

**CS415**

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M S RAMAIAH INSTITUTE OF TECHNOLOGY

(AUTONOMOUS INSTITUTE, AFFILIATED TO VTU)

BANGALORE – 560 054

SEMESTER END EXAMINATIONS – MAY / JUNE 2014

Course & Branch	: B.E.- Computer Science and Engineering	Semester	: IV
Subject	: Data Communication	Max. Marks	: 100
Subject Code	: CS415	Duration	: 3 Hrs

Instructions to the Candidates:

- Answer one full question from each unit.
- Write figures wherever necessary.

UNIT – I

1. a) Compare and contrast the following: (08)
 - i) point to point and multipoint connection
 - ii) Simplex and full duplex mode
 - iii) star and bus topology
 - iv) physical address and ip address
- b) List and explain the various protocols used in TCP/IP protocol suite. (08)
- c) What are the propagation time and transmission time for a 4.5Mbyte message if the bandwidth of the network is 2Mbps? Assume that the distance between sender and the receiver is 15,000km and that the light travels at 2.4×10^8 m/s. (04)
- 2 a) Describe the responsibilities of physical and data link layers of the OSI reference model (10)
- b) Identify the causes of transmission impairment and write the formulas to calculate Decibel, SNR and SNR_{dB} (06)
- c) What is the theoretical capacity of a channel in each of the following cases (04)
 - i) Bandwidth: 20KHz SNR_{dB}=40
 - ii) Bandwidth: 1MHz SNR_{dB}=20

UNIT – II

3. a) Define scrambling and give its purpose. What is the result of scrambling the sequence 11100000000000 using the following scrambling techniques? Explain your answer. Assume that the last non-zero signal level has been positive. (10)
 - a. B8ZS
 - b. HDB3 (The number of nonzero pulses is odd after the last substitution)
- b) Describe the 3 strategies viz. Multilevel multiplexing, multiple slot allocation and pulse stuffing that are used when the data rate is not same in TDM. (06)
- c) Define FHSS and explain how it achieves bandwidth spreading. (04)
4. a) What are the 3 major classes of guided media? Describe in detail with suitable figures. (12)
- b) Draw the graph for the bit stream 010011 using the following schemes (04)
 - i) NRZ-L
 - ii) NRZ-I (consider starting voltage is positive)
 - iii) Manchester
 - iv) Differential Manchester (consider starting voltage is negative)



- c) We need to use synchronous TDM and combine 20 digital sources, each of 100 Kbps. Each output slot carries 1 bit from each digital source, but one extra bit is added to each frame for synchronization. Answer the following questions: (04)
- i) What is the size of an output frame in bits?
 - ii) What is the output frame rate?
 - iii) What is the duration of an output frame?
 - iv) What is the output data rate?

UNIT - III

5. a) Given the dataword 1010011110 and the divisor 10111, (10)
- i) Show the generation of the codeword at the sender site (using binary division).
 - ii) Show the checking of the codeword at the receiver site (assume no error).
- b) Identify and briefly explain the 3 phases of virtual networks. (06)
- c) Compare and contrast circuit-switched network and packet-switched network. (04)
6. a) Explain the structure of a packet switches with neat figures. (10)
- b) Consider the CRC-8 polynomial $X^8 + X^2 + X + 1$, Answer the following questions: (06)
- i) Does it detect a single error? Defend your answer.
 - ii) Does it detect a burst error of size 6? Defend your answer.
 - iii) What is the probability of detecting a burst error of size 9?
 - iv) What is the probability of detecting a burst error of size 15?
- c) What are the 2 ways of error correction? (04)

UNIT - IV

7. a) Write algorithm for Go Back N sender and receiver site. (10)
- b) How is Polling used to provide controlled access to transmission media. (06)
- c) Differentiate between byte stuffing and bit stuffing (04)
8. a) With a neat flow diagram explain the working of CSMA/CD. (10)
- b) Describe the 2 authentication protocols used in PPP. (08)
- c) We have a pure ALOHA network with 100 stations. If $T_{fr} = 1\mu s$, what is the number of frames each station can send to achieve the maximum efficiency. (02)

UNIT - V

9. a) With a neat figure explain the frame format of IEEE 802.11 protocol. (10)
- b) Compare and contrast bridged ethernet, switched ethernet and full duplex ethernet. (07)
- c) An Ethernet MAC sublayer receives 1510 bytes of data from the upper layer. Can the data be encapsulated in one frame? If not, how many frames need to be sent? What is the size of the data in each frame? (03)
10. a) What is a transparent bridge? How is the problem of looping in transparent bridge solved? Explain in detail. (10)
- b) What is hidden station and exposed station problem? How is the hidden station problem solved. (08)
- c) The address 43:7B:6C:DE:10:00 has been shown as the source address in an Ethernet frame. The receiver has discarded the frame. Why? (02)
