Code : MC1.4

MCA I Semester Supplementary Examinations, August 2010
PROBABILITY & STATISTICS
(For Students admitted in 2004 & 2005 only)

Time: 3 hours **Max Marks: 60**

Answer any FIVE questions
All questions carry equal marks

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1. (a) i. A pair of fair dice is tossed . Find probability that maximum of the two numbers is greater than u.
   ii. A bag contains eight white and six red marbles. Find the probability of drawing two marbles of the same color.
   (b) State and prove Baye's theorem.

2. (a) If a conference room cannot be reserved for more than 4 hours, find the probability that a given conference lasts more than three hours.
   (b) Determine the expected number of families to have.
   i. 2 boys and 2 girls.
   ii. at least one boy
   iii. no girls
   iv. atmost two girls, out of 800 families with 4 children each. Assume equal probabilities for boys and girls.

3. (a) Two dice are thrown x assign to each point if S the sum of the variables on the faces. Find mean and variance of the random variable.
   (b) Write mean and variance of binomial distribution.

4. (a) A random sample of size 64 is taken from a normal population with μ=51.4 and σ=68. What is the probability that the mean of the sample will
   i. Exceed 52.9
   ii. Fall between 50.5 and 52.3
   iii. Be less than 50.6
   (b) In 16 one hour test runs, the gasoline consumption of an engine averaged 16.4 gallons with a standard deviation of 2.1 gallons. Test the claim that the average gasoline consumtion of this engine is 12.0 gallons per hour.

5. (a) In a city A 20% of a random sample of 900 school boys had a certain slight physical defect. In another city B 18.5% of a random sample of 1600 school boys had the same defect. Is the difference between the proportions significant of 0.5 level of significance.
   (b) According to the norms established for a mechanical aptitude test persons who are 18 years old have an average height of 73.2 with a standard deviation of 8.6. If 45 randomly selected persons of that age averaged 76.7, test the null hypothesis μ=73.2 against the alternative hypothesis μ>73.2 at the 0.01 level of significance.

6. Four methods are under development for making discs of a super conducting material. Fifty discs are made by each method and they are checked for super conducticity when cooled with liquid.

	I^{st} method	2^{nd} method	3^{rd} method	4^{th} method
Suber conductors	31	42	22	25
Failures	19	8	28	25

Test the significant difference between the proportions of suber conductors at 16m 0.05 level.

7. (a) Use method of least squares to fit a straight line for the following data.

X	0	5	10	15	20
Y	7	11	16	20	26

Estimate the value of Y when x=2.5.

(b) Find the coefficient of correlation for the following data:

X	50	50	55	60	65	65	65	60	60	60
Y	11	13	14	16	15	15	14	13	13	13

8. (a) The following tables gives the production of cotton in India in million bales (1 bale=174 kg) from 1975-76 to 1985-86

Year	1975-76	1976-77	1977-78	1978-79	1979-80
	4.76	5.95	7.24	7.96	7.65

1980-81	1981-82	1982-83	1983-84	1984-85	1985-86
7.01	7.88	7.53	6.39	8.51	8.61

Fit a trend line by a four-year moving average.

(b) A quality control effort is being attempted for a process where large steel plates are being manufactured and surface defects are of concern. The goal is to set up a quality control chart for the number of defects per plate. The data are as follows:

Sample plot	number of defects	sample plot	number of defects
1	4	11	1
2	2	12	2
3	1	13	2
4	3	14	3
5	0	15	1
6	4	16	4
7	5	17	3
8	3	18	2
9	2	19	1
10	2	20	3

Set up the appropriate control chart, using this sample information. Does the process appear to be in control ?

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