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VELLORE ▪ CHENNAI
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SCHOOL OF COMPUTER SCIENCE AND ENGINEERING (SCOPE)

CAT-II Examination

Fall Semester 2018-19

Programme and Branch: B.Tech – CSE **Max. Marks: 50**

Course Code : CSE1004 **Slot: G2+TG2**

Course Title: Network and Communication **Duration: 1.5 hours**

Answer ALL Questions (5 X10 = 50 Marks)

1. (a) The distance from earth to a distant planet is approximately 9×10^{10} m. What is the channel utilization if a stop-and-wait protocol is used for frame transmission on a 64 Mbps point-to-point link? Assume that the frame size is 32 KB and the speed of light is 3×10^{8} m/s. (5)

(b) Draw the sender and receiver windows for a system using Stop and Wait ARQ and Go-back-N ARQ for the scenarios: (5)

i. Frame 0 is sent; Frame 0 is acknowledged

ii. Frames 1 and 2 are sent; frames 1 and 2 are acknowledged

iii. Frames 3, 4, and 5 are sent; NAK4 is received.

iv. Frames 4,5, 6 and 7 are sent; frames 4 through 7 are acknowledged.

2. How does knowledge of the channel state affect the amount of useable bandwidth in a system with multiple (contention) access on a common transmission channel (i.e., networks that do not have a central controller allocating access to the channel). Name and describe the operation of any two different multiple (contention) access protocols, the information they use about the channel state and compare the amount of useable bandwidth each network can achieve (that is, how much of the capacity of the channel can actually be used). Also identify performance improvement techniques used in the design of the CSMA/CD protocol. (5+5)

3. (a) How a network manager designs subnet for his organization? (3)

(b) Suppose 198.53.202.0 is a network address and we want 4 subnets. Find the following : (7)

(i) Number of bits required for subnetting
(ii) Subnet mask
(iii) Range of address in each subnet
(iv) Broadcast address for each subnet

4. You are the network administrator for ABC.com. The company has decided to locate a small branch office in another city. To support the new location, you will need to subnet the private IP address range of your boss has given you into several smaller networks to provide services to each department. The new office location has been assigned the 10.10.10.0/24 IP address range.

When you set up the new network, you need to configure separate subnets for each department in the new office. You should allocate the addresses using CIDR notation and provide each department the minimum number of IP addresses that their needs. The department at new location requires the following number of computers on their subnets:

IT – 54

HR – 32

SALES -5

ADMINISTRATIVE – 3

Design and show the sub-blocks and give the slash notation for each sub-block. Find out how many addresses are still available after these allocations. (10)

5. Find shortest path from B to G using Dijkstra's shortest path algorithm. [Show step by step