THE OPEN UNIVERSITY OF SRI LANKA
BACHELOR OF MANAGEMNET STUDIES – LEVEL (05)
ASSIGNMENT TEST – 2010
QUANTITATIVE TECHNIQUES FOR MANAGEMENT II – MCU 3209
DURATION: TWO HOURS

DATE: 13th November 2010	TIME: 2.00 PM – 4.00 PM

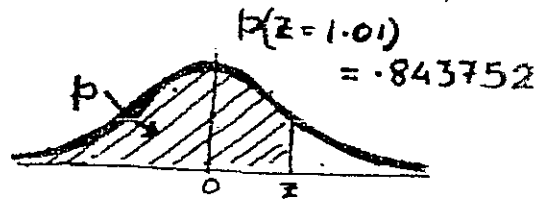*Answer Any Four (04) Questions*
Standard Normal Tables are provided.

Q1 (a) Evaluate the expression $^nC_r p^r q^{(n-r)}$ where, n = 6, r = 2 and p = 0.7.

(b) The probability that an industrial product will fail during the guarantee period is estimated as 0.15. In a batch of six such industrial products what is the probability that
(i) exactly two products will fail during the guarantee period?
(ii) at least one product will fail during the guarantee period?

(c) At a shooting game, the probability that the player will hit the target in any given trial is 0.4. How many trials should he play to be 95% sure, so that he would hit the target at least once?

Q2 (a) Evaluate the expression $\dfrac{e^{-a} a^x}{x!}$ where, a = 2, x = 3 and e = 2.71

(b) A person receives two nuisance calls per day on the average. What is the probability that he will receive less than two nuisance calls the next day?

(c) A book contains 25 pages and it is observed that on the average there is one printing mistake per page.
(i) What is the probability that there will be two printing mistakes in the next page?
(ii) What is the probability that there will be less than 15 printing mistakes in the book?

Q3 (a) Explain how you would convert a normal distribution to a standard normal distribution.

(b) At a grocery store it is observed that their daily sales are normally distributed with mean Rs. 70,000 and standard deviation of Rs. 15,000.
(i) What is the probability that on a given day the sales are less than Rs. 50,000?
(ii) On how many days in the month will the sales be less than Rs.60,000? (Consider one month = 30 days).

(c)   The life time of a washing machine is normally distributed with mean 4 years. Only 15% of these machines last for at least five years. Calculate the standard deviation of life time of the washing machine.

Q4   (a)   Briefly explain the difference between a point estimate and interval estimate.

(b)   What are the qualities of a good estimate?

(c)   To estimate the mean weight of bread of a bakery a sample of 50 was examined and it was observed that the mean and standard deviation of weight of bread in the sample were 440 grams and 95 grams respectively. It is assumed that weight of bread is normally distributed.

(i)   Develop a 95% confidence interval estimate for weight of bread.

(ii)   By how much should the sample size be increased to reduce the size of the interval by half.

Q5   a)   Explain in your own words the term "Level of Significance of a Statistical Test".

b)   Medical research has revealed that for effective results the content of a certain compound "C" in a tablet should be around 35 mg and should not be either too high or too low. A sample of 25 tablets were examined and it was observed that the mean and standard deviation of the compound "C" were 36.5mg and 7mg respectively

(i)   Develop test statistics for weight of tablets at 5% level of significance.

(iii)   Is there evidence at 5% level of significance that the content of compound "C" in the tablet is as specified by medical research?

Q6   Briefly explain the following methods of selecting a sample highlighting their advantages and disadvantages.

(i)   Systematic sampling

(ii)   Stratified sampling

(iii)   Multi-stage sampling

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Standard normal distribution

$P(z = 1.01)$
$= .843752$

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.500000	.503989	.507978	.511966	.515953	.519939	.523922	.527903	.531881	.535856
0.1	.539828	.543795	.547758	.551717	.555670	.559618	.563559	.567495	.571424	.575345
0.2	.579260	.583166	.587064	.590954	.594835	.598706	.602568	.606420	.610261	.614092
0.3	.617911	.621720	.625516	.629300	.633072	.636831	.640576	.644309	.648027	.651732
0.4	.655422	.659097	.662757	.666402	.670031	.673645	.677242	.680822	.684386	.687933
0.5	.691462	.694974	.698468	.701944	.705401	.708840	.712260	.715661	.719043	.722405
0.6	.725747	.729069	.732371	.735653	.738914	.742154	.745373	.748571	.751748	.754903
0.7	.758036	.761148	.764238	.767305	.770350	.773373	.776373	.779350	.782305	.785236
0.8	.788145	.791030	.793892	.796731	.799546	.802337	.805105	.807850	.810570	.813267
0.9	.815940	.818589	.821214	.823814	.826391	.828944	.831472	.833977	.836457	.838913
1.0	.841345	.843752	.846136	.848495	.850830	.853141	.855428	.857690	.859929	.862143
1.1	.864334	.866500	.868643	.870762	.872857	.874928	.876976	.879000	.881000	.882977
1.2	.884930	.886861	.888768	.890651	.892512	.894350	.896165	.897958	.899727	.901475
1.3	.903200	.904902	.906582	.908241	.909877	.911492	.913085	.914657	.916207	.917736
1.4	.919243	.920730	.922196	.923641	.925066	.926471	.927855	.929219	.930563	.931888
1.5	.933193	.934478	.935745	.936992	.938220	.939429	.940620	.941792	.942947	.944083
1.6	.945201	.946301	.947384	.948449	.949497	.950529	.951543	.952540	.953521	.954486
1.7	.955435	.956367	.957284	.958185	.959070	.959941	.960796	.961636	.962462	.963273
1.8	.964070	.964852	.965620	.966375	.967116	.967843	.968557	.969258	.969946	.970621
1.9	.971283	.971933	.972571	.973197	.973810	.974412	.975002	.975581	.976148	.976705
2.0	.977250	.977784	.978308	.978822	.979325	.979818	.980301	.980774	.981237	.981691
2.1	.982136	.982571	.982997	.983414	.983823	.984222	.984614	.984997	.985371	.985738
2.2	.986097	.986447	.986791	.987126	.987455	.987776	.988089	.988396	.988696	.988989
2.3	.989276	.989556	.989830	.990097	.990358	.990613	.990863	.991106	.991344	.991576
2.4	.991802	.992024	.992240	.992451	.992656	.992857	.993053	.991106	.991344	.991576
2.5	.993790	.993963	.994132	.994297	.994457	.994614	.994766	.994915	.995060	.995201
2.6	.995339	.995473	.995604	.995731	.995855	.995975	.994766	.994915	.995060	.995201
2.7	.996533	.996636	.996736	.996833	.996928	.997020	.997110	.997197	.997282	.997365
2.8	.997445	.997523	.997599	.997673	.997744	.997814	.997882	.997948	.997282	.997365
2.9	.998134	.998193	.998250	.998305	.998359	.998411	.998462	.998511	.998559	.998605