

ALCCS - NEW 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.**

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- Q.1**
- Differentiate among circuit switching, packet switching and message switching.
 - Compute the bit rate for a 12000 basic baud using 32-QAM signal.
 - Compute the signal to noise ratio in dB of a link with channel capacity 80 Mbps and bandwidth of 8 MHz.
 - Differentiate between *1-persistent* CSMA and *P-persistent* CSMA protocols.
 - Describe about Nyquist theorem.
 - What is flooding? How to reduce resource consumption in the network?
 - Using RSA public key cryptosystem with $a = 1$, $b = 2$, etc., if $p = 13$ and $q = 31$ and $d = 7$, find e . (7 × 4)
- Q.2**
- Using Differential Manchester encoding scheme, draw the time vs. amplitude graphs for the bit stream 0101101001. (6)
 - 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 frames transmitted per second, and the data capacity of the link. (6)
 - If binary signal is sent over a 3-kHz channel whose signal-to-noise ratio is 20 dB. What is the maximum achievable data rate? (6)
- Q.3**
- An FM radio transmission bandwidth is 20MHz with frequency ranging from 88MHz to 108MHz. An FM musical channel requires a bandwidth of 50KHz only. It introduces a guard band of 5KHz between the channels. Compute the maximum number of FM music channels that are possible. (6)

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- b. A channel has a bit rate of 4 kbs and a propagation delay of 20 milliseconds. For what range of frame size does stop-and-wait give an efficiency of at least 50 percent? (6)
- c. Compute the CRC for a 8-bit sequence 10100001 and a divisor of $x^3 + 1$. (6)
- Q.4** a. Describe the design issues for the layers. Also give the diagram for TCP/IP model with protocols and layers. (6)
- b. Why is slot reservation needed in DQDB? Describe the slot reservation method used in DQDB. (6)
- c. Give the format of Token Ethernet frame and explain the meaning of each field in the frame. (6)
- Q.5** a. Differentiate between adaptive and non- adaptive routing algorithms. (6)
- b. How does link state routing take care of the problem of wrapping of sequence numbers, crashing of routers and corruption of sequence number? (6)
- c. What is the purpose of *fragment offset* and *time to live* field in IP diagram? Explain. (6)
- Q.6** a. Why does UDP exist? Would it not have been enough to just let user processes send raw IP packets? Justify answer. (6)
- b. What is the purpose of following fields in TCP segment header?
(i) Urgent pointer
(ii) Six 1-bit flags
(iii) Window size (6)
- c. A TCP machine is sending windows of 65535 bytes over a 1-Gbps channel that has a 10-milisecond one-way delay. What is the maximum throughput achievable? What is the line efficiency? (6)
- Q.7** a. Write the DES algorithm for data encryption. (6)
- b. Decipher the following monoalphabetic cipher. (*Note: the space as it is*)
“VRGR PBHEFR VF TBBQ” (6)
- c. Write a short note on one of the following:
(i) Modulation and Encoding
(ii) Queuing Theory
(iii) Telnet (6)