



EASTERN UNIVERSITY, SRI LANKA

29 MAY 2006

THIRD EXAMINATION IN SCIENCE - 2005/2006

SECOND SEMESTER (Mar./ April., 2008)

CS 302 - Computer Networks

Proper & Repeat

Answer all questions

Time : Two hours

1. A businessman owns a large shopping center and currently uses 25 standalone Personal Computers. He wishes to connect them in LAN to enhance his business strategies. The two most distant computers are 200m apart.

He appoints a consultant to design a suitable LAN configuration. The designer offers the following alternative.

- (a) A **10Base5** - Thick Ethernet **Bus** network operating at 10Mbps using RG 58 coaxial cable which allows a maximum segment of 500m.
- (b) A **10BaseT** - Ethernet **Star** network operating at 10Mbps using cat3 UTP having a maximum segment length of 100m.
- (c) A **100Base FX** - Fast Ethernet **Star** network that uses Multimode Fiber-Optic cable operating at 100Mbps having a maximum segment length of 412m.
 - i. What advantages would he get by designing a LAN?
 - ii. Explain the Bus & Star topologies?
 - iii. Explain the Data Link Layer protocol (For Error Detection & Correction) used in the above Ethernet Bus / Star topologies.
 - iv. What additional device/devices/cables needed to connect each computer to the backbone if, alternative "(a)" is chosen. Describe their functions.
 - v. Will he be able to implement alternative "(b)"? If yes, how? (note that the maximum length is 100m in "(b)").

- vi. What are the advantages and disadvantages of using alternative “(“
- vii. Why didn't the designer propose to have a 10Base2 thin Ethernet technology operating at 10Mbps using RG 58 co-axial cable?

2. (a) Describe each of the following modulation techniques in data communication.

- i. Frequency Shift Keying (FSK)
- ii. Phase Shift Keying (PSK)
- iii. Amplitude Shift Keying (ASK).

(b) State clearly what Cyclic Redundancy Check (CRC) algorithm is and explain the algorithm.

(c) Suppose a series of 8-bit message blocks (frames) is to be transmitted over a data link using a CRC for error detection and a generator polynomial of $x^3 + x + 1$. Generate the CRC code for the message 11110110.

3. The ISO-OSI seven Layer model is sometimes referred to as the “Super Model of Networking”.

- (a) What are the principles that were applied to arrive at the seven layers?
- (b) Briefly discuss the major responsibilities assigned to each layer?
- (c) Briefly explain the process of information exchange between layers?

4. (a) Explain briefly the terms Attenuation, Delay Distortion & Noise of a transmission signal with the appropriate diagrams.

(b) What is a carrier signal? Explain how do you make use of a carrier signal to transmit information?

(c) What are the differences between Routed protocols and Routing protocols?

(d) Explain briefly RIP & OSPF?