Reg. No. : | | | | | | | | | | |

Question Paper Code: 53022

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Third Semester

Computer Science Engineering

15UMA322 - PROBABILITY, STATISTICS AND QUEUEING SYSTEMS

(Common to Information Technology branch)

(Regulation 2015)

(Statistical tables are may be permitted)

Duration: One hour Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. The mean and variance of the Binomial distribution are 4 and 3 respectively. Find P(X=0). CO1- R

   (a) $(1/4)^{16}$ (b) 1/4 (c) $(3/4)^{16}$ (d)3/4

2. Find λ, if X follows Poisson Distribution such that P(X=2)=3P(X=3). CO1- R

   (a) 3 (b) 4 (c) 2 (d) 1

3. Cov (X, Y) = CO2- R

   (a) E (XY) – E(X) E (Y) (b) E(X')E(Y') – E(X.Y)

   (c) E (X)E(Y) – E(X.Y) (d) E(XY)– E(X')E(Y')

4. If X and Y are independent RVs with variances 8 and 5.find the variance of 3X+4Y. CO2- R

   (a) 152 (b) 153 (c) 163 (d) 162

5. The number of experimental units in the block is called as CO3- R

   (a) Block design (b) Block size (c) Complete block unit (d) Unit size

6. A _____ is a variable defining a categorization. CO3- R

   (a) Fixed Factor (b) Factor (c) Local Control (d) Error Control

7. What do the letter "d" in the symbolic representation (a/b/c): (d/e) of a queueing model represent? CO4- R

(a) Service distribution (b) System capacity

(c) Arrival distribution (d) No.of. server

8. M/G/1 Queuing system is Markovian – Comment the statement CO4- R

(a) Correct (b) Wrong (c) Partially Correct (d) None of these

9. Find the expected number of customers in the system, if $\lambda=1/13$ and $\mu=1/4$ in (M/M/1);(∞/FCFS) CO5- R

(a) 0.4444 (b) 0.777 (c) 1.4444 (d) 1.04

10. The service facilities are arranged in a sequence and the flow is always in a single direction is called _____ CO5- R

(a) Series Queue (b) Open Queue (c) Closed Queue (d) Parallel Queue

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. An electrical firm manufactures light bulbs that have the length of life which is normally distributed with mean of 800 hours and standard deviation of 40 hours. Find the probability that a bulb burns between 778 and 834 hours. CO1- App (8)

12. The joint probability distribution of two dimensional random variable (X,Y) is given by $f(x,y)=\frac{1}{3}(x+y)$, $0 \leq x \leq 1, 0 \leq y \leq 2$. Find the correlation coefficient. Also find the equations of two lines of regression. CO2- App (8)

13. Analyze the following latin square experiment. CO3- Ana (8)

A 105	B 95	C 125	D 115
C 115	D 125	A 105	B 105
D 115	C 95	B 105	A 115
B 95	A 135	D 95	C 115

14. There are three typists in an office. Each typist can type an average of 6 letters per hour. If letters arrive for being typed at the rate of 15 letters per hour. what fraction of time all the typists will be busy ? what is the average number of letters waiting to be typed? CO4- App (8)

15. Derive the Pollaczek- Khintchine formula for M/G/1 queue. Hence deduce the result for the queues M/D/1 and $M/E_k/1$ as special cases. CO5- U (8)