b. Two horses A and B were tested according to the time (in seconds) to run a particular the track with the following results. **7M**

A	28	30	32	33	33	29	34
B	29	30	30	24	27	29	----

Test whether the two horses have the same running capacity.

UNIT-IV

8. a. A drilling machine bores holes with a mean diameter of 0.5230 cm and a Standard deviation of 0.0032 cm. calculate the 2-sigma and 3-sigma upper and lower control limits for means of samples 4 and prepare a control Chart. **7M**

b. When measurement data are used in quality control problems, why is it always important to use both $\overline{X}$ & R charts as opposed to using $\overline{X}$ chart alone **8M**

(or)

9. a. The past records of a factory using quality control methods show that on the average 4 articles produced are defective out of a batch of 100. What is the maximum number of defective articles likely to be encountered in the batch of 400, when the production process is in state of control? **7M**

b. i) Derive the expression for Exponential Distribution in life testing **4M**

ii) A sample of 50 transistors is simultaneously put on a test that is to be ended when the 15th failure occurs .if the total time is 525 hours, determine 95% confidence interval for the mean lifetime of a transistor **4M**

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14MA1401

II/IV B.Tech. DEGREE EXAMINATION, MAY, 2016

Fourth Semester

PROBABILITY AND STATISTICS

(CSE and IT Branches)

Time: 3hours ***Max. Marks: 70***

Part-A is compulsory

Answer One Question from each Unit of Part-B

PART-A

10 x 1 = 10M

1. a. Write the mean and variance of binomial distribution.

b. Define Probability density function.

c. Define unbiased estimator.

d. Define critical region.

e. Write the test statistics for t-Test for single mean.

f. Define Good ness of fit.

g. Define p-chart.

h. Define a failure rate function.

i. Write the PDF for weibull distribution.

j. What is interval estimation?

PART-B

4 x 15 = 60M

UNIT-I

2. a. Find the constant k such that $f(x)=\frac{1}{k}, a \le x \le b$ is PDF and also find mean and variance. **7M**

   b. The probability that an electric component will fail in less than 1,000hrs of continuous use is 0.25. Use the normal approximation to find the probability that among 200 such components fewer than 45 will fail in less than 1,000hrs of continuous use. **8M**

(or)

3. a. If x is normally distributed with mean 8 and standard deviation 4. find **8M**
   i) P(5<x<10) ii) P(x>5) iii) P(x<15) iv) P(x >15)

   b. Find the mean and variance of uniform distribution given by f(x) = 1/n, for x = 1, 2, 3…n **7M**

UNIT-II

4. a. Construct 98% confidence interval and maximum error estimate of a sample of 11 items with mean 3.92 and standard deviation 0.61. **7M**

   b. A sample of 450 items is taken from population whose mean is 30 and S.D is 20. Test whether the sample has come from population with mean 29. Also, calculate the 95% confidence interval of population mean. **8M**

(or)

5. a. Write a short note on Bayesian estimation. **7M**

   b. The information relating to purchase of bulbs from two manufactures A and B as

Manufacturer	No of bulbs	Mean life	S.D
A	50	1980 hrs	80hrs
B	70	2010hrs	60hrs

   Is there a significant difference in mean life of two bulbs of A and B. **8M**

UNIT-III

6. a. Test whether the intelligence of sons depends on the intelligence father's from the following data, using χ^2 test at 0.05 level
   Intelligence fathers with intelligence sons = 200
   Intelligence fathers with dull sons = 50
   Dull fathers with intelligence sons = 110
   Dull father with dull sons = 600 **8M**

   b. The lapping process which is used to grind certain silicon wafers to the proper thickness is acceptable only if σ, the population standard deviation of the thickness of dice cut from the wafers is at most 0.50mil. Use the 0.05 Los to test the null hpothesis $\sigma = 0.05$ against the alternative hypothesis $\sigma > 0.50$ if the thickness of 15 dice cut from such wafers have a standard deviation of 0.64mil. **7M**

(or)

7. a. A die is thrown 264 times with the following results. Show that the die is biased. $\left(x^2_{0.05} = 11.07 \text{ for } 5 \text{ d.f}\right)$ **8M**

No. appeared on the die	1	2	3	4	5	6
Frequency	40	32	28	58	54	52