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10652

Reg. No. :

Name :

**Fourth Semester B.Tech. Degree Examination, February 2016
(2013 Scheme)**

13.404 : DATA COMMUNICATION (FR)

Time : 3 Hours

Max. Marks : 100

PART – A

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

1. What are the advantages and disadvantages of microwave transmission ?
2. Compare and contrast two level PSK and four level PSK.
3. What are the applications where error correcting code is preferable than error detecting code ?
4. Name the main elements of the GPRS system architecture and describe their functions.
5. Discuss the purpose for having hierarchial GSM frame structure with neat sketch.

PART – B

Answer **one full** question from **each** Module.

MODULE – 1

6. a) The attenuation of a signal is -12dB. What is the final signal power if it was originally 4 W ? 5
- b) How does sky propagation differ from line-of-sight propagation ? 5
- c) Write short notes on Twisted pair cable connectors and Co-axial cable connectors. 10

OR

P.T.O.



7. a) A microwave transmitter has an output of 0.1 W at 2 GHz. Assume that this transmitter is used in a microwave communication system where the transmitting and receiving antennas are parabolas, each 1.2 m in diameter. If the receiving antenna is located 24 km from the transmitting antenna over a free space path, find the available signal power out of the receiving antenna in dBm units. 6
- b) Describe the structure of an optical fiber and explain the mechanism of light propagation along the fiber. 6
- c) Write short notes on :
- i) fundamental frequency
 - ii) channel capacity
 - iii) thermal noise
 - iv) signal-to-noise ratio. 8

MODULE – 2

8. a) A low pass signal is sampled with a bandwidth of 300 kHz using 1024 levels of quantization.
- i) Calculate the bit rate of the digitized signal.
 - ii) Calculate the SNR_{dB} for this signal.
 - iii) Calculate the PCM bandwidth of this signal. 9
- b) Compare and contrast synchronous and asynchronous transmission. 6
- c) What are the impacts of transmission impairments on analog and digital signals ? 5

OR

9. a) What is digital modulation ? How is it different from Analog Modulation ? Briefly differentiate between ASK, FSK, PSK. In PSK clearly distinguish between BPSK and QPSK. 10
- b) Given an amplifier with an effective noise temperature of 10000 K and a 10-MHz bandwidth, what thermal noise level, in dBW, may we expect at its output ? 5
- c) Explain the relationship between data rate and bandwidth. 5



MODULE – 3

10. a) Discuss in detail the following :
- i) FEC ii) VRC. **10**
 - b) Calculate the Hamming pairwise distances among the following code words :
i) 00000 ii) 000000 iii) 010101 iv) 101010 v) 110110. **10**
- OR

11. a) i) A bit stream 10011101 is transmitted using the standard CRC method. The generator polynomial is $x^3 + 1$. Show the actual bit string transmitted.
- ii) Suppose for the above problem, the third bit from the left is inverted during transmission. Show that this error is detected at the receiver's end. **10**
- b) Illustrate various multiplexing techniques with appropriate examples. **10**

MODULE – 4

12. a) What is circuit switching ? Discuss how packet switching is better than circuit switching for computer to computer communication. **10**
- b) State the main elements of WiMax network architecture and their functionality. **10**
- OR

13. a) Consider a CDMA system in which users A and B have the Walsh codes $(-1\ 1\ -1\ 1\ -1\ 1\ -1\ 1)$ and $(-1\ -1\ 1\ 1\ -1\ -1\ 1\ 1)$ respectively.
- i) Show the output at the receiver if A transmits a data bit 1 and B transmits a data bit 1. Assume the received power from B is twice the received power from A. **6**
 - ii) Show the output at the receiver if A transmits a data bit 0 and B transmits a data bit 1. Assume the received power from B is twice the received power from A.
- b) Briefly explain DSSS technique with neat block diagram. **10**
- c) What are the difficulties associated with wireless communication ? **4**
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