


SEMESTER END EXAMINATIONS – MAY/JUNE 2018

Course & Branch	: B.E. : Computer Science and Engineering	Semester	: IV
Subject	: Data Communication	Max. Marks	: 100
Subject Code	: CS44/CS1544	Duration	: 3 Hrs

Instructions to the Candidates:

- Answer one full question from each unit.

UNIT- I

1. a) Identify the causes of transmission impairment. The loss in a cable is defined as (dB/Km). If the signal at the beginning of a cable with -0.3dB/km has a power of 2 mW, Compute the power of the signal required at 5Km? CO1 (06)
- b) Describe the way in which a network is laid out physically through the geometric representation of the relationship of all the links and linking devices (usually called nodes) to one another. Also mention the clear differences between star topology and ring topology. CO1 (08)
- c) Explain the different types of data representation used in data communication. CO1 (06)
2. a) Discuss two principles of protocol layering. Explain the logical connections between layers of TCP/IP protocol with a block diagram. CO1 (08)
- b) Performance is inversely related to delay. When we use the Internet, predict which of the following applications are more sensitive to delay? Justify your views. CO1 (06)
 - i. Sending an e-mail ii. Copying a file iii. Surfing the Internet.
- c) A file contains 2 million bytes. How long does it take to download this file using a 56-Kbps channel and 1-Mbps channel? CO1 (06)

UNIT- II

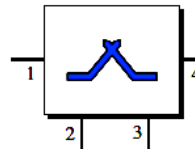
3. a) Which characteristics of an analog signal are changed to represent the digital signal in each of the following digital-to-analog conversions? CO2 (06)
 - i. ASK ii. FSK iii. PSK iv. QAM
 Draw the constellation diagram for ASK, with peak amplitude values of 1 and 3.
- b) For transmission of 1000 characters with each character encoded as 8 bits, compute the following: CO2 (06)
 - i. number of transmitted bits for synchronous transmission.
 - ii. number of transmitted bits for asynchronous transmission.
 - iii. redundancy percent in each case.
- c) Which of the three multiplexing techniques is (are) used to combine analog signals and which are used to combine digital signals? Four data channels (digital), each transmitting at 1 Mbps, use a satellite channel of 1 MHz. Design an appropriate configuration, using FDM. Illustrate with a block diagram. CO2 (08)

4. a) Explain Delta modulation and demodulation with neat block diagram. CO2 (07)
b) Justify how statistical TDM is advantageous over synchronous TDM with an example. We have 4 sources each creating 250 characters per second. If the interleaved unit is a character and one synchronizing bit is added to each frame find:
i. The data range of each source
ii. The duration of each character in each source
iii. The frame rate
iv. The duration of each frame
v. The number of bits in each frame
vi. The data rate of the link.
c) Define the digital hierarchy used by telephone companies and list different levels of the hierarchy. CO2 (05)

UNIT- III

5. a) Compare and contrast a circuit-switched network and a packet-switched network. Figure shows a switch in a virtual-circuit network. Find the output port and the output VCI for packets with the following input port and input VCI addresses:
(i) Packet 1: 3, 78 (ii) Packet 2: 2, 92.

Incoming		Outgoing	
Port	VCI	Port	VCI
1	14	3	22
2	71	4	41
2	92	1	45
3	58	2	43
3	78	2	70
4	56	3	11



- b) With a neat block diagram, explain the working of a time division switch. CO3 (08)
c) Describe the forward error correction techniques used to correct or reproduce packets. CO3 (04)
6. a) A space-division switch has 1000 inputs and outputs. What is the total number of crosspoints in each of the following cases?
i. Using a single crossbar.
ii. Using a multi-stage switch based on the Clos criteria. CO3 (06)
b) With a block diagram, explain the encoder and decoder for simple parity check code CO3 (06)
c) In CRC, which of the following generators (divisors) guarantees the detection of an odd number of errors?
i. 10111 ii. 101101 iii. 1111. CO3 (08)
Explain the procedure and algorithm for calculating Internet checksum.

UNIT- IV

7. a) With a neat flow diagram explain the working of Pure ALOHA and calculate its vulnerable time. CO4 (06)
b) Explain point to point protocol with frame format. CO4 (08)
c) List the properties each chip sequence should have in CDMA. CO4 (06)

8. a) Explain why should the send window size be less than 2^m in Go-Back-N protocol. Explain with an example. CO4 (06)
- b) Using 5-bit sequence numbers, what is the maximum size of the send and receive windows for each of the following protocols?
i. Stop-and-Wait ii. Go-Back-N iii. Selective-Repeat. CO4 (06)
- c) Draw the flow diagrams for the 3 persistent protocols and explain. CO4 (08)

UNIT- V

9. a) Explain DCF in detail with block diagrams. CO5 (08)
- b) List and explain on which characteristics memberships can be assigned for a VLAN? Also Explain the different ways of configuring a VLAN in detail. CO5 (08)
- c) Diagnose What do we mean when we say that a link-layer switch can filter traffic? Summarize why is filtering important? CO5 (04)
10. a) List the transmission medium, medium length, and encoding technique used for a 10Base-T and 10BaseF. CO5 (06)
- b) Explain the effect of bridges in an Ethernet LAN. CO5 (06)
- c) In an 802.11 communication, the size of the payload (frame body) is 1200 bytes. The station decides to fragment the frame into three fragments, each of 400 payload bytes. Answer the following questions: CO5 (08)
- i. What would be the size of the data frame if no fragmentations were done?
 - ii. What is the size of each frame after fragmentation?
 - iii. How many total bytes are sent after fragmentation (ignoring the extra control frames)?
 - iv. How many extra bytes are sent because of fragmentation (again ignoring extra control frames)?
