Code: 06MC104

MCA I Semester Supplementary Examinations, March 2013

PROBABILITY AND STATISTICS

Time: 3 hours Max Marks: 60

Answer any FIVE questions

All questions carry equal marks

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1 (a) A and B throw alternately with a pair of ordinary dice. A wins if he throws 6 before B throws 7 and B wins if he throws 7 before A throws 6. If A begins, show that his chance of winning is $30/61$.

(b) A problem in statistics is given to the 3 students A, B, C whose chances of solving it are $\frac{1}{2}, \frac{3}{4} and \frac{1}{4}$ respectively. What is the probability that the problem is solved?

2 (a) A continuous random variable x has the distribution function:

$$F(x) = \begin{cases} 0, if x \leq 1 \\ F(x-1)^4 if\ 1 \leq x \leq 3 \\ 1, \quad if\ x > 3 \end{cases}$$

Determine: (i) f (x) (ii) k (iii) mean.

(b) For the continuous probability function f(x) = kx^2e^{-x} when x ≥0, find: (i) k (ii) Mean (iii) variance.

3 (a) The probability of an man hitting a target is $\frac{1}{3}$.

(b) Show that for normal distribution: Mean = Median = Mode.

4 (a) The mean height of students in a college is 155 cms and standard deviation is 15. What is the probability that the mean height of 36 students is less than 157 cms?

(b) A random sample of size 25 from a normal population has the mean $\bar{x} = 47.5$ and the standard deviation δ =8.4. Does this information lend to support or refuse the claim that the mean of the population is μ = 42.1?

5 (a) A random sample of size 81 was taken whose variance is 20.25 and mean is 32, construct 98% confidence interval.

(b) What is the size of the smallest sample required to estimate an unknown proportion to within a maximum error of 0.06 with atleast 95% confidence.

Contd. in Page 2

6 (a) In a random sample of 125 cola drinkers, 68 said they prefer Thumsup to Pepsi. Test the null hypothesis P = 0.5 against the alternative hypothesis p>0.5.

(b) The mean and standard deviation of a population are 11795 and 14054 respectively. If n 50, find 95% confidence interval for the mean.

7 (a) 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.

(b) In an investigation on the machine performance, the following results are obtained.

	No. of units inspected	No. of defectives
Machine 1	375	17
Machine 2	450	22

Test whether there is any significant performance of two machines at α = 0.05.

8 (a) The marks obtained by 11 students of a class in Mathematics paper I and Paper II are given below:

Paper I (x)	45	55	56	58	60	65	68	70	75	80	85
Paper II (y)	56	50	48	60	62	64	65	70	74	82	90

Calculate the coefficient of correlation, the equations of lines of regression from the data and the regression coefficients.

(b) Fit a least square geometric curve y = ax^b to the following data:

X	1	2	3	4	5
y	0.5	2	4.5	8	12.5

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