# 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 <br> All questions carry equal marks

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.

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 $a=\left(T_{p}\right) /\left(T_{f r}\right)$. 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.

