



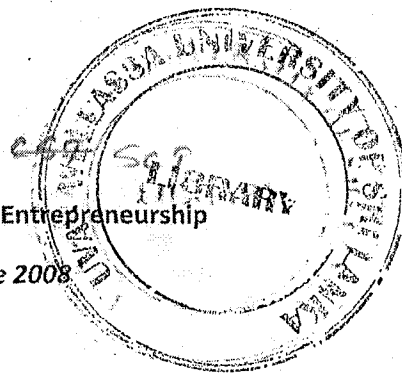
Uva Wellassa University

Faculty of Management

Degree of Bachelor of Business Management and Entrepreneurship

Year 2 Semester II Examination - June 2008

EMG 242-4 Statistical Methods



## C: Essay Questions

Answer Any Five (5) Questions

Time: One (1.00) hour and 30 minutes (Suggested)

Total marks 50

1. A company employing 10,000 workers offers deluxe medical coverage (D), standard medical coverage (S) and economy medical coverage (E) to its employees. Of the employees, 30% have D, 60% have S and 10% have E. From past experience, the probability that an employee with D, will submit no claims during next year is 0.1. The corresponding probabilities for employees with S and E are 0.4 and 0.7 respectively. If an employee is selected at random;
  - a) What is the probability that the selected employee has standard coverage and will submit no claim during next year?
  - b) What is the probability that the selected employee will submit no claim during next year?
  - c) If the selected employee submits no claims during the next year, what is the probability that the employee has standard medical coverage (S)?
  
2. A company utilizes different types of raw materials for the manufacture of its products. The number of units of each raw material used and the cost for two years are shown below:

Item	2003		2007	
	Quantity	Price per Unit	Quantity	Price per Unit
A	450	120	550	130
B	800	90	700	100
C	900	60	1000	68
D	750	67	800	80

- a) Calculate the LASPEYRE'S price index and PAASHE'S price index for the year 2007, using 2003 as a base year. Comment on it.
- b) Explain why LASPEYRE'S price index numbers are usually greater than their PAASHE'S equivalents.
- c) Explain the main disadvantage in using expenditure index.

3. A financial analyst is interested in computing the turnover rates, in percent, for shares of oil-related stocks versus other stocks, such as GE and IBM. She selected 32 oil-related stocks and 49 other stocks. The mean turnover rate of oil-related stocks is 31.4 percent and the standard deviation 5.1 percent. For the other stocks, the mean rate was computed to be 34.9 percent and the standard deviation 6.7 percent. The financial analyst is interested in testing whether there is significant difference in the turnover rates of the two types of stock.
- Is this a one-tailed or a two-tailed test?
  - Using the 0.01 level of significance, what is the decision rule?
  - Determine the value of the test statistic, and arrive at a decision regarding  $H_0$ . Explain the meaning of your decision.
4. a). An investigator is contemplating to invest either in bonds that will pay 9 percent interest or in stock. The stock prices may go up by 20 % or decrease by 10%, remain unchanged. The probabilities of these three occurrences were found by investor as 0.3, 0.2 and 0.5 respectively. If the investor has initial capital of Rs. 1000, what should he do?
- b). A simple random sample of 16 radio stations is selected in order to estimate the average charge for the same fixed-length spot announcement. The sample mean and standard deviation are Rs. 15.50 and Rs.8 respectively. Assume that the charges made by all radio stations, of the type of stations sampled are approximately normally distributed. Construct the 95% C.I. for the population mean and comment on it.
5. A television manufacturing company has been selling 1000 televisions a week at Rs. 45000 each. A market survey indicates that for each 1000 rebate offered to buyer, the number of televisions sold will increase by 100 per week.
- Derive a relationship between price of television ( $p$ ) and number of televisions ( $x$ ) sold in a week to the buyer. Express  $p$  as a function of  $x$ .
  - Write revenue function in terms of  $x$ .
  - If its weekly cost function is  $C(x) = 6800000 + 15000x$ , how should the manufacture set the price of television in order to maximize its profit?
  - What is that maximum profit for month that company can get under current situation?
  - What is the amount of money saved by buyer in purchasing televisions at price obtained by part (c)?

6. A company is considering either to buy a computer for Rs. 90000 or hire it for 5 years at Rs. 3000 per month. Assume that money is worth 12% compounded monthly and the lifetime of computer is five years. But after five years the computer can be sold for Rs. 20000 to a computer repairing shop.
- Find present value (principal value) of Rs. 20000 which is to be received at the end of five years.
  - Using part a) find the present value of actual cost of buying computer.
  - Find the present value of leasing computer.
  - Comparing part b) and c) decide, should the company buy or hire the computer.
  - Suppose the company maintenance contract for the computer is Rs. 1000 per month, what is the present value of the maintenance contract?

(Marks 5 x 10 = 50 marks)

#### Formulas

Annuity Immediate

$$S_n = \frac{R}{i} [(1+i)^n - 1]$$

$$a_n = R \left[ \frac{(1+i)^n - 1}{i(1+i)^n} \right]$$

Annuity Due

$$S_n = \frac{R(1+i)}{i} [(1+i)^n - 1]$$

$$a_n = \frac{R}{i} \left[ \frac{(1+i)^n - 1}{(1+i)^{n-1}} \right]$$

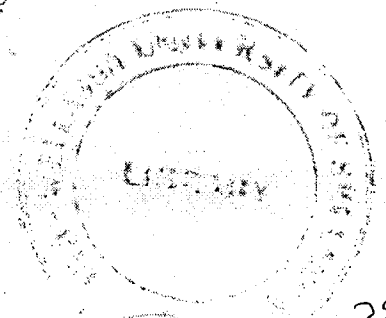
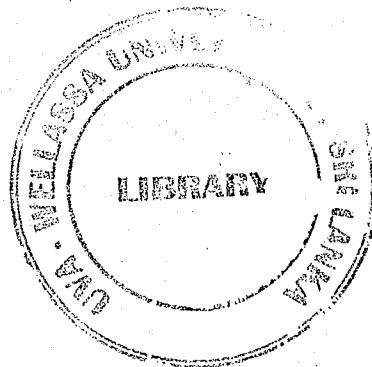
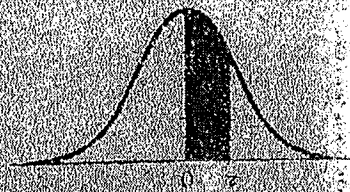


Table 3: AREA OF A STANDARD NORMAL DISTRIBUTION

An entry in the table is the proportion under the entire curve which is between  $z = 0$  and a positive value of  $z$ . Areas for negative values of  $z$  are obtained by symmetry.



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	2703	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	3926	3944	3962	3980	3997	4015
1.3	4033	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