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B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015
Computer Science & Engineering
5CS3A Telecommunication Fundamentals
Common with IT

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks Main: 26

Min. Passing Marks Back: 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.

1. NIL

2. NIL

UNIT-I

- Q.1 (a) Explain the layered architecture of OSI Model. What is the significance of OSI model? What is the significance of XDR (External Data Representation) at presentation layer? [10]
- (b) Calculate the channel capacity of a telephone line having bandwidth 3000Hz in following cases -
- (i) SNR=3162 [3]
- (ii) Noise is so strong that the signal is faint means SNR is almost zero. [3]

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OR

- Q.1 (a) The loss in a cable is usually defined in decibels per kilometer. If the signal at the beginning of a cable with -0.3db/km has a power of 2mW , what is the power of the signal at 5km ? [4]
- (b) A digital signal has eight levels. How many bits are needed per level? [2]
- (c) Explain NRZ-L, NRZ-I and RZ line encoding. [6]
- (d) Assume that, in a stop and wait ARQ system, the bandwidth of the line is 1Mbps , and 1 bit takes 20ms to make a round trip. What is the bandwidth delay product? [4]
- If the system data frames are 1000 bits in length, what is the utilization percentage of the link? [4]

UNIT-II

- Q.2 (a) (i) Find the Hamming distance between two binary pattern 10101 and 11110. [2]
- (ii) Can the value of a checksum be all 0s (in binary)? Defend your answer. Can the value be all 1s (in binary)? Defend your answer. [4]
- (iii) How is the simple parity check related to the two-dimensional parity check? [4]
- (b) Explain the frame structure of point to point protocol. What is difference between HDLC and PPP? [6]

OR

- Q.2 (a) A pure ALOHA network transmits 200 bit frames on a shared channel of 200 kbps. What is the throughput if the system (all station together) produces 1000 frame per second? [8]
- (b) What is vulnerable time in case of pure and slotted ALOHA? How we can determine the underload and overload situation for channel in pure and slotted ALOHA. [8]

UNIT-III

- Q.3 (a) What is Hidden node and Exposed node problems? Explain with example. [8]
- (b) Explain piconet and scatternet in Bluetooth. [8]

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OR

- Q.3 (a) What is looping problem in switching? Explain spanning Tree protocol in detail. [8]
- (b) Explain Virtual LANs. How we can configure VLAN in switch? [8]

UNIT-IV

- Q.4 (a) Explain TDMA superframe structure? Are collisions possible in TDMA and FDMA? Justify. [8]
- (b) We need a three-stage space division switch with $N=120$. We use 10 crossbars at the first and third stages and 4 crossbars at the middle stages. Calculate the total no. of cross points. [8]

OR

- Q.4 (a) What is the goal of Multiplexing? Four channels, two with a bit rate of 300 kbps and two with a bit rate of 250 kbps, are to be multiplexed using multiple slot TDM with no synchronization bit. What is the size of a frame in bits and what is the data rate? [8]
- (b) Explain ADSL, DS 1 and DS 3 carriers. [8]

UNIT-V

- Q.5 (a) What is difference between multiplexing and spread spectrum? Explain FHSS. [8]
- (b) An FHSS system uses a 5-bit PN sequence. If the bit rate of the PN is 64 bits per second, answer the following - [4]
- (i) What is the total number of possible hops? [4]
- (ii) What is the time needed to finish a complete cycle of PN? [4]

OR

- Q.5 (a) Explain CDMA with help of example. [8]
- (b) Write short note on following - [4]
- (i) Walsh codes [4]
- (ii) Hand off [4]

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