UNIVERSITY OF SWAZILAND

FACULTY OF COMMERCE

DEPARMENT OF BUSINESS ADMINISTRATION

SUPPLIMENTARY EXAMINATION PAPER, FULL TIME STUDENTS

JULY 2014.

TITLE OF PAPER : MANAGEMENT SCIENCE 1

COURSE COD : BA 302

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 GOOD PRESENTATION OF WORK.
6. 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.

The new product development director of a Matsapha chemical and pharmaceuticals manufacturing company believes that the firm's annual profits depend on the amount spend on research and development(R & D).The new Chief Executive Officer(CEO) does not agree and he has asked for evidence. R& D expenditure and profit data for the past six years was obtained for use and it was as follows:

Year	Amount spent on R&D (E millions)	Annual Profit (E millions)
2012	2	20
2011	3	25
2010	5	34
2009	4	30
2008	11	40
2007	5	31

Use the regression equation to advice the new CEO how much profit he will likely earn if he approves the 2014 R & D, proposed budget of E 8 million, that was presented for his approval

(20 marks)

1.2.

Study a decision table with monetary pay offs and associated probabilities is given below.

	STATE OF NATURE		
Decision alternative	Good marketing	Average audit	Bad Market
Small factory	290 000	180 000	- 170 000
Medium size factory	320 000	200 000	- 240 000
Large factory	490 000	540 000	360 000
No factory	0	0	0
Probabilities	0.3	0.6	0.1

Assuming there are no probabilities what decisions would you make under, Maximax criterion, Maximin criterion, Laplace, Minimax regret criterion and Criterion of realism with a 0.8 coefficient of realism and assuming the probabilities are now brought into place what decision will you make under the expected value decision criterion (15 marks)

1.3.

Maximize monthly earnings = 50X1 + E20X2

Subject to: 2 X1 +4X2 $\leq$ 400 (advertising budget available)

100X1 + 50X2$\leq$ 8 000 (square footage required)

X1$\leq$ 60 (rental limit expected)

X 1, X2 $\geq$ 0

Where X1 = number of large spaces developed

X2 = number of small spaces developed

Use the corner point method to determine highest earnings. (15 marks)

[Total 50 Marks]

SECTION B: CHOOSE TWO (2) QUESTIONS OF YOUR CHOICE FROM THIS SECTION. EACH QUESTION CARRIES 25 MARKS.

QUESTION 2.

2.1

Determine the sales forecast for year 13 using the 3-month moving average forecasting, and exponential smoothing model with a smoothing factor of .2. Using MAD and MSE say which forecasting method is better than the other.

Month	1	2	3	4	5	6	7	8	9	10	11	12
Actual sales	1,850	1,920	1,800	1,875	1,960	2,040	1,980	2,100	2,070	2,150	2,210	2,180

(11 marks)

2.2. Doctors operating Manzini Clinic in Swaziland use 816 cases of liquid ICU Hand wash when scrubbing up for operations. The ordering cost is R12 per order. Carrying cost is 20 percent or 0.2 times the inventory cost. A new price list has been received from Adcock Ingram the manufacturers of the ICU Hand wash who operates from Mpumalanga province in South Africa. The new price indicates that any quantity lower than 50 cases will cost R20 per case. Please study the new pricing schedule shown in the following table carefully.

Discount Number	**Range**	**Price in Rand**
1	1-49	20
2	50-79	18
3	80-99	17
4	>100	16

i. Calculate the four economic order quantities involved in the problem and indicate the quantities that you are supposed to use in determining minimum total inventory costs for the different order options available (4 marks).

ii. Determine the total costs for the different options you have. (8 marks).

iii. Which option must be selected and why? (2 marks).

[Total Marks 25].

QUESTION 3.

A financial advisor has recommended two possible mutual funds for investment; these are fund A and fund B. The return that will be achieved by each of the funds depends on whether the economy is good, fair, or poor. If the economy performs well, fund A yields E10, 000 while fund B yields E 6,000. When the economy is fair, fund A yields E2, 000 while fund B yields, E4, 000. Lastly if the economy performs poorly, fund A yields a loss of E5, 000 while fund B breaks even. The probabilities for economic performances are estimated as, good economy 0.2, fair economy 0.3, and poor economy 0.5.

3.1

Draw a decision tree to represent information that you were given (7 marks)

3.2.

Using a decision table determine which of the two funds is better than the other?

(6 marks)

3.3.

Suppose one of the investors queried the return on fund A in a good economy. It could be higher or lower than E 10.000.What value of this could cause a person to be indifferent between funds A and B? (6 marks)

3.4. Explain why quality control is important and show how the control chart works.

(6 marks)

[Total 25 Marks]

QUESTION 4.

4.1.

There are rumours of oil discovery in the Lobamba Region of Swaziland. Abraham purchased massive stretches of land in the region some time ago and is contemplating the prospects of drilling a well for oil on his piece of land. He needs to make a decision soon and he has the following information.

Alternatives or acts available to him are, Don't drill, Drill with no partners, Drill with Anderson as partner and Drill with Majozi as partner. Drilling for oil may result in three states of nature which are, No Oil, 100 thousand barrels of Oil, and 500 thousand barrels of oil.

Based on advice from his friend a Geologist and from his previous drilling experience, Abraham feels that there are 90 chances in 100 that there is no oil,8 chances in 100 that he will get 100 000 barrels of oil and 2 chances in 100 that he can make 500 000 barrels.

If Abraham does not drill, then the profit that will be derived is zero regardless of what lies beneath the surface. If a hole has to be drilled, there will be costs and there maybe revenues. The cost of drilling a well is E100, 000., and if, and only if, oil is discovered, an extra E40,000. Must be spent on equipment such as pipes and pumps. Finally, oil at the wellhead can be sold for E7 a barrel. With this information the consequences of the options you have been given can be determined.

Abraham can go it alone and take all the profits or losses.

If Abraham drills in partnership with Anderson, Anderson has offered to participate 50-50 with Abraham in both losses and gains.

Lastly, if Abraham drills in partnership with Majozi, Abraham would pay only for the well equipment if needed, and would receive E1 for each barrel of oil recovered. Majozi would receive the other E6 for each barrel.

In all our calculations we must concern ourselves with pay-offs for Abraham only. What the drilling partners gain or lose is of no importance to Abraham.

What is your advice to Abraham? (17marks)

4.2

UNISWA Luyengo campus has four refuse trucks, ULC101 which is 5 years old, ULC102 which is 3 years old, ULC103 which is 3 years old and ULC104 which is 1year old. In the previous financial year the campus had the following repair and maintenance budgets for each truck, ULC 101 & ULC102, E7, 000 each, ULC103, E6, 000., and ULC104, E4000.The campus has decided that next year it would like to use a four year old truck for refuse collection. How much must be budgeted for the repair and maintenance of this truck?

(8 marks)

[Total 25 Marks]