SATHYABAMA UNIVERSITY
(Established under section 3 of UGC Act, 1956)

Course & Branch: B.Tech-IT-P-IT
Title of the Paper: Probability and Statistics   Max. Marks: 80
Sub. Code: 412501-512501-612501-612PT401   Time: 3 Hours
Date: 08/11/2010   Session: FN

PART - A   (10 X 2 = 20)
Answer ALL the Questions

1. Write the Probability axioms.

2. Define Baye's theorem.

3. Find the Binomial distribution where mean is 6 and variance is 4.

4. Write any two properties of Normal distribution.

5. If $r_{12} = 0.8$, $r_{13} = -0.4$, $r_{23} = 0.56$, find the values of $r_{12.3}$.

6. Write relation between multiple and partial correlation.

7. Write Little's formula.

8. Define P-K formula.

9. What is meant by statistical quality control?

10. What are the different components of a time series.

PART – B   (5 x 12 = 60)
Answer ALL the Questions

11. Two urn contain 4 white and 6 black balls, 4 white and 8 black balls. One urn is selected at random and a ball is taken out. It turns out to be white. Find the probability that it is from the first urn.

(or)

12. (a) If A and B are independent events then prove that $\overline{A}$ and $\overline{B}$ are also independent events.

(b) Let x be a continuous random variable with p.d.f

$$f(x)=\begin{cases} \dfrac{x}{12}; & 1<x<3 \\ 0; & otherwise \end{cases}$$

find the p.d.f of y = 2x – 3.

13. (a) Find the mean and variance of Binomial distributions.

(b) State and prove memory less property of Uniform distribution.

(or)

14. (a) Fit a Poisson distribution of the following data:-

X	0	1	2	3	4	5	Total
f	142	156	69	27	5	1	400

(b) State and prove memory less property of Geometric distribution.

15. (a) Find the correlation coefficient between X and Y for the following data.

X	2	3	5	1
Y	3	4	2	4

(b) Fit a straight line using the method of least square

Age(x)	1	2	3	4	5	6	7	8	9	10
Weight(y)	52.5	58.7	65.0	70.2	75.4	81.1	87.2	95.5	102.2	106.4

(or)

16. Fit a second degree parabola to the following data, taking x as the independent variable

X	1	2	3	4	5	6	7	8	9
Y	2	6	7	8	10	11	11	10	0

17. A self service store employees one cashier at its counter 9 customers on an average every 5 min. While the cashier can serve

10 customers in 5 min. Assuming Poisson distribution for arrival rate. Find

(a) Average number of customer in the system

(b) Average number of customer in the queue

<p align="center">(or)</p>

18. Arrivals at telephone booth are considered to be Poisson with average time of 12 mins. between one arrival and the next. The length of a phone call is assumed to be distributed exponentially with 4 mins.

(a) Find the average number of persons waiting in the system.

(b) What is the probability that a person arriving at the booth will have to wait in the queue.

(c) Estimate the fraction of the day when the phone will be in use.

19. The following are the sample means and ranges for ten samples, each of size 5. Construct the control chart for mean and range and comment on the nature of control

Sample No	1	2	3	4	5	6	7	8	9	10
Mean	12.8	13.1	13.5	12.9	13.2	14.1	12.1	15.5	13.9	14.2
Range	2.1	3.1	3.9	2.1	1.9	3.0	2.5	2.8	2.5	2.0

<p align="center">(or)</p>

20. The data given below are the number of defectives in 10 samples of 100 items each. Construct a P-chart and np-chart and comment on the result.

Sample No	1	2	3	4	5	6	7	8	9	10
No. of defectives	6	16	7	3	8	12	7	11	11	4