R07

Code: R7210501

B.Tech II Year I Semester (R07) Supplementary Examinations December 2015

PROBABILITY & STATISTICS

(Common to CSE, IT and CSS)

(For 2008 regular admitted batch only)

Time: 3 hours Max. Marks: 80

Answer any FIVE questions

All questions carry equal marks

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1 (a) If A and B are two events such that P(A) = 1/3, P(B) = ¾ and $P(A \cup B) = 11/12$, find P(A/B) and P(B/A).

(b) A fair die is tossed twice. Find the probability of getting 4, 5 or 6 on the first toss and 1, 2, 3 or 4 on the second toss.

2 (a) A random variable X is defined as the sum of the numbers on the faces when two dice are thrown. Find the mean of X.

(b) A continuous random variable has the probability density function $f(x) = \begin{cases} Kx\,e^{-\lambda x}, & if\ x \geq 0, \lambda > 0 \\ 0, & otherwise \end{cases}$. Determine the constant K, find mean and variance.

3 (a) Average number of accidents on any day on a national highway is 1.8. Determine the probability that the number of accidents are (i) at least one (ii) at most one.

(b) Find the mean and standard deviation of a normal distribution in which 7% of items are under 35 and 89% are under 63.

4 Let $u_1 = (3, 7, 8)$, $u_2 = (2, 4)$. Find: (i) μ_{u_1}. (ii) μ_{u_2}. (iii) Mean of the sampling distribution of the differences of mean $\mu_{u_1 - u_2}$. (iv) σ_{u_1}. (v) σ_{u_2}. (vi) The standard deviation of the sampling distribution of the differences of mean $(\sigma_{u_{1-u_2}})$.

5 (a) Find 95% confidence limit for the mean of a normality distribution population from which the following sample was taken 15, 17, 10, 18, 16, 9, 7, 11, 13, 14?

(b) Suppose that we observe a random variable having the binomial distribution and get x successes in n trials. (i) Show that x/n is an unbiased estimator of the binomial parameter P. (ii) Show that $(x+1)/(n+2)$ is not an unbiased estimator of the binomial parameter P.

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6 (a) Two types of new cars produced in U.S.A are tested for petrol mileage; one sample is consisting of 42 cars averaged 15 kmpl while the other sample consisting of 80 cars averaged 11.5 kmpl with population variances as $\sigma_1^2 = 2.0 \; and \; \sigma_2^2 = 1.5$ respectively. Test whether there is any significance difference in the petrol consumption of these two types of cars (use $\alpha = 0.01$).

(b) Test whether the groups have come from same population (use $\alpha = 0.01$). IQ test on two groups of boys and girls gave the following results.
Mean of girls = 78, S.D = 10, n = 30.
Mean of boys = 78, S.D = 13, n = 70.

7 Eight students were given a test in STATISTICS and after one month coaching they were given another test of the similar nature. The following table gives the increase in their marks in the second test over the first. Do the marks indicate that the students have gained from the coaching?

Student No.	1	2	3	4	5	6	7	8
Increase of marks	4	-2	6	-8	12	5	-7	2

8 A bank plans to open a single server drive in banking facilities at a particular centre. It is estimated that 20 customers will arrive each hour on an average. If on an average, it require 2 min to process a customer's transaction, determine: (i) The proportion of time that the system will be idle. (ii) On the average how long a customer will have to wait before reaching the server? (iii) Traffic intensity of bank.

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