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10CS55

Fifth Semester B.E. Degree Examination, Jan./Feb. 2021
Computer Networks – I

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. What are the components of data communication system? Explain in brief. **(05 Marks)**

b. With a neat diagram, explain the interaction between layers in the OSI model. **(10 Marks)**

c. What is the difference between a physical and logical address? Explain with example. **(05 Marks)**

2 a. Using Shannon's theorem, compute the maximum bit rate for a channel having a band width of 3100 H_2 and signal to noise ratio of 20 db. **(06 Marks)**

b. Sketch the signal waveforms when 01001110 is transmit using following line coding schemes : i) RZ ii) NRZ – L iii) Manchester coding. **(06 Marks)**

c. Explain different types of transmission modes. **(08 Marks)**

3 a. When is the use of multiplexing justified? Mention and explain different types of multiplexing. **(08 Marks)**

b. Describe the different switched networks used in computer networks, mentioning specifically which of these need setup, transfer and teardown phase. **(08 Marks)**

c. A path in a digital circuit switched network has a data rate of 1 Mbps. Exchange of 1000 bits is required for setup and 1000 bits for teardown. The distance between two parties is 8000 km. calculate the total time required to transfer 2000 bits of data if acknowledgement requires exchange of 500 bits and tearing down of connection is initiated from source assuming no error in data transmission, no processing delay and propagation speed in connecting medium 2×10^8 m/s (Protocol ends with sending of tearing down message from source side). **(04 Marks)**

4 a. Explain CRC error detection method with an example. **(06 Marks)**

b. Explain the structure of encoder and decoder for a Hamming code. **(04 Marks)**

c. What is internet checksum? If a sender needs to send four data items 0 × 3456, 0 × ABCC, 0 × 02BC and 0 × EEEE, answer the following:

i) Find the checksum at sender site.

ii) Find the checksum at receiver's site if there is no error. **(10 Marks)**

PART – B

5 a. With neat diagram of point – to point protocol (PPP) frame format, explain each of the fields. **(08 Marks)**

b. Explain stop and wait automatic repeat request protocol. **(06 Marks)**

c. What is framing? With necessary sketches explain bit stuffing and unstuffing. **(06 Marks)**

6 a. Describe CSMA/CD access method with space/time model and indicate the requirements needed for this type of access. **(08 Marks)**

b. With a neat diagram describe the different fields and their lengths in bytes of standard Ethernet (802.3 MAC) frame. **(08 Marks)**

c. A network using CSMA/CD has a bandwidth of 10 Mbps. What should be the minimum size of frame if the maximum propagation time including delays in devices is 25.6×10^{-6} s. **(04 Marks)**

7 a. What do you mean by hidden and exposed station problems in IEEE 802.11 protocol. Explain in detail. **(06 Marks)**

b. With neat diagram, explain the architecture of Piconet and Scatternet Bluetooth networks. **(06 Marks)**

c. Explain the working of global system for mobile (GSM) in detail. **(08 Marks)**

8 a. List the deficiencies of IPV4 and advantages of IPV6 over IPV4. **(10 Marks)**

b. Draw format of an IPV6 datagram and explain. **(10 Marks)**

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