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18CS46

## Fourth Semester B.E. Degree Examination, June/July 2024 Data Communication

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. Define Data Communication. Explain fundamental characteristics of data communication system. (06 Marks)
- b. State five basic data communication components, briefly explain their functions. (06 Marks)
- c. What are the advantages of having layered model for networking? Explain important functions of OSI model. (08 Marks)

OR

- 2 a. What is Transmission Impairment? Briefly explain three causes of transmission impairment. (06 Marks)
- b. Explain briefly about Shanon capacity and Nyquist bit rate for communication channels. (06 Marks)
- c. Distinguish :  
i) Baseband and Broadband  
ii) Bandwidth and Throughput  
iii) Latency and Jitter  
iv) Dejure and Defacto model. (08 Marks)

### Module-2

- 3 a. Define Line Coding. List out its characteristics. (08 Marks)
- b. Explain different data transmission modes in detail. (07 Marks)
- c. Represent the sequence 1011001011 using polar and biphase schemes. (05 Marks)

OR

- 4 a. Explain with suitable diagram PCM encoder used for analog to digital conversion. (08 Marks)
- b. Briefly explain with neat diagrams, ASK and FSK modulation techniques and specify the bandwidth requirement. (08 Marks)
- c. We have an available bandwidth of 100 kHz which spans from 200 to 300 kHz. What are the carrier frequency and the bit rate if we modulated our data by using ASK with  $d = 1$ . (04 Marks)

### Module-3

- 5 a. What is Switching? What are the different types of switching techniques? (06 Marks)
- b. What is Hamming distance? Discuss about minimum Hamming distance. (06 Marks)
- c. Explain the need for multiplexing. Four 1kbps connections are multiplexed together. A unit is 1 bit find :  
i) The duration of 1 bit before multiplexing  
ii) The transmission rate of the link  
iii) The duration of a time slot  
iv) The duration of a frame. (08 Marks)



OR

- 6 a. Describe about Direct Sequence Spread Spectrum (DSSS). (06 Marks)
- b. Distinguish statistical TDM from synchronous TDM. (06 Marks)
- c. Explain Cycle Redundancy Check (CRC). Assume that data is 10110 and the code generator is 1101. Calculate CRC bits. (08 Marks)

**Module-4**

- 7 a. Demonstrate taking an example, character oriented and bit oriented framing. (10 Marks)
- b. A network transmit 200bit frames on a shared 200 Kbps line. Compute the throughput for pure ALOHA and slotted ALOHA if the system produces
  - i) 1000 frames/sec
  - ii) 500 frames/sec
  - iii) 250 frames/sec.Tabulate the values computed. (10 Marks)

OR

- 8 a. Demonstrate the concept of IP address and Link – layer address, consider a small internet. (07 Marks)
- b. What is the role of Address Resolution Protocol (ARP)? Explain its Operation. (07 Marks)
- c. What is Classless Inter Domain Routing (CIDR)? Explain Address Aggregation Strategy with example. (06 Marks)

**Module-5**

- 9 a. Explain Ethernet frame format with a neat diagram. (08 Marks)
- b. Describe Gigabit Ethernet. (06 Marks)
- c. Explain the architecture of IEEE 802.11. (06 Marks)

OR

- 10 a. Explain the architecture of Bluetooth. (08 Marks)
- b. Explain the operation of cellular telephony. (06 Marks)
- c. Explain fourth generation (4G) of cellular telephony. (06 Marks)

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