

Code: 9D06104

M.Tech I Semester Supplementary Examinations February/March 2018

ADVANCED DATA COMMUNICATIONS

(Digital Systems & Computer Electronics)

(For students admitted in 2012, 2013, 2014, 2015 & 2016 only)

Time: 3 hours

Max. Marks: 60

Answer any FIVE questions
All questions carry equal marks

- 1 (a) Illustrate the amplitude shift keying and frequency shift keying.
(b) Determine the minimum bandwidth, baud and bandwidth efficiency for the following bit rates and modulation schemes BPSK and QPSK: (i) $f_b = 2400$ bps. (ii) $f_b = 4800$ bps. (iii) $f_b = 9600$ bps.
- 2 (a) For each of the following 4 networks, discuss the consequence if a connection fails
(i) Seven devices arranged in a mesh topology.
(ii) Seven devices arranged in a star topology.
(iii) Seven devices arranged in a bus topology.
(iv) Seven devices arranged in a ring topology.
(b) What is the maximum number of characters or symbols that can be represented by Unicode?
- 3 (a) Distinguish between telephone network and internet? What are the similarities? What are the differences?
(b) When a party makes a local telephone call to another party, is this point-to-point or multipoint connection? Discuss in detail.
- 4 For a (7, 4) cyclic code with received vector is 0100110, with generator polynomial $g(x) = 1 + x + x^3$. Draw the syndrome computation circuit and detect and correct the error if any.
- 5 (a) Byte-stuff the following frame payload in which 'E' is the escape byte, 'F' is the flag byte and 'D' is a data byte other than an escape or a flag character.
DEDEDEDEFDFD
(b) Assume PPP is in the authentication phase, show payload exchanged between the nodes if PPP is using: (i) PAP. (ii) CHAP.
- 6 (a) In a network, datagram and virtual-circuit need a routing or switching table to find the output port from which the information belonging to a destination should be sent out, but a circuit switched network has no-need for such table. Give the reason for this difference.
(b) What is the role of the address field in a packet travelling through a virtual-circuit network?
- 7 In a bus 1-persistence CSMA/CD with $T_p = 50 \mu s$ and $T_{fr} = 120 \mu s$, there are 2 stations, A & B. Both stations start sending frames to reach other at the same time. Since the frames collide, each station tries to retransmit. Station A comes out with $R = 0$ and station B with $R = 1$. Ignore any other delay including the delay for sending jamming signals. Do the frames collide again? Draw a time line diagram to prove your claim. Does the generation of a random number help avoid collision in this case?
- 8 (a) There are only 3 active stations in a slotted ALOHA network A, B and C. Each station generates a frame in a time slot with the corresponding probabilities $\rho_A = 0.2$, $\rho_B = 0.3$ and $\rho_C = 0.4$ respectively.
(i) What is the throughput of each station?
(ii) What is the throughput of N/W.
(b) Check to see the following set of chips can belonging to an orthogonal systems:

$[+1, +1, +1, +1], [+1, -1, -1, +1], [-1, +1, +1, -1], [+1, -1, -1, +1]$