

Name or UF ID: _____

Useful formulae: [Note that you may not need all of these formulae. Use as needed]

- Utilization:

$$a = \frac{T_{prop}}{T_{trans}} = \frac{propagationDelay}{transmissionDelay}$$

$$propagationDelay = \frac{Distance}{S}, S = 2 \times 10^8 \text{ m/s}$$

$$\text{For Ethernet } u = \frac{1}{(1 + 5a)}, \text{ where } a = \frac{T_{prop}}{T_{trans}} = \frac{propagationDelay}{transmissionDelay}$$

$$\text{For token ring (release after transmission) } u = \frac{1}{(1 + \frac{a}{N})}$$

$$\text{For token ring (release after reception) } u = \frac{1}{(1 + a)}$$

- FDDI is token ring (with release after transmission) with 100Mbps

- For (pure) ALOHA the efficiency (or utilization) = $Np(1-p)^{2(N-1)}$.

- For slotted ALOHA the efficiency (or utilization) = $Np(1-p)^{N-1}$

- Efficiency of a MAC protocol is the probability of successful transmission in any time slot by any station.

- CIDR: Classless InterDomain Routing

Probability distributions and stochastic processes:

- Geometric distribution: x is the number of Bernoulli experiments until success, $\Pr[X=k]=q^{k-1}p$, $E(X)=1/p$

- Binomial distribution: x is the number of successes in n Bernoulli experiments/trials

$$P(X = k) = \binom{n}{k} q^{n-k} p^k, \binom{n}{k} = \frac{n!}{(n-k)!k!}, E[X]=np$$

- Poisson Distribution: $\Pr[X=k] = (\lambda^k/k!) e^{-\lambda}$, $E[X]=\text{Var}[X]=\lambda$

- Exponential distribution: $f(x)=\lambda e^{-\lambda x}$, $F[x]=1-e^{-\lambda x}$, $\Pr[X>x]=1-F[x]=e^{-\lambda x}$, $E[X]=1/\lambda$

Some acronyms (this list is not exhaustive):

- PIM: Protocol Independent Multicast, SM: Sparse Mode, DM: Dense Mode
- DVMRP: Distance Vector Multicast Routing Protocols
- CSMA: Carrier Sense Multiple Access, CDMA: Code Division Multiple Access
- BGP: Border Gateway Protocol, RIP: Routing Information Protocol,
- OSPF: Open Shortest Path First, VC: Virtual Circuit,