Total No. of Questions : 5] [Total No. of Printed Pages : 4

Roll No. .....

MCA–305(N)

M. C. A. (Third Semester) EXAMINATION, June, 2008

(New Course)

COMPUTER NETWORKS

[MCA – 305(N)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : Attempt all questions by attempting any *two* parts from each question. All questions carry equal marks.

1. (a) Differentiate between the following : 3, 4, 3

   (i) Frequency, Amplitude and Phase modulation.

   (ii) Pube amplitude and Pulse code modulation and Differential pulse code modulation.

   (iii) Time division, statistical time division and frequency division multiplexing.

   (b) Measurements of a slotted ALOHA channel with an infinite number of users show that 10 percent of the slots are idle : 4, 3, 3

   (i) What is the channel load G ?

   (ii) What is the throughput ?

   (iii) Is the channel underloaded or overloaded ?

P. T. O.

(c) (i) If a binary signal is sent over a 3 kHz channel whose signal-to-noise ratio is 20 dB, what is the maximum achievable data rate ? 5

(ii) Consider building a CSMA/CD network running at 1 Gbps over a 1 km cable with no repeaters. The signal speed in the cable is 200000 km/sec. What is the minimum frame size ? 5

2. (a) (i) A system using two-dimensional even parity sends a block of 8 bytes. How many redundant bits are sent per block ? What is the ratio of useful bits of total bits ? 4

(ii) What is the remainder obtained by dividing $x^8 + x^6 + x^5 + 1$ by the generator polynomial $x^5 + x^3 + 1$ using modulo-2 arithmetic. 4

(iii) The code 11110101101 was received using the Hamming encoding algorithm. What is the original code sent ? 2

(b) What do you mean by protocol correctness ? Construct a finite state diagram for a full duplex channel that never loses frames. 2, 8

(c) Write the complete procedure of GO-Back-N protocol. How does it differ from the selective-repeat ? 6, 4

3. (a) A 4-Mbps token ring has token-holding timer value of 10 m sec. What is the longest frame that can be sent on this ring ? Does the use of a wire centre have any influence on the performance of a token ring ? 6, 4

(b) Explain the working of FDDI protocol. A large FDDI ring has 100 stations and a token rotation time of 40 m sec. The token holding time is 10 m sec. What is the maximum achievable efficiency of the ring ? 5, 5

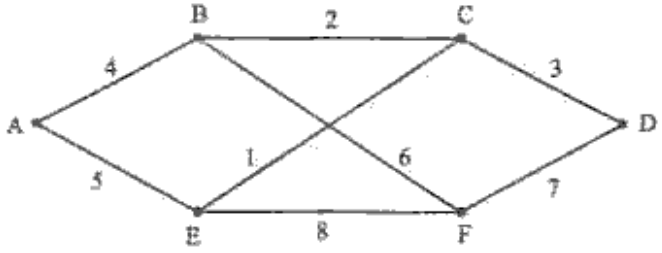
(c) Differentiate between the following : 4, 4, 2

(i) Hubs, switches and routers

(ii) Transparent and source routing bridge

(iii) Repeaters and gateways

4. (a) Consider the subnet of the following network : 10



Distance vector routing is used and the following vectors have just come into router C : from B (5, 0, 8, 12, 6, 2) : from D : (16, 12, 6, 0, 9, 10) and from E : (7, 6, 3, 9, 0, 4). The measured delays to B, D and E are 6, 3 and 5 respectively. What is C's new routing table ? Give both the outgoing line to use and the expected delay.

(b) What do you mean by congestion in computer networks ? What are the various methods to control it ? Give an argument why the leaky bucket algorithm should allow just one packet per tick, independent of how large the packet is. 3, 4, 3

(c) (i) Convert the IP address whose hexadecimal representation is C 22 F1 582 to dotted decimal notation. 4

(ii) Differentiate between the following : 6

(1) TCP and UDP

(2) Deadlocks and Livelocks

P. T. O.

5. (a) Compare Cipher block chaining with Cipher feedback mode in terms of the number of encryption operations needed to transmit a large file. Which *one* is more efficient and by how much ? 7, 3

(b) Using the RSA public key cryptosystem with $a = 1$, $b = 2$, etc..., 4, 6

(i) If $p = 7$ and $q = 11$, list five legal values for d.

