MOI UNIVERSITY

OFFICE OF THE CHIEF ACADEMIC OFFICER

UNIVERSITY EXAMINATIONS
2012/2013 ACADEMIC YEAR

THIRD YEAR END OF SEMESTER I EXAMINATIONS

FOR THE DEGREE OF
BACHELOR OF BUSINESS MANAGEMENT

COURSE CODE: BBM 350

EXAM TITLE: MANAGERIAL STATISTICS

DATE: 11TH JULY, 2012   TIME: 9.00 A.M. –12.00 NOON.

INSTRUCTION TO CANDIDATES

➢   **SEE INSIDE.**

1ST SEMESTER 2011/2012 ACADEMIC YEAR
BBM 350: MANAGERIAL STATISTICS

Instructions to candidates
- Answer Question ONE and any other THREE

Question One

(a) Suppose there are 50 delegates from a green county to a national political convention of which 30 are pledged to candidate A and 20 are pledged to B. If five delegates are selected at random, what is the probability that among the five at least two are pledged to candidate A? (Hyper geometric).   (10 Marks)

(b) In a certain examination, the percentage of passes and distinctions were 45 and 9 respectively. Estimate the average marks obtained by the candidates, the minimum pass and distinction marks being 40 and 75 respectively (Assume the distribution of marks to be normal) Also determine what would have been the minimum qualifying marks for admission to a re-examination of the failed candidates, had it been desired that the best 25% of them should be given another opportunity of being examined.   (15 Marks)

Question Two

(a) A manufacturer, who produces soda bottles, finds that 0.1% of the bottles are defective. The bottles are packed in boxes containing 500 bottles. A soda manufacturer buys 100 boxes from the producers of bottles. Using poisson distribution find how many boxes will contain.
  - (i)   No defectives
  - (ii) At least two defectives (given $e^{-0.5} = 0.6065$)   (12 Marks)

b) The income of a group of 10,000 persons was found to be normally distributed with mean Shs. 750 pm and standard deviation of shs 50. Show that of this group about 95% had income exceeding sh.668 and only 5% has income exceeding shs. 832. What was the lowest income among the richest 100?   (13 Marks)

Question Three

(a) Explain the following terms as used in estimation of parameters.
  - (i)   Estimator
  - (ii)   Estimate
  - (iii) Unbiased estimator
  - (iv)   Confidence interval
  - (v)   Confidence coefficient
  - (vi)   Confidence level   (2 Marks each Total 14 Marks)

VII. AREAS UNDER THE STANDARD NORMAL DISTRIBUTION

The entries in this table are the probabilities that a standard normal variate is between 0 and Z (the shaded area).
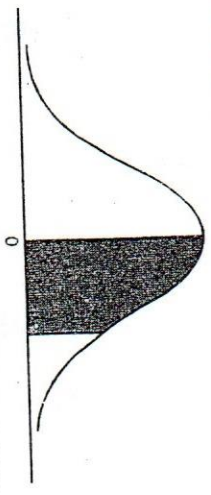
Z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.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	.48424	.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

VIII. CRITICAL VALUES OF CHI-SQUARE (χ^2)
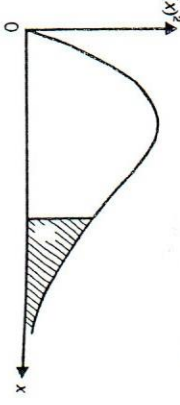
df \ α	.100	.050	.025	.010	.005	.001
1	2.71	3.84	5.02	6.63	7.88	10.8
2	4.61	5.99	7.38	9.21	10.6	13.8
3	6.25	7.81	9.35	11.3	12.8	16.3
4	7.78	9.49	11.1	13.3	14.9	18.5
5	9.24	11.1	12.8	15.1	16.7	20.5
6	10.6	12.6	14.4	16.8	18.5	22.5
7	12.0	14.1	16.0	18.5	20.3	24.3
8	13.4	15.5	17.5	20.1	22.0	26.1
9	14.7	16.9	19.0	21.7	23.6	27.9
10	16.0	18.3	20.5	23.2	25.2	29.6
11	17.3	19.7	21.9	24.7	26.8	31.3
12	18.5	21.0	23.3	26.2	28.3	32.9
13	19.8	22.4	24.7	27.7	29.8	34.5
14	21.1	23.7	26.1	29.1	31.3	36.1
15	22.3	25.0	27.5	30.6	32.8	37.7
16	23.5	26.3	28.8	32.0	34.3	39.3
17	24.8	27.6	30.2	33.4	35.7	40.8
18	26.0	28.9	31.5	34.8	37.2	42.3
19	27.2	30.1	32.9	36.2	38.6	43.8
20	28.4	31.4	34.2	37.6	40.0	45.3
21	29.6	32.7	35.5	38.9	41.4	46.8
22	30.8	33.9	36.8	40.3	42.8	48.3
23	32.0	35.2	38.1	41.6	44.2	49.7
24	33.2	36.4	39.4	43.0	45.6	51.2
25	34.4	37.7	40.6	44.3	46.9	52.6
26	35.6	38.9	41.9	45.6	48.3	54.1
27	36.7	40.1	43.2	47.0	49.6	55.5
28	37.9	41.3	44.5	48.3	51.0	56.9
29	39.1	42.6	45.7	49.6	52.3	58.3
30	40.3	43.8	47.0	50.9	53.7	59.7
35	46.1	49.8	53.2	57.3	60.3	66.6
40	51.8	55.8	59.3	63.7	66.8	73.4
45	57.5	61.7	65.4	70.0	73.2	80.1
50	63.2	67.5	71.4	76.2	79.5	86.7
55	68.8	73.3	77.4	82.3	85.7	93.2
60	74.4	79.1	83.3	88.4	92.0	99.6
65	80.0	84.8	89.2	94.4	98.1	106.0
70	85.5	90.5	95.0	100.4	104.0	112.3
75	91.1	96.2	100.8	106.4	110.3	118.6
80	96.6	101.9	106.6	112.3	116.3	124.8
85	102.1	107.5	112.4	118.2	122.3	131.0
90	107.6	113.1	118.1	124.1	128.3	137.2
95	113.0	118.8	123.9	130.0	134.2	143.3
100	118.5	124.3	129.6	135.8	140.2	149.4

