5E 5103

B. Tech. V Semester (Main/Back) Examination, Dec., 2014
COMPUTER SCIENCE & ENGINEERING 5CS3A

TELECOMMUNICATION FUNDAMENTALS

Time: 3 Hours   Min. Passing Marks: 24   Maximum Marks: 80

Instruction to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)

Unit-'I'

1. (a) Draw the following reference models used in computer communication.
   (i) OSI/ISO Model
   (ii) TCP/IP Model
   Also give the key difference in both above models [3+3+2]

   (b) Suppose a spectrum of a channel is between 3 MHz and 4 MHz and signal to noise ratio is 24 dB, computer how many signaling levels are required to achieve the reachable data rates. Also calculate the channel capacity. [3]

   (c) What are various transmission impairments? Explain in brief. [5]

   OR

1. (a) Explain the working of Stop-and-Wait protocol with the help of suitable diagrams. [8]
   (b) Distinguish between Synchronous and Asynchronous communication systems. [5]
   (c) Sketch the waveforms for each of the following code for the bit sequence 11001101
   (i) Manchester coding
   (ii) Bipolar NRZ
   (iii) Unipolar RZ

Unit-'II'

2. (a) Consider a (7, 4) block code generated by [7]

$$G = \begin{bmatrix} 1 & 0 & 0 & 0 & : & 1 & 1 & 1 \\ 0 & 1 & 0 & 0 & : & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 & : & 1 & 0 & 1 \\ 0 & 0 & 0 & 1 & : & 0 & 1 & 1 \end{bmatrix}$$

   (b) Explain frame structure of HDLC Protocol and compare with PPP. [7]
   (c) Give the functions of Media Access Control Sublayers. [2]

   OR

2. (a) Generate the hamming codeword for ASCII character 'S' = 1010101. Assume odd parity for the Hamming code. [7]
   (b) Explain Pure ALOHA and Slotted ALOHA. Give relationship in terms of their throughout. [7]
   (c) Give the applications of CSMA/CD. [2]

Unit-'III'

3. (a) What are the various effects of Hidden node and Exposed node problem in communication? [4]
   (b) How can Virtual LANs be more efficient than normal LAN? Explain in detail using suitable diagram. [7]
   (c) Explain Transparent and Learning Bridge. [5]

   OR

3. (a) Draw and Explain 802.11 architecture and protocol stack. [8]
   (b) Explain Protocol stack for Bluetooth Architecture. [8]

Unit-'IV'

4. (a) Why do we require switching in communication? Explain Signal stage and Multistage switches [6]
   (b) Design a 3 stage 200×200 switch (N=200) with k = 4 and n = 20. Also compare number of cross points with single stage switch. [4]
   (c) Draw and explain TDMA frame structure and burst structure. [6]

   OR

4. (a) Describe ADSL and slip rate in terrestrial network. [8]
   (b) If a normal GSM time slot consists of 6 trailing bits, 8.25 guard bits, 26 training bits and 2 traffic burst of 58 bits of data, find the frame efficiency. [6]
   (c) Draw Analog Hierarchy of FDM. [2]

Unit-'V'

5. (a) Find the processing gain of the system when data rate is 7.8 Kbps and the spread rate or chip rate is 9.6 Mbps. (Use BPSK technique for modulation). [4]
   (b) Discuss the concept of Spread spectrum used in communication and explain the working of DSSS transmitter and receiver using the suitable block diagram. [6]
   (c) Explain Forward and Reverse CDMA in detail. [6]

   OR

5. (a) Write short notes on any three: [3×3=9]
   (i) M-sequence
   (ii) Hand-Off Process
   (iii) Gold Sequence
   (iv) IMT-2000
   (b) Explain the direct sequence and frequency spread spectrum with their performance measurement. [4]
   (c) Explain the generation of PN sequence. [3]