	10 000	12 000	15 000	8 600
Costs (in 000s)				
Labor costs	$3 500	$4 200	$2 500	$800
Materials costs	$3 500	$3 000	$2 000	$1 100
Energy costs	$1 000	$1 500	$1 200	$800
Transport costs	$750	$2 500	$2 000	$1 000
Overhead costs	$1 200	$3 000	$2 500	$500

   i. Calculate the labor productivity of each facility?   [2]
   ii. Calculate the multi-factor productivity of each facility?   [2]
   iii. If Coca Cola needed to close one of the plants, which one should they choose?   [1]

4) A local distributor for a national tire company expects to sell approximately 9600 tires of a certain design next year. Annual carrying cost is $16 per tire, and the ordering cost is $75 per order. The distributor operates 288 days a year.
    a) What is the EOQ?   [2]
    b) How many times per year does the store reorder?   [1]
    c) What is the length of the order cycle time?   [1]
    d) If the lead time is 2days, what is the reorder point?   [1]

5) Using the following factor ratings, determine which location alternative should be chosen on the basis of maximum score?   [3]

FACTOR	Weight	LOCATION		
		A	B	C
convenient	0.15	80	70	60
Parking facilities	0.20	72	76	92
Display area	0.18	88	90	90
Shopper traffic	0.27	94	86	80
Operating costs	0.10	98	90	82
Neighborhood	0.10	96	85	75
	1.00			

6) Suppose a photographic paper manufacturer has a coating line with a design capacity of 168 hours. The record for a week's production show the following lost production time:

1. Product changeovers (set-ups)	20hrs
2. Regular preventative maintenance	16hrs
3. On work scheduled	8hrs
4. Quality sampling checks	8hrs
5. Shift change times	7hrs
6. Maintenance breakdown	18hrs
7. Quality failure investigation	20hrs
8. Coating materials stockouts	8hrs
9. Labor shortages	6hrs
10. Waiting for paper rolls	6hrs

The first five categories of lost production occur as a consequence of reasonably unavoidable, planned occurrences. The last five categories are unplanned, and avoidable, losses.

a) Measured in hours of production, calculate efficiency and utilization for this coating line? [3]

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