

UNIVERSITY OF SWAZILAND

FACULTY OF COMMERCE

DEPARTMENT OF BUSINESS ADMINISTRATION

SUPPLEMENTARY FINAL EXAMINATION PAPER

JULY 2005

- TITLE PAPER : PRODUCTION/OPERATIONS MANAGEMENT**
- COURSE TITLE : BA 513**
- TIME ALLOWED : THREE (3) HOURS**
- INSTRUCTIONS :**
- (1) TOTAL NUMBER OF QUESTIONS IN THIS PAPER IS SIX (6)**
 - (2) THE PAPER CONSISTS OF SECTION A AND SECTION B.**
 - (3) ANSWER ANY TWO (2) QUESTIONS FROM EACH SECTION.**
 - (4) THE MARKS AWARDED FOR A QUESTION /PART OF A QUESTION ARE INDICATED AT THE END OF EACH QUESTION / PART OF QUESTION.**
 - (5) ALL WORKINGS MUST BE CLEARLY SHOWN**

NOTE: MAXIMUM MARKS WILL BE AWARDED FOR GOOD QUALITY LAYOUT, ACCURACY, AND PRESENTATION OF YOUR WORK.

THIS PAPER MUST NOT BE OPENED UNTIL PERMISSION HAS BEEN GRANTED BY THE INVIGILATOR.

!!!GOOD LUCK!!!

SECTION A (ANSWER ANY TWO QUESTIONS)

Q1. (a). A company produces various types of fans. In May, the company produced 1,728 window fans at a standard price of E40. The company has 12 direct labour employees whose compensation (including wages and fringe benefits) amounts to E21 per hour. During May, window fans were produced on 9 working days (of 8 hours each), and other products were produced on other days.
Determine the labour productivity of the window fans. (5marks).

(b). The company also produces desk fans at a standard price of E25. During May, 1,872 desk fans were produced on 11 working days (of 8 hours each). On one day, two employees called in sick.
Determine the labour productivity of the desk fans. Was productivity higher for the window fans or for the desk fans in May? (10marks).

(c). As additional information to the above, assuming there were 20 working days in May. And that the direct material cost of window fans is E7; the direct material cost of desk fans is E5. And the annual overhead expense incurred in operating the factory is E144,000.
Determine the multi-factor productivity of the company in May. What is the interpretation of your calculated multi-factor productivity? (10marks).

Q2. (a). ***“ In JIT, waste represents unproductive resources; eliminating waste can free up resources and enhance production ”*** Enumerate these wastes. (10marks).

(b). Determine which shipping alternative is best if the annual holding cost of an item is 25% of unit price, and a single unit with a price of E6000 is to be shipped, ***either by 2-day freight at a cost of E400 or 5-day freight at a cost of E350.*** (10marks).

(c). ***Determine the number of containers*** needed for a work station that uses 100 parts per hour ***if the time for a container to complete a cycle*** (move, wait, empty, return, fill) is 90 minutes and a ***standard container*** holds 84 parts. ***Efficiency factor of 0.10 is currently being used.*** (5marks).

16.

Q3 (a). A simple system consists of three components, A, B, and C as shown below, with the probability that each component will work. Component A costs E20,000 each, B costs E10,000 each, and C costs E6,000 each.

$$\text{----- } p(A) = 0.99 \text{ ----- } p(B) = 0.99 \text{ ----- } p(C) = 0.75 \text{ -----}$$

- i. Is this a serial or parallel system? (2marks).
 - ii. What is the probability that the system will work? (2marks).
 - iii. Management wishes to have at least a 95% probability that the system will work, and proposes to achieve this goal by adding redundant component *C*'s to the system, which are identical to the existing components *C*. Each new *C* would switch on if the preceding *C*'s failed. How many *C*'s will be required? (5marks).
 - iv. Draw the diagram of the new system. (3marks).
 - v. Is this serial or a parallel system? (2marks).
 - vi. How much will it cost to achieve a 95% probability by adding *C*'s? (2marks).
- (b). The mean operating life (MTBF) of TV picture tubes is 4000 hours, and the failure rate of the tubes can be modelled by a negatively exponential distribution.
- i. Determine the probability that a picture tube will fail within 3,200 hours. (2marks).
 - ii. Determine the probability that a picture tube will last at least 6400 hours. (2marks).
 - iii. The manufacturer wishes to provide a warranty on which he will be obligated to make a replacement of only 2% of the picture tubes sold. For how many hours should the picture tubes be warranted? (5marks).

