*Ref No:* **Ex/EE/PC/H/T/413/2024(S)**

**B. E. ELECTRICAL ENGINEERING 4TH YEAR 1ST SEMESTER SUPPLEMENTARY EXAMINATION, 2024**

**SUBJECT: - PRINCIPLES OF COMMUNICATION ENGINEERING & COMPUTER NETWORKS (HONS.)**

**Time: Three hours** **Part-I** **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). Describe the main elements of a communication system. Differentiate between two basic modes of communication. What are autocorrelation function and crosscorrelation function for a stationary random process? 08

Q.1b). How can SSB-AM signals be generated using Hilbert transform? How can upper single sideband AM and lower single sideband AM signals be separately generated? 08

Q.2a). How can a Balanced Modulator be built to generate DSB-SC signals using two Square-Law AM Modulators? 08

Q.2b). Differentiate between direct and indirect methods of generating FM signals. Describe in detail a scheme for generating indirect FM signals. 08

Q.3a). In digital communication, describe in detail different criteria employed for selecting modulation schemes. What is the importance of Gaussian integral in this regard? 08

Q.3b). In digital communication, prove that the signal-to-noise ratio for quantized pulses is a function of the number of the quantization levels. 08

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Q.4a). How can baseband demodulation/detection be carried out in digital communication using the concepts of conditional pdfs and likelihood functions? 08

Q.4b). In spread spectrum modulation, how can a feedback shift register be employed to generate pseudo-noise sequences? Under what condition, a PN sequence is called a maximal-length sequence? 08

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

(a) Envelop detectors for demodulation of conventional DSB AM signals.

(b) AWGN communication channels in digital communication.

(c) Narrowband frequency modulation.

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# B.E. Electrical Engineering Fourth Year First Semester Supplementary Examination 2024

## Principles of Communication Engineering and Computer Networks (HONS)

**Time:** Three Hours **Full Marks:** 100

(50 marks for each part)
Use a separate Answer-Script for each Part

### PART-II

Answer *any three* questions from this part. **Question No. 1 is of 18 Marks.**

1. a) Explain the QoS (Quality of Service), TTL and Flag field of IP Header. 6
   b) Describe sliding window flow control mechanism. 6
   c) Explain slow start and congestion avoidance mechanism for controlling congestion in computer network. 6

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) Explain Manchester and Differential Manchester encoding schemes. 4
   b) List different types of unguided transmission medium. Mention the advantages of optical fiber as transmission medium. 2+2
   c) Generate CRC code for the data word 1010001011 using the polynomial $x^4+x^3+x^2+1$. Show the actual bit stream transmitted. If the fourth bit from the left is inverted during transmission show how this error is detected by the receiver. . 4+1+3

4. a) Explain the functions of physical layer and network layer of TCP/IP architecture model. Name the protocol data unit of TCP and IP layer. 4+2
   b) Explain random technique of routing in packet switched network. 4
   c) Explain virtual circuit service and datagram service in packet switched network. 6

5. Write short notes on any two: 8+8

i) Public switched Telephone Network ii) Transmission Impairments

iii) Connection less Internetworking iv) LAN topology