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 :04/11/2009   Session :FN

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

1.   If from a pack of cards a single card is drawn what is the probability that it is either a spade or a king?

2.   State Baye's theorem.

3.   The number of monthly breakdowns of a computer is a Random Variable having a Poisson distribution with mean equal to 1.8. Find the probability that this computer will function for a month with only one breakdown.

4.   If X is uniformly distributed over (0, 10) calculate the probability that
     (a) X > 6   (b) 3 < X < 8

5.   Write any two properties of correlation coefficient.

6.   Define method of least squares.

7.   What are the basic characteristics of queuing processes?

8.   In the usual notation of an m/m/1, queuing system if λ = 12/hr. and μ = 24/hr. Find the average number of customers in the system.

9.   What are the components of time series?

10. What are the uses of P-chart and np-chart?

11. There are true coins and 1 false coin with 'head' on both sides. A coin is chosen at random and tossed 4 times. If 'head' occurs all the 4 times, what is the probability that the false coin has been chosen and used?

(or)

12. A random variable X has the following probability distribution

X	0	1	2	3	4	5	6	7
P(X)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2+K$

Find (a) the value of K

(b) $P(1.5 < X < 4.5/X > 2)$ and

(c) the smallest value of λ for which $P(X \leq \lambda) > \frac{1}{2}$.

13. Derive the mean and variance of Binomial Distribution.

(or)

14. In an engineering examination, a student is considered to have failed, secured second class, first class and distinction, according as he scores less than 45%, between 45% and 60%, between 60% and 75% and above 75% respectively. In a particular year 10% of the students failed in the examination and 5% of the students get distinction. Find the percentages of students who have get first class and second class. (Assume normal distribution of marks.)

15. If X, Y and 2 are uncorrelated RVs with zero means and standard deviations 5, 12 and 9 respectively and if U = x + y and V = Y + Z, find the correlation coefficient between U and V.

(or)

16. Using 1983 as the origin, obtain a straight line trend equation by the method of least squares:

Year:	1982	1984	1985	1986	1987	1988	1991
Value:	140	144	160	152	168	176	180

Find the trend value of the missing year 1980

17. If people arrive to purchase cinema tickets at the average rate of 6 per minute, it takes an average of 7.5 seconds to purchase a ticket. If a person arrives 2 minutes before the picture starts and if it takes exactly 1.5 minutes to reach the correct seat after purchasing the ticket.
(a) Can the expect to be seated for the start of the picture?
(b) What is the probability that he will be seated for the start of the picture?
(c) How early must he arrive in order to be 99% sure of being seated for the start of the picture?

(or)

18. A one-man barber shop takes exactly 25 minutes to complete one hair-cut. If customers arrive at the barbershop in a Poisson fashion at an average rate of one every 40 minutes, how long on the average a customer spends in the shop? Also find the average time a customer must wait for service.

19. In a factory producing spark plugs, the number of defectives found in the inspection of 15 lots of 100 each is given below. Draw the control chart for the number of defectives and comment on the state of control

Sample number(i)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Number of defective(np)	5	10	12	8	6	4	6	3	4	5	4	7	9	3	4

(or)

20. 15 tape-recorders were examined for quality control test. The number of defects in each tape-recorder is recorded below. Draw the appropriate control chart and comment on the state of control

Unit no.(i)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
No.of defects(c)	2	4	3	1	1	2	5	3	6	7	3	1	4	2	1