(ii) Using $p = 5$, $q = 11$ and $d = 27$, find e and encrypt '*abcdef*'

(c) Write brief notes on the following : 3, 3, 4

(i) SNMP

(ii) Virtual terminal protocol

(iii) e-mail

Total No. of Questions : 5] [Total No. of Printed Pages : 4

MCA–305(N)

M. C. A. (Third Semester) EXAMINATION, Dec., 2006

(New Scheme)

COMPUTER NETWORKS

[MCA–305(N)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 40

Note : There are five Units. Attempt *one* question from each Unit. All questions carry equal marks.

Unit–I

1. (a) What is difference if any between demodulator part of a modem and a coder part of a coder ? 5

   (b) Compare twisted pair cable, coaxial cable, fiber optic cable based on the following : 5

   (i) Noise immunity

   (ii) Propagation delay

   (c) Find the efficiency of empty slot, successful transmission and collision occur in slotted ALOHA. 10

Or

   (a) Explain pure ALOHA and slotted ALOHA and show that its throughput is twice that of pure ALOHA. 10

   (b) Why telephone system is organised as highly redundant, multilevel hierarchy ? 5

P. T. O.

(c) Why is CSMA protocol not suitable for satellite networks ? 5

Unit – II

2. (a) Explain piggy backing, sliding window and explain sliding window protocol. Imagine a sliding window protocol using large no. of bits for sequence numbers so that wrap around never occurs. What relation must hold among the four window edges and window size ? 15

(b) What is the remainder obtained by dividing $x^7 + x^5 + 1$ by the generator polynomial $x^3 + 1$? 5

Or

(a) Explain transmit and receive window. A connection protocol for a wide area network provides a transmission window size of N messages. Derive the minimum message sequence number range for the protocol in the following cases : 8

(i) The receiver accepts out of sequence messages and lost or currepted messages are selectively retransmitted.

(ii) Only in sequence messages are accepted and if a message is lost all subsequent messages must be retransmitted.

(b) Find the simple check sum of the following bytes using modulo 256 addition. The MSB's are on the left of each byte : 6

10101010 10000001 11011011 01101100 10010101

(c) Which error detection method is used most frequently with asynchronous data streams ? 6

Or

(a) Discuss VRC and the types of errors it can and cannot detect. 6

(b) Generate the CRC code of data word 110101010 using the divisor 10101. 6

(c) Explain two sceneries for one bit sliding window protocol in terms of sending window, sliding window and receiving window. 8

Unit–III

3. (a) Discuss Distance Vector Routing algorithm with suitable example. 10

(b) Differentiate between the following : 10

(i) Connection oriented gateway and connectionless gateway

(ii) Transparent bridge and source routing bridge.

Or,

(a) Describe the IEEE 802·6 standard protocol and its frame format. 10

(b) What are the tasks of the FDDI media access control protocol ? What type of traffic is handled by a FDDI networks ? 5

(c) Compare 802·4 and 802·5. 5

Unit–IV

4. (a) Discuss the Distance Vector Routing algorithm with suitable examples. 10

(b) What is service access point in transport layer ? How three way handshaking is achieved in connection establishment and connection release ? 10

P. T. O.

Or

(a) Explain the following : 10

(i) Leaky bucket algorithm

(ii) Token bucket algorithm

(b) In a network that has a maximum packet size of 128 bytes, a minimum packet life time of 30 secs and 8-bit packet sequence number, what is the maximum data rate per connection ? 10

Unit–V

5. (a) Explain digital signature with public key encryption technique. 10

(b) Describe the tools of Network Management System. 10

Or

(a) Explain substitutional cipher and transpositional cipher. Also differentiate between them. 10

(b) Explain the following : 10

(i) DNS

(ii) e-Mail

(iii) www