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M.Tech I Semester Supplementary Examinations August/September 2018

ADVANCED DATA COMMUNICATIONS

(Digital Systems & Computer Electronics)

(For students admitted in 2013, 2014, 2015 & 2016 only)

Time: 3 hours Max. Marks: 60

Answer any FIVE questions

All questions carry equal marks

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1 (a) With neat diagram, explain the following modulation schemes: (i) PSK. (ii) QAM.

(b) Find out the minimum bandwidth, baud and bandwidth efficiency for the following bit rates and modulation schemes are 8-QAM and 16-QAM.

(i) f_b = 2400 bps. (ii) f_b = 4800 bps. (iii) f_b = 9600 bps.

2 (a) In home two computers are connected by an Ethernet hub. In this a LAN or a WAN? Explain the reason.

(b) Assume 8 devices are arranged in a mesh topology. How many cables are needed? How many parts are needed for each device?

3 (a) Performance is inversely related to delay. When we use the internet, which of the following are more sensitive to delay: (i) Sending an e-mail. (ii) Copying a file. (iii) Surfing the internet. Explain in detail.

(b) How many point-to-point WAN's are needed to connect 'n' LAN's, if each LAN should be able to directly communicate with any other LAN.

4 The parity check bit of (8, 4) block code are generated by $C_5 = d_1 + d_2 + d_4$, $C_6 = d_1 + d_2 + d_3$, $C_7 = d_1 + d_3 + d_4$, & $C_8 = d_2 + d_3 + d_4$, where d_1, d_2, d_3 and d_4 are message bits. Find: (i) G and H. (ii) Minimum weight of code. (iii) Error detecting capacity. (iv) Show that through 2 examples that the code can detect and correct errors.

5 (a) Compare and contract byte-stuffing and bit stuffing.

(b) Assume the only computer in the residence user PPP to communicate with the ISP. If the user sends 10 network-layer packets to ISP, how many frames are exchanged in each of the following cases: (i) Using no authentication. (ii) Using PAP for authentication. (iii) Using CHAP for authentication.

6 (a) Consider a space division switch with 100 inputs and outputs. What is the total number of cross points in each of the following cases: (i) Using a single crossbar. (ii) Using a multi-stage switch based on the Clos criteria.

(b) Consider nXk crossbar switch with 'n' inputs and 'k' outputs.

(i) Can we say that the switch acts as a multiplexer if n>k?

(ii) Can we say that the switch acts as a demultiplexer if n<k? Give reason.

7 We have defined the parameter 'a' as the number of frames that can fit the medium between two stations, or $a = (T_p)/(T_{fr})$. Another way to define the parameter is $a = L_b/F_b$, in which L_b in the bit length of the medium and F_b is the frame length of the medium. Show that two definitions are equivalent.

8 Alice and Bob are experimenting with CSMA using a W_2 Walsh table. Alice use the code (+1, -1) and Bob user the code (+1, -1). Assume that they simultaneously send a hexadecimal digit to each other. Alice sends $(6)_{16}$ and Bob sends $(B)_{16}$. Show how they can detect what are other person has sent.

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