KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2016/2017

FIRST SEMESTER EXAMINATION FOR THE DEGREE OF

EXECUTIVE MASTER OF PUBLIC POLICY AND ADMINISTRATION

APE 801: QUANTITATIVE TECHNIQUES FOR PUBLIC POLICY

DATE: Saturday, 3rd December 2016 **TIME:** 9.00 a.m. - 12.00 p.m.

INSTRUCTIONS:

Answer question ONE and any other 2 questions.

QUESTION ONE (30 Marks)

a. Distinguish between kurtosis and skewness (3 Marks)

b. Distinguish between inferential statistics from descriptive statistics (2 Marks)

c. Explain the term dispersion. What purpose does a measure of dispersion serve? (3 Marks)

d. Distinguish between positive correlation from negative correlation (2 Marks)

e. Koiwa Traders has developed a new tea grade named Chemagel. They can either test the market or abandon the project. The details are as set out below.

Test market costs - Kshs 500,000, likely outcome are favourable (0.7), or failure (p = 0.3). If favourable, they could either abandon or produce it when demand is anticipated to be:

Low	p = 0.25	Loss –Kshs.1, 000,000
Medium	p = 0.6	Profit – Kshs.1, 500,000
High	p = 0.15	Profit – Kshs. 4,500,000

If the test market indicates failure,the project would be abandoned. Abandonment a stage results in a gain of Kshs. 300,000 from the special machinery used. Draw the decisio tree showing the nodes and probabilities. (9 Marks)

f. Evaluate the decision tree in (a) above (3 Marks)

g. From the data below, weight of students in an Masters Class, calculate and comment on:

i. Mean

ii. Standard Deviation

iii. Coefficient of variation

65, 56, 98, 76, 45, 97, 29, 45, 74, 39, 34, 87, 75, 65, 50, 68, 90, 95, 101, 87, 85, 68, 81,93 and 92

(8 Marks)

QUESTION TWO

a. Twenty (20) bottles are taken at random from the Softa beverages filling machine. The mean weight of the bottles is 299ml and the standard deviation is 0.5ml. Does the sample mean differ significantly from the intended weight of 300ml at 5%? (6 Marks)

b. For the grouped data below, the marks for an examination in a class, find the mean, the standard deviation and comment on them

Class	20-29	30-39	40-49	50-59	60-69	70-79	80-89
Frequency	4	7	12	9	11	5	2

(9 Marks)

QUESTION THREE

a. Using the pay-off table below for the implemented projects, answer the questions that follow

	Favourable (0.54)	Steady (0.26)	Unfavourable (0.2)
Build a house	+20	+15	-19.5
Buy a car	-15.7	+7.9	+30
Invest in Stocks	+4.6	-6.8	+19

Using the listed decision criteria, rank the projects;

i. Expected Value (EV)
ii. Maximin
iii. Maximax
iv. Minimax Regret and
v. Hurwicz Criterion ($\alpha = 0.6$) (10 Marks)

b. The probability that it is Friday and that a student is absent is 0.03. Since there are 5 school days in a week, the probability that it is Friday is 0.2. What is the probability that a student is absent given that today is Friday? (5 Marks)

QUESTION FOUR

a. There are 100 students in a first year Bachelor of Commerce class at Kenyatta University City Campus. 36 of them are male and specializing in Human Resources, 9 are male and not specializing in HR. 13 are female and specializing in HR while 42 are female and not specializing in HR.

What is the probability that a student selected at random is:

i. Male – P(M)
ii. Female - (P (F)
iii. Doing HR and Male - P(M and HR)
iv. Not Doing HR – P(HR')
v. P (HR/M)

(10 Marks)

b. Distinguish between a parameter from a statistic (2 Marks)

c. What is the difference between a one-tailed test and two-tailed test? (3 Marks)

QUESTION FIVE

African Express wants to estimate the relationship between the number of reservations and the actual number of passengers who show up for their flight. They can use this information to estimate how many reservations the airline should take for the flight in the future.

Information gathered over 12 randomly selected days for flight African Express is given in the table below:

Day	1	2	3	4	5	6	7	8	9	10	11	12
No. of Reservations	250	548	156	121	416	450	462	508	307	311	265	189
No. of Passengers	210	405	120	89	304	320	319	410	275	289	236	170

The airline is particularly interested in how many passengers to expect for a day on which 350 reservations have been made, and for a day on which 80 reservations have been made

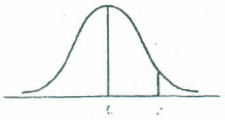
Find the regression model for this and interpret the results.

How many passengers should the Airline expect for a day on which;

i. 350 reservations will have been made
ii. 80 reservations have been made
iii. How many reservations would have been made if they received 150 passengers?

(15 Marks)

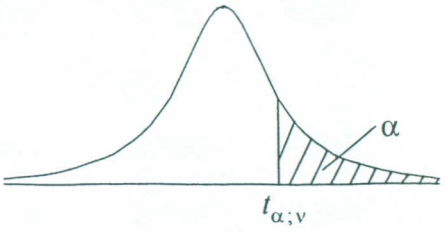
Table 3 Normal Probabilities



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

SOURCE: Abridged from Table 1 of A. Hald, *Statistical Tables and Formulas* (New York: Wiley & Sons, Inc.), 1952. Reproduced by permission of A. Hald and the publisher, John Wiley & Sons, Inc.

Table of the Student's *t*-distribution



The table gives the values of $t_{\alpha;\nu}$ where

$\Pr(T_\nu > t_{\alpha;\nu}) = \alpha$, with ν degrees of freedom

ν \ α	0.1	0.05	0.025	0.01	0.005	0.001	0.0005
1	3.078	6.314	12.076	31.821	63.657	318.310	636.620
2	1.886	2.920	4.303	6.965	9.925	22.326	31.598
3	1.638	2.353	3.182	4.541	5.841	10.213	12.924
4	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	1.476	2.015	2.571	3.365	4.032	5.893	6.869
6	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	1.345	1.761	2.145	2.624	2.977	3.787	4.140

15	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	1.337	1.746	2.120	2.583	2.921	3.686	4.015
17	1.333	1.740	2.110	2.567	2.898	3.646	3.965
18	1.330	1.734	2.101	2.552	2.878	3.610	3.922
19	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	1.325	1.725	2.086	2.528	2.845	3.552	3.850
21	1.323	1.721	2.080	2.518	2.831	3.527	3.819
22	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	1.319	1.714	2.069	2.500	2.807	3.485	3.767
24	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	1.316	1.708	2.060	2.485	2.787	3.450	3.725
26	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	1.314	1.703	2.052	2.473	2.771	3.421	3.690
28	1.313	1.701	2.048	2.467	2.763	3.408	3.674
29	1.311	1.699	2.045	2.462	2.756	3.396	3.659
30	1.310	1.697	2.042	2.457	2.750	3.385	3.646
40	1.303	1.684	2.021	2.423	2.704	3.307	3.551
60	1.296	1.671	2.000	2.390	2.660	3.232	3.460
120	1.289	1.658	1.980	2.358	2.617	3.160	3.373
∞	1.282	1.645	1.960	2.326	2.576	3.090	3.291