

R13**Code No: 114CR****JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech II Year II Semester Examinations, May - 2015****DATA COMMUNICATION****(Information Technology)****Time: 3 Hours****Max. Marks: 75****Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit.

Each question carries 10 marks and may have a, b, c as sub questions.

PART- A**[25 Marks]**

- 1.a) What is a network and data communication network? [2M]
- b) Describe the following terms: Information capacity, bit, bit rate and baud. [3M]
- c) What is multiplexing? What are its types? [2M]
- d) Give the advantages of optical fiber cables. [3M]
- e) What is attenuation distortion and envelope delay distortion? [2M]
- f) Define and describe subscriber loop. [3M]
- g) Give the differences between asynchronous and synchronous data formats. [2M]
- h) What is digital cellular telephone? Give its advantages and disadvantages compared to analog cellular telephone. [3M]
- i) Define voice band data communications modem. [2M]
- j) Explain modem training. [3M]

PART-B**[50 marks]**

- 2.a) Describe the principle of Amplitude shift keying (ASK) and Frequency Shift Keying (FSK) digital modulations. [4M]
- b) Determine the minimum bandwidth, baud and bandwidth efficiency for a bit rate of 9600 bps with 8-QAM and 16-QAM? [6M]

OR

- 3.a) Describe the principle of OSI seven layer international protocol hierarchy with necessary diagram. [6M]
 - b) Determine the highest bit rate possible for a circuit propagating a four-bit binary code with a bandwidth of 10,000 Hz? [4M]
- 4.a) Draw the block diagram of Frequency Division Multiplexing and explain its principle in detail. [6M]
 - b) For a glass ($n = 1.5$)/quartz ($n=1.38$) interface and an angle of incidences of 35° determine the angle of refraction, critical angle, acceptance angle and numerical aperture of the fiber? [4M]

OR

- 5.a) Describe the principle of Statistical Time Division Multiplexing. [6M]
- b) What is Clarke orbit? Give the advantages and disadvantages of geo synchronous satellites. [4M]

6.a) Describe the principle of working of a standard telephone set and mention the basic steps involved. [6M]

b) What is crosstalk? What is the difference between intelligible and unintelligible crosstalk? List and describe three types of cross talks. [4M]

OR

7.a) Describe the basic operation of a cordless telephone with necessary diagram. [6M]

b) What is local subscriber loop? Describe in detail. [4M]

8.a) What is GSM? Give its system architecture and explain its working principle. [4M]

b) Determine BCS for the data polynomial $g(x) = x^7 + x^5 + x^4 + x^2 + x + 1$ and CRC

generating polynomial $p(x) = x^5 + x^4 + x + 1$. [6M]

OR

9.a) Describe the principle of personal communications satellite system and give its advantages and disadvantages. [6M]

b) For a 12 bit data string of 101100010010, determine the number of Hamming bits required, arbitrarily place the Hamming bits into the data string, determine the logic condition of each Hamming bit, assume an arbitrary single bit transmission error, and prove that the Hamming code will successfully detect the error. [4M]

10.a) Draw the simplified block diagram of an asynchronous FSK modem and explain its working principle. [6M]

b) What is probability of error? Describe cable modems. [4M]

OR

11.a) Draw the clock recovery circuit and explain its operation using an appropriate timing diagram. [6M]

b) What are the uses of modem equalizers? Explain. [4M]

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