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University, Sri Lanka

**EASTERN UNIVERSITY, SRI LANKA**  
**THIRD EXAMINATION IN SCIENCE 2003/2004**  
**SECOND SEMESTER (June/July, 2005)**

**CS302 - Computer Network**

**Answer All Questions**

**Time Allowed: Two hours**

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1. (a) List the seven layers of the OSI reference model and briefly describe the function of each layer. {40}
- (b) Define the following terms under the data transmission:
- i. Frequency
  - ii. Spectrum
  - iii. Bandwidth {3 × 5 = 15}
- (c) Give a description of the application and limitation of each of the following types of transmission media:
- i. Optical fiber cable
  - ii. Satellite microwave
  - iii. Broadcast radio {3 × 15 = 45}
2. (a) Briefly describe the characteristics of the following multiplexing:
- i. Frequency-Division Multiplexing
  - ii. Synchronous Time-Division Multiplexing {2 × 15 = 30}
- (b) Describe each of the following switching techniques:
- i. Circuit switching
  - ii. Packet switching {2 × 15 = 30}
- (c) List the main types of network topology currently in widespread use for LAN's and, with the aid of sketches, explain their operation. {40}

3. (a) Briefly describe the services provided by the data link layer to the network layer. {20}

(b) Describe:

i. Character oriented transmission with character stuffing

ii. Bit oriented transmission with bit stuffing

{2 × 20 = 40}

(c) Describe the principle of operation of a CRC error detection method. {15}

Suppose a series of 8-bit message blocks (frames) is to be transmitted across a data link using a CRC for error detection and a generator polynomial,  $G(x) = x^4 + x + 1$ . Generate the CRC code for the message 1101011011.

4. (a) Briefly describe the data link protocol '**Simplex Protocol for Noisy Channel**'. {15}

(b) With the aid of suitable examples, discuss the sliding window protocol

i. using Go-Back-N

ii. using Selective repeat.

{2 × 25 = 50}

Suppose, a sliding window protocol is used in a Computer Network with three bits for the packet sequence number.

Find out the maximum window size in each of the above cases. Explain your answer.

(c) Briefly describe the Eastern University Campus Wide Area Network setup.