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K – 4288

Reg. No. : .....

Name : .....

**Fourth Semester B.Tech. Degree Examination, September 2020**

**13.404 : DATA COMMUNICATION (FR)**

**(2013 Scheme)**

Time : 3 Hours

Max. Marks : 100

PART – A

Answer **all** questions. Each question carries **4** marks.

1. Define the following characteristics in relation to the simple sine wave model for an analog signal:
  - (i) Amplitude
  - (ii) Frequency
  - (iii) Phase
2. Highlight the differences between circuit switching and packet switching.
3. What is Pulse Amplitude Modulation (PAM)? Specify its role in Pulse Code Modulation(PCM).
4. For the given data bits = 1000000111110000011 and generator polynomial bits 1001010, Find out the CRC code.
5. Mention the benefits of a spread spectrum system. State, how spreading can be achieved?

**(5 × 4 = 20 Marks)**

P.T.O.



PART – B

Answer **any one full** questions from **each** Module. Each question carries **20** marks

**Module – I**

6. With the neat sketch, explain the physical description, applications and transmission characteristics of the following:
- (i) Twisted pair
  - (ii) Coaxial Cable
  - (iii) Terrestrial Microwave
  - (iv) Satellite

OR

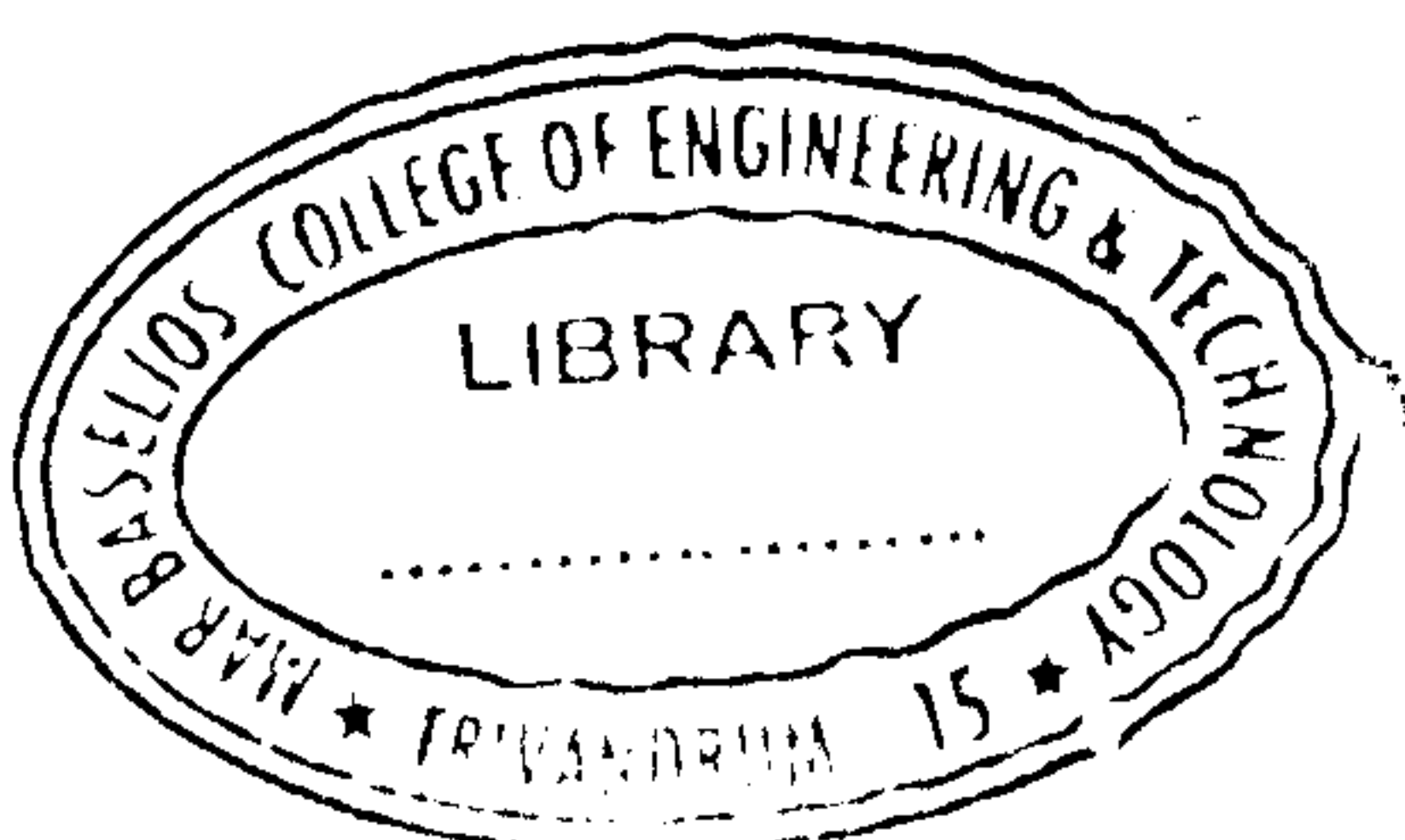
7. (a) Discuss various transmission impairments and how they may affect the information carrying capacity of a communication link. **14**
- (b) Given a channel with an intended capacity of 20 Mbps. The bandwidth of the channel is 3MHz. What Signal-to-Noise Ratio(SNR) is required in order to achieve this capacity? **6**

**Module – II**

8. (a) For the bit stream 100010100 sketch the waveform for Manchester and Differential Manchester coding and also discuss the advantages and disadvantages of these coding schemes. **6**
- (b) Explain about the various types of modulation techniques used in analog to analog signals. **14**

OR

9. (a) With a neat sketch, explain the QPSK transmitter and receiver. Calculate the error probability for QPSK. **14**
- (b) Find the maximum bit rates for an FSK signal if the bandwidth of the medium is 12,000 Hz and the difference between the two carriers is 2000 Hz. Transmission is in full duplex mode. **6**



### Module – III

10. With an example, explain the principle of convolutional coding technique.

OR

11. (a) Define multiplexing. Specify the need for multiplexing in data communication. Also write notes on types of multiplexing. **14**
- (b) Five channels, each with a 100 KHz bandwidth, are to be multiplexed together. What is the minimum bandwidth of the link if there is a need for a guard band of 10 KHz between the channels to prevent interference? **6**

### Module – IV

12. Explain the data Services available in GPRS. Write about the applications for GPRS. State, how is it different from GSM.

OR

13. (a) With a diagram, write about direct sequence spread spectrum in detail. **10**
- (b) Discuss the technology of CDMA. Explain, how is CDMA different from GPRS and GSM? **10**

