

ALCCS – OLD SCHEME

Time: 3 Hours

AUGUST 2013

Max. Marks: 100

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

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**
- What is the principal difference between synchronous and asynchronous communication?
 - Construct a Huffman tree for the following characters with their frequency given in brackets: e(9), f(5), d(16), c(12), a(45), b(13)
 - Packets arrive at a transmission line every 5 seconds with the first packet arriving at time 0. The capacity of transmission line is 9kbps. Length of each packet is 1500 bytes. Propagation delay is 0.5 seconds. If the packets arrive at a regular interval, compute the time a packet spends in the system.
 - Differentiate between *Pure* ALOHA and *slotted* ALOHA protocol.
 - What are the reasons for Ethernet frame having a minimum size?
 - Compute the bit rate of a modem that uses QAM with 4 amplitudes and 16 phases. Modem transmits signal at 1200 baud/second.
 - Differentiate between a bridge and a router. (7×4)
- Q.2**
- In a digital system with 8 input links are multiplexed using STDM. Each input source is creating 1024 bits per second. Each frame contains 8 bits from each source and adds 1 bit as a framing bit. Compute the number of frame transmitted per second and the data capacity of the link. (6)
 - Compute the CRC for a 10-bit sequence 1010011110 and a divisor of 1011. (6)
 - Explain what is B8ZS encoding? Draw the time vs. amplitude graphs for the stream 100100000010001 using the B8ZS Bipolar encoding scheme. (6)

Code: CS32**Subject: COMPUTER NETWORKS**

- Q.3** a. Communication line capable of transmitting at a rate of 50 Kbps will be used to accommodate 10 sessions each generating Poisson traffic at a rate 150 packets/minute. Packet lengths are exponentially distributed with mean 1000 bits. For each session find the average number of packets in the queue, average number of packets in the system and average delay per packet when line is allocated to the sessions by using 10 equal-capacity time-division multiplexed channels. (6)
- b. Differentiate between Go-Back-n and Selective-Rject protocols. Show the sequence numbers for 20 packets in which they are transmitted using Selective-Rject, if packet 5 is damaged and acknowledgement for packet 12 is lost. Assume that the sliding window size is 7 and acknowledge for ever packet is sent. (6)
- c. Give the header format of ATM Cell. Also explain the semantics of each field in the header. (6)
- Q.4** a. Give the format of token ring and explain the meaning of each field in the frame. (6)
- b. What happens in a token bus if a station accepts the token and then crashes immediately? How does IEEE 802.4 handles it? (6)
- c. Using RSA public key cryptosystem with $a=1$, $b = 2$, $c=3$, etc.
 (i) If $p = 7$ and $q = 11$, list five legal values for d
 (ii) If $p = 13$, and $q = 31$, and $d = 7$, find e
 (iii) Using $p = 5$, $q = 11$ and $d = 27$, find e and encrypt "abcdefghij" (6)
- Q.5** a. Describe Dijkstra shortest path algorithm. Also show working of Dijkstra algorithm with the help of an example. (6)
- b. A router has the following (CIDR) entries in its routing table
- | Address/Mask | Next Hop |
|----------------|-------------|
| 135.46.56.0/22 | interface 0 |
| 135.46.60.0/22 | interface 1 |
| 192.53.40.0/23 | Router 1 |
| Default | Router 2 |
- or each of the following IP addresses, what does the router do if a packet with that address arrives?
- (i) 135.46.63.10
 (ii) 135.46.57.14
 (iii) 135.46.52.2
 (iv) 192.53.40.7
 (v) 192.53.56.7 (6)
- c. Differentiate between bridge and a repeater. (6)
- Q.6** a. In case a two-way handshake is used rather than three-way handshake for setting up a connection can deadlock occur? Justify your answer. (6)

- b. Describe DES algorithm used for encryption. (6)
- c. The session layer has four data stream. Could any of them be removed without any loss of functionality? If so, how? If not, why? (6)
- Q.7**
- a. Using MIT public key cryptosystem with $a = 1$, $b = 2$, $c = 3$, etc. find e and encrypt the string “abcdefghij” for $p = 5$, $q = 11$ and $d = 27$. (6)
- b. Derive the formula for M/M/1 queue to compute Average number of customers in the system, and Average waiting time in the system. (6)
- c. Write a short note on ONE of the following:
- (i) Wireless LAN
 - (ii) X.25 Network
 - (iii) Frame Relay (6)