MARCH 2010

ALCCS

Code: CS32 **Subject: COMPUTER NETWORKS**
Time: 3 Hours **Max. Marks: 100**

NOTE:

- **Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.**
- **Parts of a question should be answered at the same place.**

Q.1 a. Differentiate among circuit switching, packet switching and message switching

b. Differentiate between error detection and forward error correction approaches based on the appropriate conditions (situations) used.

c. Compute the signal to noise ratio in dB of a link with channel capacity 80 Mbps and bandwidth of 8 Mhz.

d. Differentiate between *1-persistent* CSMA and *p-persistent* CSMA protocols.

e. Does pure ALOHA have less delay than slotted ALOHA at low load? Discuss.

f. For hierarchical routing with 4800 IMPs, what region and cluster size should be chosen to minimize the size of routing table for three layer hierarchy?

g. Datagram fragmentation and reassembly is handled by IP, and is invisible to TCP. Does this mean that TCP does not have to worry about data arriving to it? **(7 × 4)**

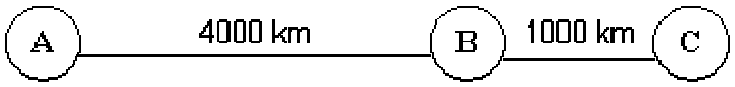
Q.2 a. Derive the efficiency of Go-Back-N ARQ with error when window size is W_s and P_f is probability of a frame received with error.

b. A bit stream 10011101 is transmitted using standard CRC method. The generator polynomial is $x^3 + 1$. Show that the actual bit string are

transmitted. Suppose that the third bit from the left is inverted during transmission. Show that this error is detected at the receiver's end.

c. Using Differential Manchester encoding scheme, draw the time vs. amplitude graphs for the bit stream 0101101001.
(6+6+6)

Q.3 a. In the following figure, frames are generated at node A and sent to node C through node B. Determine minimum transmission rate required between nodes B and C so that buffers of node B are not flooded given that the data rate between A and B is 100 kbps, propagation delay for both lines is 5 μs/km, lines are full duplex, data frames are 1000 bits long, ACK frames are of negligible length, between A and B sliding window protocol with windows size 3 is used, between B and C stop-and wait is used, and there is no error in transmission.



b. A channel of one Mbps with propagation delay of 270 ms transmits frames of size 1000 bits. What is the maximum link utilization for stop-and-wait, and sliding window with window size 7?

c. Explain the Checksum method for error detection with the help of an example. **(6+6+6)**

Q.4 a. Discuss ATM networks in brief.

b. What happens in a token ring if a station accepts the token and then crashes immediately? How does IEEE 802.5 handle it?

c. Give the format of Token Ethernet frame and explain the meaning of each field in the frame. **(6+6+6)**

Q.5 a. Describe Dijkstra shortest path algorithm. Also show working of Dijkstra algorithm with the help of an example.

b. How does link state routing take care of the problem of wrapping of sequence numbers, crashing of routers and corruption of sequence number?

c. What is the purpose of *fragment offset* and *time to live* field in IP diagram? Explain **(6+6+6)**

Q.6 a. Explain three-way handshake process of setting up or closing of a connection in TCP.

b. What is the purpose of following fields in TCP segment header?
(i) Urgent pointer
(ii) six 1-bit flags
(iii) window size

c. Differentiate between UDP and TCP protocols. **(6+6+6)**

Q.7 a. Explain RSA algorithm. Using RSA public key cryptosystem find *e* for p = 5, q=13, and d = 11

b. Describe symmetric and asymmetic key cryptography.

c. Write a short note on one of the following:
(i) Modulation and Encoding
(ii) Email
(iii) Telnet **(6+6+6)**