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Question Paper Code: 93022

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

Third Semester

Computer Science Engineering

19UMA322 - PROBABILITY, QUEUEING THEORY AND NUMERICAL METHODS

(Common to Information Technology branch)

(Regulation 2019)

(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)

- Probability of an impossible event is CO1- R
(a) 1 (b) 10 (c) 0 (d) 100
- The r^{th} moment about origin is CO1- R
(a) $\mu(X)$ (b) $\mu(X^2)$ (c) $\mu(X^r)$ (d) None of the above
- In (M/M/1): (∞ / FCFS), Traffic intensity is ____ CO2- R
a) $\frac{\lambda}{\mu}$ b) $\frac{\lambda}{c\mu}$ c) $\frac{c\lambda}{\mu}$ d) $\lambda\mu$
- In (M/M/1) : (K / FCFS), The effective arrival rate is ____ CO2- R
(a) λ (b) λ' (c) μ' (d) $\lambda\mu'$
- The linear law is CO3- R
(a) $Y=A+B$ (b) $Y=AX+B$ (c) $Y=A+BY$ (d) $Y=X+A$
- _____ number of normal equations are required to fit a parabola in method of least squares CO3- R
(a) 1 (b) 2 (c) 3 (d) 4

7. Iteration method converges if $|g'(x)|$ _____ CO4- R
 (a) >1 (b) <1 (c) $=0$ (d) >0
8. Newton's method is also called method of _____ CO4- R
 (a) tangents (b) slope (c) secants (d) false
9. In Euler's method, if h is small, the method is too _____ CO5- R
 (a) fast (b) slow (c) average (d) None of these
10. The Fourth order RungeKutta methods are used widely in _____ CO5- R
 solution to differential equations
 (a) abstract (b) graphical (c) numerical (d) None of these

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Find the moment generating function of binomial distribution and CO1- App (8)
 hence find its mean and variance.
12. Customers arrive at one man barber shop according to a Poisson CO2- App (8)
 process with a mean interarrival time of 12 minutes; Customers spend
 an average of 10 minutes in the barber's chair.
 a) What is the probability that the barber shop is empty?
 b) What is the expected number of customers in the barber shop and
 in the queue?
 c) Find the average time a customer spends in the barbershop.
13. By using the method of moments, obtain a straight line fit to the CO3- Ana (8)
 following data::
- | | | | | |
|---|------|------|------|------|
| X | 1 | 2 | 3 | 4 |
| Y | 0.30 | 0.64 | 1.32 | 5.40 |
14. Solve for a positive root of $3x - \cos x - 1 = 0$ by Newton's Raphson CO4- App (8)
 method.
15. Using Taylor series method find $y(0.1)$ for $\frac{dy}{dx} = x^2 y - 1$ with $y(0) = 1$. CO5- U (8)