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II B.Tech I Semester Examinations,November 2010
PROBABILITY AND STATICTICS
Bio-Technology

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks
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1. (a) The nicotine contest in milligrams of two samples of tobacco are found to be as follows. Can it be said that the two samples come from the same population.

Sample A	24	27	26	21	25	
Sample B	27	30	28	31	22	36

   (b) A machine is expected to produce nails of length 7 cms.A random sample of 10 nails was found to measure in 7.2, 7.3, 7.1, 6.9, 6.8, 6.5, 6.9, 6.8, 7.1 and 7.2 respectively. On the basis of the machine what can we say about the reliability of the machine?

   [8+8]

2. (a) A sample of 400 items is taken from a population whose standard deviation is18 The mean of the sample is 82.construct 95% confidence interval

   (b) The S.D of a population is 140.5 and the sample size 50 Find the maximum error with 95% confidence.

   (c) Derive a formula to find the confidence interval for the mean   [5+5+6]

3. (a) If f(x)=$Ke^{-|x|}$ is p. d.f in $-\infty \le x \le \infty$, find

      i. K
      ii. the mean
      iii. Variance.

   (b) A die is thrown 6 times. Getting an even number is a success. Find the probability that there are

      i. At least one success.
      ii. $\le$ 3 successes
      iii. 4 successes

4. Apopulation consists if five numbers 5,8,15,24,32,.Consider all Samples of size two which can be taken without replacement from this population.Find

   (a) The population mean

   (b) The population Standard deviation

   (c) The mean of the sampling distribution of mean

   (d) Standard deviation of the sampling distribution of mean   [16]

5. (a) Two boxes contain ten chips numbered 1 to 10. one chip is drawn from each box. Find the probability that thje sum is greater than 4.

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(b) If 4 cards are drawn from a pack of 52 cards, find the probability that

    i. Two spades and two are diamonds

    ii. One is red and three are black

(c) If A and B are two mutually exclusive events and A∪B≠ ϕ, then prove that
P(A/ (A∪B)) = $\frac{P(A)}{P(A)+P(B)}$ [5+6+5]

6. (a) Write about Critical region and one tailed and two tailed tests.

  (b) A candidate for election made a speech in a city. Among 500 voters from city A 59.6% are in favour of him where as among 300 voters from city B 50% are in favour of him. Test the significance between the difference of two proportions at 5% level.

                                             [8+8]

7. (a) If μ = .6 for a Poisson variate, Find the probabilities when x = 0, 1, 2, 3, 4 and 5 using recurrence formula.

  (b) A random variable has a normal distribution with standard deviation 10. Find the mean if the probability that the random variable takes the value less than 80.5 is .3264 Also find P(x < 100).   [8+8]

8. A repair shop attended by a single mechanic has an average of Four customers per hour, who bring small appliances for repair. The mechanic inspects them for defects and quite often can fix them right away or otherwise render a diagnosis.This takes him 6 minutes on the average.

  (a) Average number of customers in the system.

  (b) Average number of customers in the queue.

  (c) The average time including service, spent by a customer .

  (d) The probability that queue length is greater than or equal to five.

  (e) The probability that an arrival will have to wait for more than 10 minutes.

                                            [16]

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