

**B.E. COMPUTER SCIENCE & ENGINEERING 3RD YEAR 1ST SEMESTER
SUPPLEMENTARY EXAM- 2018**

DIGITAL COMMUNICATION SYSTEM

Time: 3 hours

Full Marks: 100

Answer question 1 and any four questions
All questions carry equal marks

1. Answer any ten 10X2=20
- i. What is topology?
 - ii. What is full-duplex transmission?
 - iii. What is a peer to peer process?
 - iv. What are the advantages of multipoint connection over a point-to-point connection?
 - v. Define digital-to-analog conversion.
 - vi. What is the relationship between period and frequency?
 - vii. What do you mean by the peak amplitude of a signal?
 - viii. What is the spectrum of a signal?
 - ix. Why line coding is required?
 - x. What is the significance of twisting in twisted pair cable?
 - xi. Why pulse code modulation is required?
 - xii. What are the different line coding schemes?
2. a) Why layered architecture is used for networking? Explain the TCP/IP protocol suite?. Discuss the functionalities of physical layer. 2+4+4
- b) Which layer is responsible for hop-to-hop delivery? Explain the main functionalities of this layer. How many levels of addresses are used in TCP/IP? What is the difference between a port address, a logical address and a physical address? 2+4+4
3. a) How composite signals are represented? Explain with example. Explain the process of decomposing a composite signal? If a periodic signal is decomposed into five sine waves with frequencies of 100, 300, 500, 700 and 900Hz. What is the bandwidth? Draw the spectrum, assuming all components have a maximum amplitude of 10V. 2+3+5
- b) What are the different types of impairments usually occur in communication? Explain them. Discuss two theoretical formulas i.e., Nyquist bit rate and shanon capacity to calculate the data rate. 4+6
4. a) What is polar encoding? Describe any two variations of polar encoding. 2+8
- b) What are the main differences between synchronous TDM and statistical TDM? Explain the basic model of PSK implementation. 5+5

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5. a) Why low-pass channel is needed in digital transmission? Explain the bandwidth requirement for binary FSK. Calculate the number of levels and frequencies, the baud rate, and the bandwidth when the carrier frequency is 10 MHz and you want to send 3 bits at a time at a bit rate of 3Mbps. 2+3+5
- b) How does a single bit error differ from a burst error? How to make Hamming code respond to a burst error? Discuss the concept of redundancy in error detection and correction. 2+4+4
6. a) Explain the working procedure of CRC encoder and decoder. Which of the following $g(x)$ values guarantees that a single bit error is caught? In each case, what is the error that cannot be caught? (i) $x+1$ (ii) x^3 (iii) 1. 4+6
- b) What kind of error is undetectable by the checksum? Explain the error detection method of checksum for a list of five 4-bit numbers (9, 10, 2, 0, 4). 2+8
7. a) Describe the services provided by the data link layer. Explain the Stop-and-Wait ARQ protocol with an illustration of the mechanism. 3+7
- b) Why simple parity check code is a single bit error detecting code? How is the simple parity check related to the two-dimensional parity check? Compare and contrast the Go-Back-N ARQ protocol with Selective- Repeat ARQ. 2+2+6