

EXAMINATIONS SEPTEMBER /OCTOBER 2021 SUPPLEMENTARY SEMESTER / GRADE IMPROVEMENT/ RE -REGISTERED CANDIDATES

Program	: B.E. : Computer Science and Engineering	Semester	: IV
Course Name	: Data Communication	Max. Marks	: 100
Course Code	: CS44(O)	Duration	: 3 Hrs

Instructions to the Candidates:

- Answer any five full questions.

- Explain the encapsulation/decapsulation at the source host, router and destination host. CO1 (08)
 - The power of a signal is 10 mW and the power of the noise is 1microwatt; Find the values of SNR and SNR_{db}. CO1 (04)
 - Compare and contrast the following: CO1 (08)
 - point to point and multipoint connection
 - Simplex and full duplex mode
 - star and bus topology
 - physical address and ip address.
- Name the four basic network topologies, and mention advantages of each type. CO1 (08)
 - Identify the causes of transmission impairment and explain each with an example. CO1 (06)
 - With a block diagram, explain the five components of data communication. CO1 (06)
- The signal waveform when 10011010 is transmitted in the signal. Draw the graph of the following. CO2 (08)
 - Unipolar NRZ
 - Polar NRZ-I
 - Differential Manchester
 - Pseudo ternary.
 - Explain frequency hopping spread spectrum with diagram. CO2 (06)
 - Two channels, one with a bit rate of 190 kbps and another with a bit rate of 180 kbps, are to be multiplexed using pulse-stuffing TDM with no synchronization bits. Answer the following questions: CO2 (06)
 - What is the size of a frame in bits?
 - What is the frame rate?
 - What is the duration of a frame?
 - What is the data rate?
- Define DSSS and explain how it achieves bandwidth spreading. CO2 (06)
 - Explain Delta modulation technique with block diagrams. CO2 (08)
 - What is the result of scrambling the sequence 11100000000000 using each of the following scrambling techniques? Assume that the last non-zero signal level has been positive. CO2 (06)
 - B8ZS
 - HDB3 (The number of nonzero pulses is odd after the last substitution.)

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| 5. | a) | Explain the three phases of circuit-switched network. | CO3 | (08) |
| | b) | With a block diagram, explain the encoder and decoder for simple parity check code. | CO3 | (06) |
| | c) | We need a three-stage space-division switch with $N = 100$. We use 10 crossbars at the first and third stages and 4 crossbars at the middle stage. | CO3 | (06) |
| | | i) Draw the configuration diagram. | | |
| | | ii) Calculate the total number of crosspoints. | | |
| | | iii) Find the possible number of simultaneous connections. | | |
| | | iv) Find the possible number of simultaneous connections if we use a single crossbar (100 X 100). | | |
| | | v) Find the blocking factor, the ratio of the number of connections in part iii) and in part iv). | | |
| 6. | a) | Explain hamming distance technique with suitable example. | CO3 | (06) |
| | b) | Explain the procedure and algorithm for calculating Internet checksum. | CO3 | (06) |
| | c) | Generate the codeword for the data stream 1001110 using the divisor 1011 on sender side and show the checking for error on receiver side (assume no error). | CO3 | (08) |
| 7. | a) | Explain the transition phases of PPP with a neat block diagram. | CO4 | (08) |
| | b) | Define channelization and briefly explain FDMA. | CO4 | (06) |
| | c) | Explain Token Passing in Controlled Access method with example. | CO4 | (06) |
| 8. | a) | A pure ALOHA network transmits 200-bit frames using a shared channel with a 200-kbps bandwidth. Find the throughput if the system (all stations together) produces | CO4 | (06) |
| | | i. 1000 frames per second. | | |
| | | ii. 500 frames per second. | | |
| | | iii. 250 frames per second | | |
| | b) | Differentiate between Bit stuffing and byte stuffing. | CO4 | (06) |
| | c) | With a neat flow diagram explain the working of CSMA/CA. | CO4 | (08) |
| 9. | a) | Differentiate between piconet and scatternet Bluetooth architecture. | CO5 | (06) |
| | b) | Explain hidden station problem? Discuss how this problem can be solved? | CO5 | (06) |
| | c) | Explain distributed coordination function in detail with block diagrams. | CO5 | (08) |
| 10. | a) | Explain L2CAP data packet format with block diagram. | CO5 | (08) |
| | b) | Explain Spanning tree algorithm with an example. | CO5 | (06) |
| | c) | Explain the addressing mechanism used by wireless LAN's. | CO5 | (06) |
