

BACHELOR OF COMPUTER SCIENCE. & ENGINEERING EXAMINATION, 2012

3rd year, 2nd Semester(Supplementary)

COMPUTER NETWORKS

Time: 3 hours

Full Marks: 100

Answer any FIVE questions.

(Parts of a question must be answered together)

1. a) Explain with actual routing table examples:
 - (i) Datagram subnet.
 - (ii) Virtual Circuit subnet.
- b) Compare UDP and TCP protocols.
- c) Consider building a CSMA/ CD network running at 1 Gbps over a 1 Km cable with no repeaters. Signal speed in the cable is 200,000 Kms/ sec. What should be the minimum frame size? Explain your answer briefly. [(5+5)+5+5]
2. a) What is the maximum throughput that can be expected from:
 - (i) Pure ALOHA
 - (ii) Slotted ALOHA
 Give formal explanations for your answers.
- b) A bit stream '10011101' is transmitted using the standard CRC method. The generator polynomial is $x^3 + 1$. Find the actual bit string transmitted; suppose the third bit from left is inverted during transmission. Will this error be detected at the receiver? Explain briefly. [(6+6)+(6+2)]
3. a) What is the 'Count to Infinity' problem in the context of Distance Vector routing? Explain briefly.
- b) 'Flooding' algorithms always attempt to reduce/ eliminate broadcast of duplicate and/ or obsolete packets. Name two techniques for doing this and explain briefly.
- c) List steps needed in Link State routing and suggest possible ways for their implementation.
- d) Explain Reverse Path Forwarding technique. Does it differ from the Sink Tree method? If so, how? [5+5+5+5]
4. a) Give the formal algorithm for Selective Repeat Sliding Window protocol. Explain its working briefly.
- b) How many timers are needed in an efficient implementation of the Go Back N Sliding Window protocol? Can you suggest any method for their efficient realization? Explain briefly.

- c) Data Link protocols almost always put the CRC in a 'trailer' rather than in a 'header' – why? [(7+3)+(3+4)+3]

5. a) Explain working of the following devices briefly and name the Network Layers where they are normally used.

- (i) Hub.
- (ii) Switch.
- (iii) Router.
- (iv) Bridge.

- b) A router is generating IPv4 packets each having a total length (data plus header) of 1024 bytes. Assuming that each packet has a 'time to live' of 10 seconds, what is the maximum line speed (in bits/ sec) that the router can operate at without danger of cycling through the IP datagram 'identification field'? Explain your answer briefly.

[(4+4+4+4)+4]

6. a) Give the different 'Classful' address formats as used in IPv4 and explain briefly.

- b) In an IPv4 packet:

- (i) The first eight bits are (01000010....); the packet is discarded at the receiver. Why?
- (ii) The first few hexadecimal digits are (45000028000100000102....); how many hops can this packet travel before being dropped?

- c) Suppose a class B IPv4 address is modified to a new class Q address with 20 bit 'network number'. How many class Q networks can there be? How many hosts can each class Q network have? [8+(4+4)+(2+2)]

7. Write short notes on any four:

- (i) PCF & DCF in 802.3 network.
- (ii) Variable/ constant data rate connection oriented service using WDMA.
- (iii) Finite State machine model for the 'PAR' data link protocol.
- (iv) Contention free/ Limited Contention routing in CSMA.
- (v) Dijkstra's Shortest Path routing.
- (vi) CIDR
- (vii) Exposed/ Hidden Station problem.

[5+5+5+5]