

ALCCS

Time: 3 Hours

JUNE 2016

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**
- Explain the evolutions and services of network architecture.
 - Explain the role of Polynomial Codes in error correction and detection.
 - Compare Go-Back-N ARQ and Selective Repeat ARQ protocols.
 - Mention the basic functions of transparent bridge used in LANs.
 - Explain Weighted Fair Queueing in traffic management at packet level.
 - Draw the format of TCP segment and label the fields with respective size.
 - Explain the role of checksums and hashes in cryptographic algorithms. **(7 × 4)**
- Q.2**
- Explain TCP/IP architecture. **(6)**
 - Explain the frequency domain and time domain characteristics of communication channel. **(6)**
 - Suppose we take the (7,4) Hamming code and obtain an (8,4) code by adding an overall parity check bit.
 - Find the H matrix for this code.
 - What is the minimum distance?
 - Does the extra check bit increase the error-correction capability? **(6)**
- Q.3**
- Explain the connection-oriented transfer service and connectionless transfer service in peer-to-peer protocols. Give an illustration for each. **(4+4)**
 - Define Nyquist signalling rate and Shannon's channel capacity. **(4)**
 - Explain the following for HDLC protocol: **(6)**
 - HDLC Transfer Modes
 - HDLC Frame Format

- Q.4** a. A telephone modem is used to connect a personal computer to a host computer. The speed of the modem is 56 kbps and the one-way propagation delay is 100 ms.
(i) Find the efficiency for Stop-and-Wait ARQ if the frame size is 256 bytes. Assume a bit error rate of 10^{-4} .
(ii) Find the efficiency of Go-Back-N if three-bit sequence numbering is used with frame sizes of 256 bytes. Assume a bit error rate of 10^{-4} . (6)
- b. Compare the scheduling approaches in MAC protocols. (6)
- c. Explain Distributed Coordination Function (DCF) and Point Coordination Function (PCF) in IEEE 802.11 standards. (6)
- Q.5** a. Explain the working mechanism of virtual-circuit packet switching. Mention the delay issues in virtual-circuit packet switching. (3+2)
- b. Explain the traffic management in open-loop control and closed-loop control for packet-switched networks. (8)
- c. Compare link state routing and distance vector routing methods in packet networks. (5)
- Q.6** a. Derive the following terms for M/M/1 queues, with Poisson arrival process with rate λ and exponential service time with mean service rate μ with one server
(i) Average queue length
(ii) Average Waiting time
(iii) Little's Formula (6)
- b. Explain Discrete Time Markov Chain. (6)
- c. Compare address resolution and reverse address resolution used in TCP/IP. (6)
- Q.7** a. Explain RSA algorithm and give its analysis. (6)
- b. Compare symmetric-key cryptography and asymmetric-key cryptography. (6)
- c. Draw the architecture of SMTP. (6)