

UNIVERSITY OF SWAZILAND

FACULTY OF COMMERCE

DEPARTMENT OF BUSINESS ADMINISTRATION

MAIN EXAMINATION PAPER; FUL TIME & IDE STUDENTS

DECEMBER 2016

TITLE OF PAPER : MANAGEMENT SCIENCE1

COURSE CODE : BA 302/BA406

TIME ALLOCATED : THREE [3] HOURS

TOTAL MARKS : 100 MARKS

INSTRUCTIONS

1. TOTAL NUMBER OF QUESTIONS IN THIS PAPER IS 5
2. THE PAPER CONSISTS OF SECTION A AND SECTION B
3. ANSWER THE QUESTION IN SECTION A WHICH IS COMPULSORY AND ANY THREE [3] QUESTIONS IN SECTION B.
4. THE MARKS ALLOCATED FOR A QUESTION/PART OF A QUESTION ARE INDICATED AT THE END OF EACH QUESTION/PART OF QUESTION.
5. 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

QUESTION 1.1.

- a. The importance of quality in business cannot be underestimated nowadays. What is the meaning of quality? (2marks)
- b. Explain statistical control charts and their use in a quality oriented Swaziland food manufacturing company (8 marks)
- c. In a statistical quality control environment, what are the differences between natural cause variations and assignable variations? (7 marks)

[17 MARKS]

QUESTION 1.2.

Lidwala Insurance has just sold another fire insurance policy to a home owner who wanted an insurance cover for his household property. The premium is E200 per year. E30 of the premium goes to commission and office expenses. The property for which the policy has been purchased is valued at E40, 000.

The probability of no fire is 0.99, the probability of a small fire causing a damage of E5 000 is 0.008, and the probability of a large fire causing a E40,000 in damage is 0.002. What is the expected profit contribution to Lidwala from this policy? **[10 MARKS]**

QUESTION 1.3.

Gugulethu claims she has been unfairly dismissed by her employers. She engages a law firm of Dlamini and Associates who agree to handle her case. The lawyers advise her that, if she wins her case she can expect compensation of E 15 000, but if she loses she will receive nothing. The lawyers estimate that their fees will be E 1 500 which she will pay whether she wins or loses the case. Under the rules of the relevant Labour laws Gugulethu cannot be asked to pay her employer's costs.

As an alternative the lawyers offer Gugulethu a "NO WIN NO FEE" deal under which she pays no fees but if she wins the case Dlamini & Associates take one third of the compensation she receives. Gugulethu could decide against bringing the case to court, an option which would incur no cost and results in no compensation. Advise the young lady what to do using the following decision approaches:

- i. Maxi-max decision rule (3)
- ii. Maxi-min decision rule (3)
- iii. Equally likely decision rule (3)
- iv. Mini-max regret (4)

[17 MARKS]

[TOTAL 40 MARKS]

SECTION B. CHOOSE THREE (3) QUESTIONS OF YOUR CHOICE FROM THIS SECTION. EACH QUESTION CARRIES EQUAL MARKS (20).

QUESTION 2.

Consider some UNISWA entrepreneurship students who have 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 hook-like ends, one of which is fitted 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 hand brake lever. The two forms and steel rod are then held in place in a manner similar to that used in type one lock, using a latch padlock.

The youth 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 metres steel sheet and 30 metres of steel rod per week. Each clutch lock is made up of 0.75 metres rod. Each gear lock requires 0.4 metres rod and 0.2 square metres steel sheet. Of course each lock type is fitted with only one padlock. A clutch lock brings in a profit contribution of E 50, while a gear lock brings in E 70.

How many of each type of locking system should the entrepreneurs produce in order to maximise their total weekly profit contribution?

[TOTAL 20 MARKS]

QUESTION 3.

The passenger miles flown on the South Africa Air link which serves the King Mswati 111 International Airport and Oliver Tambo International Airport for the past twelve months are as follows:

Month	Actual passenger kilometres(1000's)	Month	Actual passenger kilometres(1000's)
1	17	7	20
2	21	8	18
3	19	9	22
4	23	10	20
5	18	11	15
6	16	12	22

- a. Assuming the forecasts for month 1 & 2 is 17 000 kilometres use the exponential smoothing to calculate forecasts for month 3 through 13. Use $\alpha=0.2$ (5)
- b. Use the three month moving average to forecast mileage for month 13 (5)
- c. Which of the two forecast methods would you recommend using both mean average deviation (MAD) and mean squared deviation (MSE)? (10)

[TOTAL 20 MARKS]

QUESTION 4.

Kaizer Chief's Football Club wants to develop its budget for the year using forecast for football attendance. Football attendance account for the largest portion of the club's annual revenue, and the Club director believes attendance is directly related to the number of wins by the team. Thus the manager has collected total annual attendance figures for the past eight years which are shown below.

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

Given the number of returning first team players and the 'favourableness' of fixtures, the Director believes the team will win at least 7 games next season. Develop a simple regression equation for this data to forecast attendance for this level of success

[TOTAL 20 MARKS]

QUESTION 5.

A new company has an opportunity of marketing a new package of computer games. It has two possible courses of action; to test the market on a limited scale or to give up the project completely. A test market would cost E160, 000 and current evidence suggests that consumer reaction is equally likely to be positive (+ve) or negative (-ve). If the reactions to the test marketing were to be positive the company could either market the computer game nationally or still give up the project completely. Research suggests that a national launch might result in the following sales:

Sales	Contribution (E million)	Probability
High	1.20	0.25
Average	0.30	0.50
Low	- 0.24	0.25

If the test marketing were to yield negative results a contribution of E 60 000 will be achieved from the sale of copyright to another manufacturer. All contributions have been discounted to present values.

5.1. Draw a decision tree to represent the above situation, including all relevant probabilities and financial values (10)

5.2. Recommend a course of action for the company on the basis of expected values (10)

[TOTAL 20 MARKS]

END OF EXAMINATION: GOOD LUCK!!!!