SECTION B (ANSWER ANY TWO QUESTIONS)

Q4. SwaziTel has three billing plans.

- A: An unlimited number of local telephone calls per month for E20.00
- B: Fifty (or fewer) local telephone calls per month for E16 plus 8 cents per call above 50 calls.
- C: Twenty (or fewer) local telephone calls per month for E12 plus 10 cents per call above 20 calls.

The subscriber is uncertain as to whether the number of local telephone calls will be about 60 per month, or about 90 per month, or about 120 per month, or about 160 per month. Use decision theory to determine which billing plan the subscriber should select.

- (a). What is the *payoff table*? (5marks).
- (b). Which plan should be selected under *the minimax regret criterion*? (10marks).
- (c). *Why is it improper to use the maximax criteria here?* (3marks).
- (d). Suppose that the subscriber assesses probabilities as follows:

$p(60 \text{ calls}) = 40\%$	$p(120 \text{ calls}) = 20\%$
$p(90 \text{ calls}) = 30\%$	$p(160 \text{ calls}) = 10\%$

- Which plan should be selected under the *best expected value criterion*? (5marks).
- (e). Which plan should be selected under the *least expected regret criterion*? (2marks).

Q5. In the recent Board meeting of XYZ company, the *Production Manager in Trainee* engaged in a hot argument that the **“keys to effective supply chain management are information, communication, cooperation and trust”**. With your knowledge in Production Management, **write a report** to the Board of Directors why you AGREE or DISAGREE with the view of the *Production Manager in Trainee*. (25marks).

Q6. (a). The Dine Corporation is both a producer and a user of brass couplings. The firms operates 220 days a year and uses the couplings at a steady rate of 50 per day. Couplings can be produced at a rate of 200 per day. Annual storage cost is E1.00 per coupling, and machine setup cost is E35 per run.

- (i). Determine the economic run size. (2marks).

- (ii). Approximately, how many runs per year will there be? (2marks).
- (iii). Compute the maximum inventory level. (3marks).
- (iv). Determine the length of the *pure consumption portion* of the circle. (5marks).
- (b). The manager of a store that sells office supplies has decided to set an annual service level of 96% for a certain model of telephone answering equipment. The store sells approximately 300 of this model a year. Holding cost is E5.00 per unit annually, ordering cost is E25, and $\delta_{dLT} = 7$.
- (i). What average number of units short per year will be consistent with the specified annual service level? (3marks).
- (ii). What average number of units short per cycle will provide the desired annual service level? (5marks).
- (iii). What lead time service level is necessary for the 96% annual service level? (5marks).

