

**BACHELOR OF ENGINEERING (ELECTRICAL ENGINEERING) FIFTH YEAR
FIRST SEMESTER 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.

Two marks are reserved for neat and well organised answer

1. a) Explain the need for detection of error in data transmission system. How checksum is used for detection of error in such system? Mention the drawback of checksum in detecting error. 3+3+2
- b) A channel is required to carry a signal at 32Mbps. The bandwidth of the channel is 4Mhz. What is the required signal-to-noise ratio of the channel in order to achieve this capacity. 4
- c) Explain the functions of transport layer and internet layer of TCP/IP architectural model. 4
2. a) Compare the bus, star and ring LAN networks. 6
- b) Why congestion control is necessary in transmitting information from source to destination? 3
- c) Explain Slow Start and Congestion Avoidance protocol. 7
3. a) Explain circuit switching operation. Mention the limitations of circuit switching network. Give one example of circuit switched network. 3+2+1
- b) With neat sketches show the signals to be transmitted using i) Manchester encoding and ii) Differential Manchester encoding to transmit the binary data 110111010. Also mention the relative merits and demerits of these two methods. 6
- c) Explain the function of local loop in PSTN. 4

[Turn over

4. Write short notes on any two: 8+8
- i) Go-BACK-N Flow control mechanism
 - ii) Wireless Transmission medium for data transmission
 - iii) Transmission impairments
5. Explain CSMA/CD protocol in LAN. What do you understand by baseband LAN and broadband LAN? Discuss the functions of LAN bridge. 7+3+6

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

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No. of Questions	PART II	Marks
	<i>Answer any three questions. TWO marks are reserved for neat and well organized answers.</i>	
1. a)	Describe in detail how can DSB-SC AM signals be generated? Sketch representative magnitude and phase spectra of message signal and modulated signal. How can synchronous demodulation technique be used for demodulation of DSB-SC AM signals?	10
(b)	What is the importance of shot noise and thermal noise in communication systems? Give a detailed description of power spectral density and autocorrelation function of white noise.	06
2. a)	Consider a baseband signal: $m(t) = 5\cos 2000t$ i) Sketch the spectrum of $m(t)$ ii) Sketch the spectrum of the DSB-SC signal, $m(t) \cos 15,000t$ iii) Identify the upper side band (USB) and the lower sideband (LSB) spectra.	08
b)	Prove that a switching modulator can be used to generate a conventional DSB AM signal at its output.	08
3. a)	How can a PM modulator be employed to generate an FM signal? What is the importance of n th order Bessel function in wideband FM modulation?	04+06
b)	How are power efficiency and bandwidth efficiency computed in digital modulation techniques?	06
4. a)	Give a step-by-step description of how can the message TIGER be transmitted, in digital baseband communication, using 6-bit ASCII character coding and 8-ary symbols. Draw the corresponding voltage waveforms.	08
b)	Why a message signal is intentionally oversampled in Delta Modulation? Explain the implementation of a receiver in a Delta Modulation scheme. What is granular noise in DM?	08

Ref No: Ex/EE/5/T/511/2024

No. of Questions	PART II	Marks
5.	Write short notes on <i>any two</i> of the following: a) Matched filters in digital communication. b) AM radio broadcasting. c) Narrowband frequency modulation.	08+08