

Code: AE28  
Time: 3 Hours

Subject: COMPUTER NETWORKS  
Max. Marks: 100

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| DECEMBER 2007 |
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NOTE: There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q. 1. must be written in the space provided for it in the answer book supplied and nowhere else.
- Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

**Q.1 Choose the correct or best alternative in the following: (2x10)**

- a. Communication protocols always have which of the following?
- |                            |                     |
|----------------------------|---------------------|
| (A) A set of symbols       | (B) Start of header |
| (C) A special flag symbols | (D) BCC             |
- b. Transmission media with maximum error rate is \_\_\_\_\_.
- |                    |                   |
|--------------------|-------------------|
| (A) Coaxial cable  | (B) Twisted pair  |
| (C) Satellite link | (D) Optical fiber |
- c. Which of the following is the escape character that identifies control characters in BiSync transparency mode?
- |         |         |
|---------|---------|
| (A) ESC | (B) SYN |
| (C) DLE | (D) RVI |
- d. Which of the following function is not provided as a part of the basic Ethernet design?
- |   |
|---|
| (A) Access control                        |
| (B) Addressing                            |
| (C) Automatic retransmission of a message |
| (D) Multiple virtual network              |
- e. Gigabit Ethernet has a data rate of \_\_\_\_\_.
- |               |             |
|---------------|-------------|
| (A) 100 Mbps  | (B) 10 Gbps |
| (C) 1000 Mbps | (D) 10 Mbps |
- f. The address <ftp.moscow.edu> correspond to
- |                             |                            |
|-----------------------------|----------------------------|
| (A) located in Russia       | (B) an FTP server          |
| (C) a military organization | (D) James Bond's mail drop |
- g. The HDLC \_\_\_\_\_ field defines the beginning and end of a frame.
- |             |             |
|-------------|-------------|
| (A) flag    | (B) address |
| (C) control | (D) FCS     |
- h. The \_\_\_\_\_ is a product of the LLC sublayer.
- |                 |                 |
|-----------------|-----------------|
| (A) 802.3 frame | (B) 802.5 frame |
| (C) PDU         | (D) preamble    |
- i. The \_\_\_\_\_ is a user-friendly unique name of a station on an internet.
- |                     |                      |
|---------------------|----------------------|
| (A) domain name     | (B) internet address |
| (C) station address | (D) physical address |
- j. IEEE standard for token bus is \_\_\_\_\_.

(A) 802.4  
(C) 802.2

(B) 802.3  
(D) 802.5

**Answer any FIVE Questions out of EIGHT Questions.**  
**Each question carries 16 marks.**

- Q.2** a. Match the following to one or more layers of the OSI model.
- (i) Communicates directly with user's application program.
  - (ii) error correction and retransmission
  - (iii) mechanical, electrical and functional interface
  - (iv) responsibility for carrying frames between adjacent nodes (4)
- b. Why do you think that an Ethernet frame should have a minimum data size? (5)
- c. Compare and contrast CSMA/CD with CSMA/CA. (7)
- Q.3** a. In a Class A subnet , we know that IP address of one of the hosts and the mask as given below:
- |            |               |      |               |
|------------|---------------|------|---------------|
| IP Address | : 25.34.12.56 | Mask | : 255.255.0.0 |
|------------|---------------|------|---------------|
- What is the first address (subnet address)? (4)
- b. What is the maximum number of subnets in each case?
- (i) Class A; mask 255.255.192.0
  - (ii) Class B; mask 255.255.192.0
  - (iii) Class C; mask 255.255.255.192
  - (iv) Class C; mask 255.255.255.240 (4)
- c. Show a routing table for a host that is connected to a LAN without being connected to the Internet. (4)
- d. Is the size of the RARP packet fixed? Explain. (4)
- Q.4** a. What would be the advantage of having a small MTU and large MTU? (4)
- b. Compare the TCP header and the UDP header. List the fields in the TCP header that are missing from UDP headers. Give the reason for their absence. (6)
- c. What do you mean by a synchronous TDM and a statistical TDM? Also define multiplexing. (6)
- Q.5** a. Discuss the concept of switching as it relates to the problems involved in the connection of devices. (4)
- b. Explain the following:-
- (i) HDLC configurations and transfer modes.
  - (ii) HDLC frame format and control field formats. (8)
- c. What does the number on an ACK frame mean for
- (i) stop-and-wait ARQ?
  - (ii) go-back-n ARQ?
  - (iii) selective-repeat ARQ?
- Also describe these above techniques in brief. (4)
- Q.6** a. Draw frame format of IEEE 802.3 MAC frame and IEEE 802.11 frame structure. (6)
- b. If a bridge sends data from an Ethernet network to a Token Ring network, how is a collision handled by the bridge and explain

briefly various types of scheduling approaches used in Medium access control. (7)

- c. Explain the Leaky bucket algorithm to control congestion. Explain how the drawbacks of this are overcome in a token bucket algorithm. (3)

**Q.7** a. Use the following encryption algorithm to encrypt the message "GOOD DAY":

- (iii) Replace each character with its ASCII code
- (iv) Add a 0 bit at the left to make each character 8 bits long
- (v) Swap the first four bits with the last 4 bits
- (vi) Replace every 4 bits with its hexadecimal equivalent.

What is the key in this method?

(6)

- b. Does RPF (Reverse Path Forwarding) actually create a shortest path tree? Explain. (4)

- c. Explain three types of Autonomous System (AS) used in Internet Routing protocols. What are various interior and exterior routing protocols? (6)

**Q.8** a. Write short notes on (Any FOUR)

- (i) M/M/1 Queues (Little's Formula)
- (ii) Datagram and Virtual Circuits
- (iii) ATM adaptation Layer
- (iv) Differences between B-ISDN and N-ISDN.
- (v) Differences between IPv4 and IPv6.
- (vi) Integrated services in the Internet.

(12)

- b. Describe Real Time Transport and Session Control protocols. (4)

**Q.9** a. What is the difference between a confirmed and unconfirmed services? Give an example for each. (4)

- b. Explain the difference between Pure ALOHA and Slotted ALOHA. Which one of the two has better channel utilization? (5)

- c. How DSL modem can support high speed digital communication over the existing telephone local loops? (3)

- d. Give the differences between circuit switching and packet switching. (4)