COURSE CODE: 18B11MA312   MAX. MARKS: 25

COURSE NAME: PROBABILITY AND STATISTICAL TECHNIQUES

COURSE CREDITS: 04   MAX. TIME: 1:30 HRS

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Use of scientific calculator is allowed.

1. Subjects in a psychological study were timed while completing a certain task. Complete a stem-and-leaf plot for the following list of times:
   7.6, 8.1, 9.2, 6.8, 5.9, 6.2, 6.1, 5.8, 7.3, 8.1, 8.8, 7.4, 7.7, 8.2   [CO-1][2]

2. If 5 men out of 100 and 25 women out of 10000 are color blind. A person is chosen at random. What is the probability that the person who is found to be color blind is a male, assuming the males and females are equal in number?   [CO-2][3]

3. If the chance that any one of 5 telephone lines is busy at any instant is 0.02,.
   a) What is the probability that all the lines are busy?
   b) What is the probability that more than 3 lines are busy?   -   [CO-2][3]

4. Reckitt Benckiser (India) Limited uses a machine to fill soap dispenser with Dettol liquid soap. Assume that the net weight of the soap dispenser is normally distributed with mean 100 ml and standard deviation 20ml. What is the probability that soap dispensers will have net weight of more than 105 ml?   [CO-2][5]

5. Describe Type-I and Type-II errors in inferential statistics.   [CO-3][2]

6. Two horses A and B were tested according to the time (in seconds) to run a particular track, with the following results.

Horse A:	28	30	32	33	33	29	34
Horse B:	29	30	30	24	27	29	

   Test whether the two horses have the same running capacity.
   [Given that $F_{0.05,(5,6)} = 4.95$]   [CO-3][5]

7. A tobacco company claims that there is no relationship between smoking and lung cancer. To investigate the claim, a random sample of 300 males in the age group of 40 and 50 are given a medical test. The observed sample results are tabulated below;

	Lung Cancer	No Lung Cancer	Total
Smokers	75	105	180
Non-smokers	25	95	120
Total	100	200	300

On the basis of this information, can it be calculated that smoking and lung cancer are independent [Given that $\chi^2_{0.05,1df} = 3.841$]?   [CO-3][5]
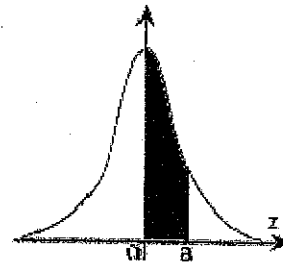
Normal Distribution Table

Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0753
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879