# II B.Tech I Semester Examinations,MAY 2011 <br> PROBABILITY AND STATISTICS 

Common to Information Technology, Computer Science And Engineering, Computer Science And Systems Engineering
Time: 3 hours
Max Marks: 80
Answer any FIVE Questions
All Questions carry equal marks

1. A researcher wants to know the intelligence of students in a school. He selected two groups of students. In the first group there are 150 students having mean IQ of 75 with a S.D of 15 in the second group there are 250 students having mean IQ of 70 with S.D of 20.
Test whether the groups have came from same population (Use a as 0.01) [16]
2. (a) Discuss about KENDALL'S Notation?
(b) Discuss about classification of queing models. $\quad[6+10]$
3. (a) The mean and standard deviation of a population are 11795 and 14054 respectively, what can one assert the $95 \%$ eonfidence about the maximum error if $\mathrm{x}=11795$ and $\mathrm{n}=50$. Find the confidence limits for the mean if $\mathrm{x}=84$ ?
(b) Find $95 \%$ confidence limits for the mean of a normality distribution population form which the following sample was taken $15,17,10,18,16,9,7,11,13,14$ ?
(c) Explain about "Point Estimation"?
$[6+6+4]$
4. The following table gives the number of units of production per day turned out by four different types of machines.

| Employee | Type of Machines |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
|  | M1 | M2 | M3 | M4 |
| E1 | 43 | 39 | 49 | 35 |
| E2 | 41 | 44 | 53 | 45 |
| E3 | 39 | 34 | 52 | 38 |
| E4 | 49 | 51 | 56 | 48 |

Using ANOVA
(a) Test the hypothesis that the mean production is the same for the four machines.
(b) Test the hypothesis that the employees do not differ with respect to mean productivity.
5. (a) A distributor of bean seeds determines from extensive tests that $5 \%$ of large batch of seeds will not germinate. He sells the seeds in packets of 200 and guarantees $90 \%$ germination. Determine the probability that a particular packet will violate the guarantee.
(b) Show that the mean deviation from the mean equals (approximately) to $4 / 5$ of standard deviation for normal distribution.
6. (a) A sample of 4 items is selected at random from a box containing 12 items of which 5 are defective. Find the expected number $E$ of defective items.
(b) If the probability of a defective bolt is $1 / 8$. Find
i. the mean
ii. the variance for the distribution of defective bolts of 640 .
7. (a) A random sample of size 100 is taken from an infinite population having the mean $\mu=76$ and the variance $\sigma^{2}=256$. what is the probability that $\bar{x}$ will be between 75 and 78 .
(b) A sample of size 400 is taken from a population whosestandard deviation is 16. Find the standard error and probable error.
$[10+6]$
8. (a) A bag contains 4 red, 5 white and 7 black balls, if 2 balls are taken out at random, what is the probability that both of them will be black or both will be white.
(b) If $\mathrm{A}, \mathrm{B}, \mathrm{C}$ are mutually independent events then prove that $\mathrm{A} \cup \mathrm{B}$ and C are also independent.

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