5E5103

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B. Tech. V Sem. (Main / Back) Exam., Dec. 2014
Computer Science & Engineering
5CS3A Telecommunication Fundamentals
Common with CS IT

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

Instructions 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.

Use of following supporting material is permitted during examination.

(Mentioned in form No. 205)

1. NIL_____   2. NIL_____

UNIT – I

Q. 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, compute 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

(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   rtuonline.com [3]

    (i) Manchester coding

    (ii) Bipolar NRZ

    (iii) Unipolar RZ

UNIT – II

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

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

Find out the error vector in data word 0010000.

(b) Explain frame structure of HDLC Protocol and compare with PPP. [7]

(c) Give the functions of Media Access Control Sublayers. [2]

OR

(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 throughput. [7]

(c) Give the applications of CSMA/CD. [2]

UNIT – III

Q. 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

(a) Draw and Explain 802.11 architecture & protocol stack. [8]

(b) Explain Protocol stack for Bluetooth Architecture. [8]

UNIT – IV

Q. 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

(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 bursts of 58 bits of data, find the frame efficiency. [6]

(c) Draw Analog Hierarchy of FDM. [2]

UNIT – V

Q. 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

(a) Write short notes on any three- [3x3=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]

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