

**BACHELOR OF ENGINEERING (ELECTRICAL ENGINEERING) FIFTH
YEAR FIRST SEMESTER SUPPLEMENTARY EXAM 2024**

Principles of Communication Engineering and Computer Networks

Time: Three Hours

Full Marks: 100

(50 marks for each part)

Use a separate Answer-Script for each Part

PART-I

Answer *any three* questions from this part

1. a) A channel is required to carry a signal at 32Mbps. The bandwidth of the channel is 4MHz. 4
What is the required signal-to-noise ratio of the channel in order to achieve this capacity?
- b) Why flow control is necessary in transmitting information from source to destination? 4
- c) Describe sliding window flow control mechanism. 8
2. a) Explain TOKEN RING protocol in LAN. 5
- b) Write down the main differences between baseband LAN and broadband LAN. What do you mean by "10BASEF" in context of LAN? Mention different LAN addresses. 2+2+2
- c) Describe the functions of a LAN Bridge. 5
3. a) With neat sketches show the signals to be transmitted using i) NRZ (Non-return-to zero) and 6
ii) Manchester encoding to transmit the binary data 110111010. Also mention the relative merits and demerits of the two methods.
- b) List different types of unguided transmission medium. Mention the advantages of optical fiber as transmission medium. 2+2
- c) Find the checksum of the following four binary numbers each having 8 bits. The MSBs are on the left hand of each byte. 6
10110011, 10101011, 01011010 and 11010101.
4. a) Explain the functions of presentation layer of ISOOSI and transport layer of TCP/IP architectural model. 5
- b) Explain Alternate technique of routing in circuit switched network. 4
- c) The TCP congestion window is at 24KB and triple duplicate ACK occurs, then what will be the window size and threshold size. Explain what TCP will do to overcome this situation of congestion. 6

[Turn over

5. Write short notes on any two:

8+8

- i) Public switched Telephone Network
- ii) Transmission Impairments
- iii) Congestion control
- iv) LAN topology

Ref No: Ex/EE/5/T/511/2024(S)

BACHELOR OF ENGINEERING (ELECTRICAL ENGINEERING) 5TH YEAR 1ST
SEMESTER SUPPLEMENTARY EXAMINATION, 2024

**SUBJECT: - PRINCIPLES OF COMMUNICATION ENGINEERING &
COMPUTER NETWORKS**

Time: Three hours **Part-II** **Full Marks 100**
(50 marks for each part)✓

Use a separate Answer-Script for each part

Answer Any Three Questions

Two marks reserved for neat and well organized answers

- Q.1a). Differentiate between two categories of communication channels used in analog communication. Describe the main characteristic features of telephone channels using twisted pairs. 08
- Q.1b). Differentiate between baseband and broadband modulation. What is the purpose of modulation in analog communication? What is a stationary random process? 08
- Q.2a). Derive in detail the frequency spectrum of the modulated signal in conventional DSB AM. What are the drawbacks of conventional DSB AM? 08
- Q.2b). Explain the operating principle of ring modulator and prove that this modulator can be employed for generation of DSB-SC AM signals. 08
- Q.3a). What are the merits and demerits of angle modulation? What is instantaneous frequency? Differentiate between phase modulation and frequency modulation. 08
- Q.3b). In digital communication, give a block diagram representation for formatting and transmission of baseband signals. What are messages, characters and symbols in digital communication? 08

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Q.4a). In digital communication, differentiate between uniform and nonuniform quantization. In nonuniform quantization, how are μ -law characteristic and A-law characteristic implemented? 08

Q.4b). In digital communication, how can correlation realization of matched filter be implemented for detection of binary signals in Gaussian noise? 08

Q.5. Write short notes on any **two**: 08+08

- (a) Power law modulators for generation of conventional DSB AM signals.
- (b) Frequency division multiplexing.
- (c) PLL based FM demodulators.