b)   The results from a sample taken n=25; $\sum X_i = 500$, $\sum X_i^2 = 12400$. find the point estimates for the following;

      (i)   The mean μ (3 Marks)
      (ii)   The variance ∂^2 (3 Marks)
      (iii)   The standard deviation.   (2 Marks)
      (iv)   The standard error of the sample mean.   (3 Marks)

Question Four

(a)   using relevant examples explain what you understand by type I and type II errors.   (6 Marks)

(b)   In 2009 15 percent of the households in Kisumu city indicated, that they owned a sewing machine. In 2011, there was reason to believe that there was some increase in this percentage. A survey based on a random sample of 900 households was taken and it was found that 189 households has a sewing machine. Can we conclude that there has been a significant increase in the sale of sewing machines (Assuming alpha of 0.05)   (19 Marks)

Question Five

(a)   State the conditions of applying Chi-square.   (6 Marks)
(b)   A certain drug is claimed to be effective in curing cold. In an experiment on 500 persons with cold, half of them were given the drug and half of them were given the sugar bills. The patients reaction to the treatment are recorded in the following table.

	Helped	Harmed	No effects	Total
Drug	150	30	70	250
Sugar bills	130	40	80	250
Total	280	70	150	500

On the basis of the data can it be concluded that there is a significant difference in the effect of the drug and sugar bills.   (19 Marks)

E...N...D

IX. CRITICAL VALUES OF t
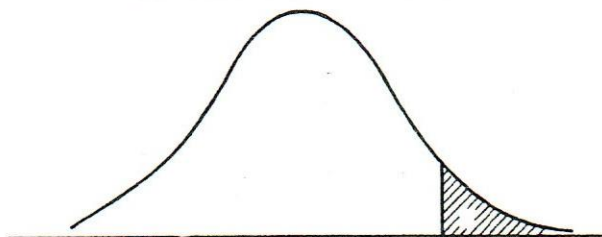
d.f.	$t_{.100}$	$t_{.050}$	$t_{.025}$	$t_{.010}$	$t_{.005}$
1	3.078	6.314	12.706	31.821	63.657
2	1.886	2.920	4.303	6.965	9.925
3	1.638	2.353	3.182	4.541	5.841
4	1.533	2.132	2.776	3.747	4.604
5	1.476	2.015	2.571	3.365	4.032
6	1.440	1.943	2.447	3.143	3.707
7	1.415	1.895	2.365	2.998	3.499
8	1.397	1.860	2.306	2.896	3.355
9	1.383	1.833	2.262	2.821	3.250
10	1.372	1.812	2.228	2.764	3.169
11	1.363	1.796	2.201	2.718	3.106
12	1.356	1.782	2.179	2.681	3.055
13	1.350	1.771	2.160	2.650	3.012
14	1.345	1.761	2.145	2.624	2.977
15	1.341	1.753	2.131	2.602	2.947
16	1.337	1.746	2.120	2.583	2.921
17	1.333	1.740	2.110	2.567	2.898
18	1.330	1.734	2.101	2.552	2.878
19	1.328	1.729	2.093	2.539	2.861
20	1.325	1.725	2.086	2.528	2.845
21	1.323	1.721	2.080	2.518	2.831
22	1.321	1.717	2.074	2.508	2.819
23	1.319	1.714	2.069	2.500	2.807
24	1.318	1.711	2.064	2.492	2.797
25	1.316	1.708	2.060	2.485	2.787
26	1.315	1.706	2.056	2.479	2.779
27	1.314	1.703	2.052	2.473	2.771
28	1.313	1.701	2.048	2.467	2.763
29	1.311	1.699	2.045	2.462	2.756
inf.	1.282	1.645	1.960	2.326	2.576

Critical values of z both one-tailed and two-tailed tests at various levels of significance.

Level of Significance	0.10	0.05	0.01	0.005	0.0002
Critical value of z for one-tailed tests	-1.28 or1.28	-1.645 or1.645	-2.33 or 2.33	-2.58 or2.58	-2.88 or2.88
Critical value of z for two-tailed tests	-1.645 and1.645	-1.96 and 1.96	-2.58 and 2.58	-2.81 and 2.81	-3.08 and 3.08