BE Part IV 7th Semester Final Examination, 2007
Computer Networks and Distributed Systems
CST-704

Full Marks: 100 **Time: 3 hours**

Answer any three questions from each half.
Two marks in each half are reserved for clarity of answers.

First Half

Q1. What is a protocol stack? [2]
Describe briefly the role of different layers OSI reference model. [5]
What are the three different components of Round Trip Time (RTT)? [3]
Give the NRZ-I and differential Manchester encoding of 01001110. [3]
Explain why 4B/5B encoding scheme is used. [3]

Q2. Describe the relationship between bit rate and baud rate in 16 QAM. [2]
What is the problem of framing using byte-counting approach? [1]
Write the modified algorithm for bit stuffing, for both at the sender and the receiver, when the beginning and end sequence is 10000001. [5]
Write down the sliding window algorithm for both sender and receiver for reliable transmission (use diagrams for explanation). [4+4]

Q3. Prove that for slotted ALOHA the vulnerable period is equal to one frame transmission time. [2]
Derive the expression for channel efficiency in i) bit-map protocol ii) binary countdown protocol. [4]
What do you understand by connection hand-off in GSM? [2]
Describe when slotted aloha is used in GSM protocol. [3]
"In CDMA, all chip sequences are pairwise orthogonal" – comment. [3]
Differentiate between HLR and VLR in GSM protocol. [2]

Q4. Describe how learning takes place in a learning bridge. [4]
What do the four address fields in 802.11 frame signify when both toDS and fromDS bits are set? [4]
Write down the steps required, in protocol independent multicast, to create a) source specific tree, b) shared tree. [4+4]

Q5. When is an ARPQuery generated? [2]
What are the actions taken by the different hosts (including the target host) in the network after seeing the ARPQuery packet? [5]
What is proxy ARP? Describe its role in Mobile IP. [4]
What is the difference of token bucket and leaky bucket algorithm for traffic shaping? [3]
What is jitter? [2]

Second Half

Q6. Explain briefly the working principle of NAT. [3]
What is a resource record in DNS? [2]
Describe the different components of a resource record in detail. [4]
Can you enumerate all the ensuing steps when a DNS query is generated? [7]

Q7. Design an authentication mechanism using public key cryptosystem. [4]
Describe the algorithm for key generation in RSA. [4]
Explain the trusted third party (Kerberos) authentication protocol and also explain how both client and server are authenticated to each other. [5]
Describe the problem of Public Key distribution. [3]

Q8. What is a CRL (Certificate Revocation List)? [2]
CRL is digitally signed, who signs it and why? [2]
What are the different steps for each transaction in an ATM (Automated Teller Machine)? [6]
What is the difference between an offline and online ATM? [2]
Describe clearly how active ftp fails across a firewall. [4]

Q9. How can you construct a compound data type using ASN.1 Basic Encoding Rules [3]
What is the object identification scheme in ASN.1? [4]
What is MIB? [3]
Describe the steps used in SNMP to retrieve information from a server. [4]
How is GET-NEXT different from GET in SNMP? [2]

Q10. Define distributed systems. [4]
What are the different challenges for the design of a distributed system? [4]
What are i) access transparency ii) replication transparency iii) network transparency and iv) failure transparency? [4]
Describe the different invocation semantics when the remote procedures are invoked. [4]