Code: 9FBS101

MCA I Semester Regular & 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) What is the probability of getting a total of 8 or 10 when a pair of fair dice are tossed?

(b) Suppose 5 men out of 100 and 25 women out of 10,000 are color blind. A color blind person is choosen at random. What is the probability of the person being a male (Assume male and female to be in equal numbers).

2 (a) If X denotes the maximum of the two numbers that appear when a pair of fair dice is thrown once. Determine the (i) Probability distribution. (ii) Mean. (iii) Variances.

(b) Suppose a continuous random variable X has the probability density $f(x) = k(1-x^2) for\ 0 < x < 1 > and\ f(x) = 0$ otherwise find (i) k (ii) mean (iii) variance.

3 (a) Show that the poisson distribution can be derived as a limiting case of the binomial distribution.

(b) Show that for a normal distribution mean, mode and median coincide

4 Let U_1 be the variable that stands for any of the elements of the population 2, 7, 9 and U_2 be a variable the stands for any of the elements of the population 3, 8. Compute (i) μ_{U_1}(ii) μ_{U_2}(iii) $\mu_{U_1+U_2}$(iv) $\mu_{U_1-U_2}$ (v) σ_{U_1} (vi) σ_{U_2}(vii) $\sigma_{U_1+U_2}$(viii) $\sigma_{U_1-U_2}$. Also verify that $\mu_{U_1+U_2} = \mu_{U_1-U_2}$.

5 (a) What is the maximum error one can expect to make with probability 0.90 when using the mean of a random sample of size n = 64 to estimate the mean of population with σ^2 = 2.56.

(b) Show that S is an undressed estimator of the parameter σ.

(c) Find 95% confidence limits for the mean of a normally distributed population from which the following sample was taken 15,17,10,18,16,9,7,11,13,14.

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6 (a) In two large populations, there are 30% and 25% respectively of fair haired people. Is this difference likely to be hidden in samples of 1200 and 900 respectively from the two populations.

(b) Explain briefly (i) Type I error. (ii) Type II error.

(c) It is claimed that a random sample of 49 types has a mean life of 15200 km. This sample was drawn from a population whose mean is 15150 kms and a standard deviation of 1200 km. Test the significance at 0.05 level.

7 (a) A sample of size 16 values from a normal population showed a mean of 53 and a sum of squares of deviation from the mean equals to 150. Can this sample be regarded as taken from the population having 56 as mean? Obtain 95% confidence limits of the mean of the populations.

(b) Fit a poisson distribution to the following data and test for its goodness of fit at 0.05 L.O.S.

x	0	1	2	3	4	5
f	275	138	75	7	4	1

8 (a) It the curve $y = a + b\sqrt{x}$ by the method of least squares to the following data.

x	200	600	1000	1400	1800
y	0.28	0.37	0.45	0.58	0.67

(b) 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.

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