UNIVERSITY OF SWAZILAND

FACULTY OF COMMERCE

DEPARMENT OF BUSINESS ADMINISTRATION

FINAL EXAMINATION PAPER; FULL TIME& IDE STUDENTS

DECEMBER 2014.

TITLE OF PAPER : MANAGEMENT SCIENCE 1

COURSE CODE : BA 302/ BA406

TIME ALLOCATED : THREE [3] HOURS

TOTAL MARKS : 100 MARKS

INSTRUCTIONS

1. TOTAL NUMBER OF QUESTIONS IN THIS PAPER IS 4
2. THE PAPER CONSISTS OF SECTION A AND SECTION B
3. ANSWER ALL QUESTION IN SECTION A AND ANY TWO [2] QUESTIONS IN SECTION B.
4. THE MARKS ALLOCATED FOR A QUESTION OR PART OF A QUESTION ARE INDICATED AT THE END OF EACH QUESTION OR PART OF THE QUESTION.
5. NOTE: MAXIMUM MARKS WILL BE AWARDED FOR QUALITY, LAYOUT, ACCURACY, AND EXPLANATIONS FOR STEPS USED TO SOLVE PROBLEMS

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.

1.1.

Explain with the assistance of an illustration what it meant by a production system being out of control (12)

1.2.

Benele Lungile Simiso is considering investing some money that she inherited. The following payoff table gives the profits that would be realised during the next year for three investment alternatives Benele is considering.

	State of Nature	
Decision Alternative	Good Economy	Poor Economy
Stock Market	80,000	-20,000
Bonds	30,000	20,000
CD	23,000	- 23,000
Probability	0.5	0.5

i. What decision would maximise expected profit? (4)
ii. What decision would you make using the mini-max regret criterion (5)
iii. What decision will be made using the criterion of realism (α= 0.7) (2)
iv. What is the maximum amount that should be paid for a perfect forecastof the economy? (4)

1.3.

Room registrations at Esibayeni Lodge have been recorded for the past 9 years.Management would like to determine the mathematical trend of guest registration in order to project future occupancy.The estimate would help the hotel to determine whether future expansion will be needed.Given the following time series data. Room registrations are in thousands.

Year	1	2	3	4	5	6	7	8	9
Registrations	17	16	16	21	20	20	23	25	24

i. Use a three year moving average to forecast bookings for year 10 (5)
ii. Calculate MAD and MSE using the three year moving average forecast (5)

iii. Use exponential smoothing forecast with an exponential smoothing factor of 0.4 to forecast bookings for year 10 (assume) forecast for year 1 is equivalent to the year's actual bookings. (5)

iv. Calculate MAD and MSE for exponential smoothing forecast. (5)

v. Which of the two forecasts must be selected and why? (3)

[TOTAL MARKS 50]

SECTION B: ANSWER TWO QUESTIONS OF YOUR CHOICE FROM THIS SECTION. EACH QUESTION CARRIES 25 MARKS.

QUESTION 2.

(a).

Lutsango Lwaka Ngwane distributors has an annual demand for a special water pump of 1400.The cost of a typical pump to Hellenic is E400.Carrying cost is estimated to be 20% of the unit cost,and the ordering cost is E 25 per order. If Lutsango orders quantities of 300 or more,it can get a 5 % quantity discount on the costof the detectors. Should Lutsango take the quantity discount? Assume demand is constant. (7)

(b).

The Bambani Farmers Association in Mpuluzi is considering buying two different brands of chick feed and blending them to provide good, low-cost diet for its birds.Each feed contains in varying proportions, some or all of the three nutritional ingredients essential for fattening chicks.Each kilogram of brand 1 purchased for example, contains 5 grams of ingredient A, 4 grams of ingredient B, and 0.5 grams of ingredient C. Each kilogram of brand 2contains 10 grams of ingredient A,3 grams of ingredient B, but no ingredient C.

The brand 1 feed cost theAssociation 2Emalangeni a kilogram, while brand 2 costs 3 Emalangeni per kilogram.

Use LP to determine the lowest diet that meets the minimum monthly intake requirement for each nutritional ingredient when the minimum monthly ingredients requirements are: Ingredient A (90 grams), Ingredient B (48 grams), and Ingredient C (1 ½ grams). (18)

[TOTAL MARKS 25]

QUESTION 3.

a.

Thirteen girls entered the undergraduate programme introduced at a local university2 years ago.The following table indicates what their grade points average(GPA) were after being in the programme for two years and what each student would have scored on entrance test taken

when they were still in high school. If a student scores 350 on the entrants' test what do you think her GPA will be? What about a student who scores 800? (15)

Student	1	2	3	4	5	6	7	8	9	10	11	12	13
TEST SCORE	421	377	585	690	608	390	415	481	729	501	613	709	366
GPA	2.90	2.93	3.00	3.45	3.66	2.88	2.15	2.53	3.22	1.99	2.75	3.90	1.60

b.

A chemical firm produces sodium bisulphate in 100 kg bags.Demand for this product is 20 tons per day.The capacity for producing the product is 50 tons per day. Set up cost is E 100, and storage and handling costs are E5 per ton per year. The firm operates 200 days a year.(NB.1 ton =2,000 kg).

1. How many bags per run are optimal? (3)
2. Determine the approximate length of a production run in days (1)
3. About how many runs per year would there be? (1)
4. How much could the company save annually if the set up cost could be reduced to E25 per run? (5)

[TOTAL MARK 25]

QUESTION 4.

A group of medical professionals is considering the construction of a private clinic. If the medical demand is high (favourable market) for the clinic, the physicians could realise a net profit of E 100,000.If the market is not favourable they could lose E40, 000. Of course they do not have to proceed, at all, in which case there is no cost. In the absence of any market data, the best the physicians can guess is that there is a 50-50 chance the clinic will be successful.

4.1.Construct a decision tree to help analyse this problem (3)
4.2.What should the medical professionals do? (3)
4.3.Uses the EMV approach to recommend the appropriate strategy given additional information detailed below and calculate the amount of money the physicians must be willing to pay for the information. (19)

A Marketing Research firm that offered to do a survey for the medical professionals charged E 5,000 claiming their experiences enables them to use Baye's theorem to make the following statements of the problem:

Probability of the favourable market given a favourable study is 0.82,

Probability of an unfavourable market given a favourable study is 0.18,

Probability of a favourable market given an unfavourable study is 0.11,

Probability of an unfavourable market given an unfavourable study is 0.89

Probability of a favourable research study is 0.55 and

Probability of unfavourable research study is 0.45

[TOTAL MARKS 25]

END OF QUESTION PAPER: GOOD LUCK!!!!!!!!!