UNIVERSITY OF EMBU

2017/2018 ACADEMIC YEAR

SECOND SEMESTER EXAMINATIONS

FIRST YEAR EXAMINATION FOR THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION

DMS 501: BUSINESS QUANTITATIVE ANALYSIS

DATE: APRIL 23, 2018   TIME: 8:30 AM – 11:30 AM

INSTRUCTIONS:

ANSWER ANY FOUR (4) QUESTIONS.

QUESTION ONE (25MARKS)

a) Briefly explain each of the following distributions indicating whether it is a discrete or a continuous distribution.

    i)   Binomial distribution   (3 marks)

    ii)   Poisson distribution   (3 marks)

    iii)   Normal distribution   (3 marks)

b) Highlight the applications of markov analysis in business   (6 marks)

c) Distinguish between correlation and regression   (4 marks)

d) The following information relates to M. Mutuma, a dealer in standard wooden tables:

M. Mutuma realized profits of Shs. 12,000 from 7 tables, Shs. 12,400 from 9 tables and Shs. 11,300 from 4 tables sold respectively.

Mutuma has approached you for assistance in forecasting future profits. The profit function is believed to be quadratic in nature.

Required:

Derive the profit function. (6 marks)

QUESTION TWO (25MARKS)

a) Explain how calculus is used to distinguish the nature of a turning point (5 Marks)

b) Gatheru and Kabiru Certified Public Accountants have recently started to give business advise to their clients. Acting as consultants, they have estimated the demand curve of a clients firm to be;

$AR=200-8Q$

Where AR is average revenue in millions of shillings and Q is the output in units.

Investigation of the client firm's cost profile shows that marginal cost (MC) is given by:

$MC=Q^2-28Q+211$(In million shillings)

Further investigations have shown that the firm's cost when not producing output is sh.10 million.

Required:

i) The equation of total cost (3 marks)

ii) The equation of total revenue (2 marks)

iii) An expression for profit (2 marks)

iv) The level of output that maximizes profit (4 marks)

v) The maximum profit (2 marks)

vi) The equation of marginal revenue. (2 marks)

QUESTION THREE (25MARKS)

a) Briefly explain the importance of Markov analysis. (5 marks)

b) Consider a hypothetical economy consisting of three sectors A, B and C with inputs and outputs for a particular period. The balanced transaction table has the form shown in the following table. The figures given are in billions of shillings.

	Input to				
	A	B	C	External demand	Total Output
Output from A	18	30	45	15	108

Output from B	27	30	60	3	120
Output from C	54	40	60	26	180
Other input	9	20	15		
Total input	108	120	180		

Required:

i)   Form technical co-efficients input-output matrix from the above data. Name this matrix 'A'. (5 marks)

ii) If the external demand was to change from Sh. 15 billion, Sh. 3 billion and Sh. 26 billion to Sh. 10 billion, Sh. 2 billion and Sh. 20 billlion, calculate the total output for sector A, B and C.

You may assume $(1-A)^{-1}=$ $\dfrac{1}{109}\begin{pmatrix} 336 & 216 & 234 \\ 288 & 372 & 294 \\ 396 & 348 & 486 \end{pmatrix}$

Where I is identity matrix (10 marks)

iii) What will be the intermediate demand for sectors A, B and C in this case?

(5 marks)

QUESTION FOUR (25MARKS)

a) Distinguish between classical and empirical approach to probability (4 marks)

b) Highlight the features of a binomial probability distribution (5 marks)

c) A batch of 5000 electric lamps has a mean life of 1000 hours and a standard deviation of 75 hours. Assuming a normal distribution, determine

   i)   Proportion of lamps that will fail before 900 hours (2 marks)

   ii) Proportion of lamps that will fail between 950 and 1200 hours (3 marks)

   iii) Proportion of lamps that will fail after 925 hours (2 marks)

   iv) Given the same mean life, what would the standard deviation have to be to ensure that no more than 20% of lamps fail before 916 hours? (3 marks)

d) An insurance company takes a keen interest in the age at which a person is insured. Consequently a survey conducted on prospective clients indicated that for clients having the same age the probability that they will be alive in 30 years time is $\frac{2}{3}$. This probability was

established using the actuarial tables. If a sample of 5 people was insured now, find the probability of having the following possible outcomes in 30 years

i)	All are alive	(2 marks)
ii)	At least 3 are alive	(2 marks)
iii)	At most one is alive	(2 marks)

QUESTION FIVE (25 MARKS)

a) Describe the steps used in hypothesis testing   (5 marks)

b) Highlight any five assumptions underlying linear regression   (5 marks)

c) An investment company advertised the sale of pieces of land at different prices. The following table shows the pieces of land their acreage and costs

Piece of Land	Acreage(Hectares)	Cost(sh.000)
A	2.3	230
B	1.7	150
C	4.2	450
D	3.3	310
E	5.2	550
F	6	590
G	7.3	740
H	8.4	850
J	5.6	530

Required

i) The product moment correlation coefficient briefly comment on the value obtained

(4 marks)

ii) Coefficient determination and its interpretation   (3 marks)

iii) Regression equations of y on x and hence estimate the cost of a piece of land with 4.5 hectares   (8 marks)

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Standard Normal Distribution Table
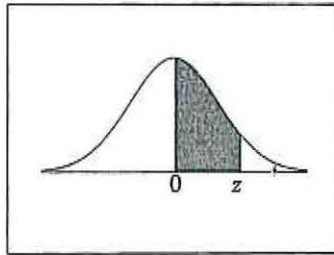
z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990
3.1	.4990	.4991	.4991	.4991	.4992	.4992	.4992	.4992	.4993	.4993
3.2	.4993	.4993	.4994	.4994	.4994	.4994	.4994	.4995	.4995	.4995
3.3	.4995	.4995	.4995	.4996	.4996	.4996	.4996	.4996	.4996	.4997
3.4	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4997	.4998
3.5	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998