

**UNIVERSITY OF SWAZILAND**

**FACULTY OF COMMERCE**

**DEPARTMENT OF BUSINESS ADMINISTRATION**

**MAIN EXAMINATION PAPER; F/T & IDE STUDENTS**

**MAY 2013.**

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**TITLE OF PAPER : OPERATIONS MANAGEMENT**  
**COURSE CODE : BA 513**  
**TIME ALLOCATED : THREE [3] HOURS**  
**TOTAL MARKS : 100 MARKS**

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**INSTRUCTIONS**

- 1. TOTAL NUMBER OF QUESTIONS IN THIS PAPER IS 4**
- 2. THE PAPER CONSISTS OF SECTION A AND SECTION B: ANSWER THE QUESTIONS IN SECTION A WHICH ARE COMPULSORY AND ANY TWO [2] QUESTIONS IN SECTION B.**
- 3. THE MARKS ALLOCATED FOR A QUESTION/PART OF A QUESTION ARE INDICATED AT THE END OF EACH QUESTION/PART OF THE QUESTION.**
- 4. NOTE: MAXIMUM MARKS WILL BE AWARDED FOR QUALITY, LAYOUT, ACCURACY, AND GOOD PRESENTATION OF WORK.**

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

**SECTION A : ANSWER ALL QUESTIONS IN THIS SECTION [50 MARKS]**

**QUESTION 1.**

- a. Some students who recently graduated from university decided to utilise skills they learnt in some of the management courses such as Operations Management and Entrepreneurship management. One group teamed up to manufacture car security systems. They specialise in making two types of anti-burglar gadgets. Type 1 is made up of a length of steel rod with two hooks- like ends, one of which is to fit under the clutch pedal and the other end fits over the steering wheel. The two hooks are then held in place and secured by an adjustable steel latch-padlock arrangement. Type two is also made up of the same length of steel rod connecting two steel plate formed shapes. One form fits over the gear lever while the other fits over the handbrake lever. The two forms and steel rods are then held in place in a manner similar to that used by type 1 lock, using a latch-padlock arrangement.

The youths are able to sell all the car locks they can produce because of the recent increases in car thefts. Unfortunately, they can only get a maximum of 50 padlocks, 6 square meters of steel sheet, and 30 metres of steel rod per week. Each clutch lock is made up of 0.75m rod. Each gear lock requires 0,4m rod and 0, 2 square meters steel sheet. Of course, each lock type is fitted with only one padlock.

A clutch lock brings in a profit contribution of E50, while a gear lock brings in E70. How many of each type of locking system should the youths produce and what will be the highest profit contribution? Use the graphical solution (corner point method) and also confirm your findings using the mathematical method to solve the problem

**(30 marks).**

- b. Supply chain management (SCM) is an issue that concerns operations managers throughout the corporate world these days. Some of the areas that SCM emphasize are outsourcing and managing procurement costs. What are the advantages of outsourcing and how can you manage procurement costs in an organisation. Please discuss in detail.

**(20 marks).**

**[Total Marks 50]**

**SECTION B. ANSWER TWO [2] QUESTIONS ONLY FROM THIS SECTION.  
EACH QUESTION CARRIES 25 MARKS.**

**QUESTION 2.**

- a. UNISWA Maintenance unit employs five joiners. Each joiner has different abilities and skills and takes different amounts of time to do each job. At present there are five jobs to be allocated. The time taken for each job by each person is given below.

**Time per job (hours)**

	Job 1.	Job 2.	Job 3.	Job 4.	Job 5.
M1	25	16	15	14	13
M2	25	17	18	23	15
M3	30	15	20	19	14
M4	27	20	22	25	12
M5	29	19	17	32	10

The jobs have to be assigned one job to one joiner. How should this be done in order to minimize the total man time needed to finish all of the jobs? **(10 marks).**

- b. The Swaziland National Traffic police was serious about reducing road traffic accidents to a bare minimum during the Easter holidays. My friend was held at a particular road block for 30 minutes and in those few minutes he witnessed issuance of 20 tickets for offences as shown in the table below. Explain the use of Check sheets and Pareto diagrams in an organisation that you know and make a Check sheet and a Pareto diagram for the infractions/offences shown in the diagram **(15 marks).**

Ticket No.	Offence	Ticket No.	Offence.
1	Excessive speed	11	Expired licence disc
2	Expired licence disc	12	Parking violation
3	Improper U turn	13	Improper U turn
4	Excessive speed	14	Parking violation
5	Parking violation	15	Excessive speed
6	Parking violation	16	Parking violation
7	Excessive speed	17	Parking violation
8	Parking violation	18	Parking violation
9	Improper U turn	19	Excessive speed
10	Parking violation	20	Parking violation

[Total Marks 25 ]

**QUESTION 3.**

- a. The University's Athletics department wants to develop its budget for the coming academic year using forecasts for football attendance. Football attendance account for the largest portion of the department's revenue and the Athletics Director believes attendance is directly related to the number of wins by the football team. The table below shows games won and attendance summaries for football games for the past 8 years.

Wins                      Attendance

4	36,300
6	40,100
6	41,200
8	53,000
6	44,000
7	45,600
5	39,000
7	47,500

Given the returning starters and the strengths of the schedules, the Athletics Director believes that the team will win at least 7 games next year. Develop a simple regression equation for the above data and forecast next year's attendance for the expected level of success

**(15 marks)**

- b. Matsapha Garage has developed a new device which should make the internal combustion engine more efficient. The chief mechanic is faced with three alternatives in regard to the marketing of this device. The garage can proceed to manufacture and make the device itself; in this case the garage would make a profit of E2,00 for each device sold. As a second choice, the garage can sell the patent outright to another company for E1 million. In the third case, the garage can sell the patent for E0,3 million and receive a royalty of E1,00 per device sold. Which is the optimal choice using the expectation principle if there is a 0,50 probability that the sales of the device will be 2,000,000 units, a 0,40 probability of sales of 800,000 units, and if there is 0,10 probability of 1,400,000 million units being sold? Set up the decision matrix before applying the expectation principle.

**(10 marks)**

**[Total Marks 25]**

#### **QUESTION 4**

- a. You have been offered to start a job as a Master Scheduler at a Matsapha based water pump manufacturing company, starting from June 1, 2013. In your first assignment you have been asked to come up with the company's master production schedule (MPS) and all the necessary information was given to you as follows:

##### **Inputs.**

The company currently has inventory of 64 units from last week. Weekly forecasts for the months of June and July are 30 units per week for the month of June and 40 units per week for the month of July. You are also told that customer orders (commitments) for weeks 1 to 5 are 33, 20, 10, 4, and 2 respectively. \

## Outputs

If the company is required to produce additional pumps, it already has an approved production batch size of 70 units per production run. You are required to project on hand inventory for the eight (8) weeks and showing the number of production runs (MPS) that will be required to take care of shortfalls if there will be any. Please do not include the uncommitted inventory in your computations. **(10 marks)**

b. The following table is a summary of jobs arrivals at a workshop.

Job Number	Processing Time	Due Date
1	2	13
2	14	22
3	10	10
4	16	23
5	11	48
6	18	53

Assume that the order of arrival for the jobs at a workshop is as per the above table. As the Operations Manager, you are required to determine;

- i. What will be the preferred order sequence if you used the FCFS, EDD and SPT?  
**(3marks)**
- ii. What will be the Average flow time, average tardiness and average number of jobs at the workshop under the FCFS rule?  
**(12 marks)**

**[Total Marks 25]**

**END OF EXAMINATION: GOOD LUCK!!!**