z	Lead Time Service Level	E(z)	z	Lead Time Service Level	E(z)	z	Lead Time Service Level	E(z)	z	Lead Time Service Level	E(z)
0.0	0.5000	0.5000	0.0	0.5000	0.5000	0.0	0.5000	0.5000	0.0	0.5000	0.5000
0.1	0.5398	0.4602	0.1	0.5398	0.4602	0.1	0.5398	0.4602	0.1	0.5398	0.4602
0.2	0.5793	0.4207	0.2	0.5793	0.4207	0.2	0.5793	0.4207	0.2	0.5793	0.4207
0.3	0.6179	0.3821	0.3	0.6179	0.3821	0.3	0.6179	0.3821	0.3	0.6179	0.3821
0.4	0.6554	0.3455	0.4	0.6554	0.3455	0.4	0.6554	0.3455	0.4	0.6554	0.3455
0.5	0.6915	0.3114	0.5	0.6915	0.3114	0.5	0.6915	0.3114	0.5	0.6915	0.3114
0.6	0.7264	0.2793	0.6	0.7264	0.2793	0.6	0.7264	0.2793	0.6	0.7264	0.2793
0.7	0.7603	0.2480	0.7	0.7603	0.2480	0.7	0.7603	0.2480	0.7	0.7603	0.2480
0.8	0.7930	0.2187	0.8	0.7930	0.2187	0.8	0.7930	0.2187	0.8	0.7930	0.2187
0.9	0.8244	0.1915	0.9	0.8244	0.1915	0.9	0.8244	0.1915	0.9	0.8244	0.1915
1.0	0.8544	0.1665	1.0	0.8544	0.1665	1.0	0.8544	0.1665	1.0	0.8544	0.1665
1.1	0.8830	0.1436	1.1	0.8830	0.1436	1.1	0.8830	0.1436	1.1	0.8830	0.1436
1.2	0.9102	0.1222	1.2	0.9102	0.1222	1.2	0.9102	0.1222	1.2	0.9102	0.1222
1.3	0.9359	0.1021	1.3	0.9359	0.1021	1.3	0.9359	0.1021	1.3	0.9359	0.1021
1.4	0.9602	0.0833	1.4	0.9602	0.0833	1.4	0.9602	0.0833	1.4	0.9602	0.0833
1.5	0.9832	0.0658	1.5	0.9832	0.0658	1.5	0.9832	0.0658	1.5	0.9832	0.0658
1.6	0.9943	0.0500	1.6	0.9943	0.0500	1.6	0.9943	0.0500	1.6	0.9943	0.0500
1.7	0.9970	0.0359	1.7	0.9970	0.0359	1.7	0.9970	0.0359	1.7	0.9970	0.0359
1.8	0.9984	0.0255	1.8	0.9984	0.0255	1.8	0.9984	0.0255	1.8	0.9984	0.0255
1.9	0.9994	0.0175	1.9	0.9994	0.0175	1.9	0.9994	0.0175	1.9	0.9994	0.0175
2.0	0.9997	0.0125	2.0	0.9997	0.0125	2.0	0.9997	0.0125	2.0	0.9997	0.0125
2.1	0.9998	0.0087	2.1	0.9998	0.0087	2.1	0.9998	0.0087	2.1	0.9998	0.0087
2.2	0.9999	0.0059	2.2	0.9999	0.0059	2.2	0.9999	0.0059	2.2	0.9999	0.0059
2.3	0.9999	0.0039	2.3	0.9999	0.0039	2.3	0.9999	0.0039	2.3	0.9999	0.0039
2.4	0.9999	0.0026	2.4	0.9999	0.0026	2.4	0.9999	0.0026	2.4	0.9999	0.0026
2.5	0.9999	0.0017	2.5	0.9999	0.0017	2.5	0.9999	0.0017	2.5	0.9999	0.0017
2.6	0.9999	0.0011	2.6	0.9999	0.0011	2.6	0.9999	0.0011	2.6	0.9999	0.0011
2.7	0.9999	0.0007	2.7	0.9999	0.0007	2.7	0.9999	0.0007	2.7	0.9999	0.0007
2.8	0.9999	0.0004	2.8	0.9999	0.0004	2.8	0.9999	0.0004	2.8	0.9999	0.0004
2.9	0.9999	0.0003	2.9	0.9999	0.0003	2.9	0.9999	0.0003	2.9	0.9999	0.0003
3.0	0.9999	0.0002	3.0	0.9999	0.0002	3.0	0.9999	0.0002	3.0	0.9999	0.0002

Normal distribution service levels and unit normal loss function

QUESTION – 7

DISCUSS THE VALUES OF ORGANIZATION DEVELOPMENT MOVEMENT?

(20 MARKS)

QUESTION – 8

WRITE THE DEFINITION OF LEADERSHIP?

(5 MARKS)

DESCRIBE THE VARIOUS TYPES OF LEADERSHIP?

(15 MARKS)