(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 1457 Roll No. | | | | | | | | | | |

M.C.A.

(SEM. IV) THEORY EXAMINATION 2010-11

COMPUTER NETWORKS

Time : 3 Hours *Total Marks : 100*

Note : (1) Attempt **all** the questions, choices are within each question.

(2) All questions carry equal marks.

1. Attempt any **four** parts of the following : **(5×4=20)**

(a) Differentiate among circuit switching, packet switching and message switching.

(b) What do you understand by network topology ? Compare and contrast different network topologies used in LAN.

(c) Explain baud rate with a suitable example. 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 ?

(d) Describe the following :

(i) ISDN (ii) Hub

(iii) Switches (iv) Socket primitives

(e) How does an organization choose the type of Internet connection it should have ? Assume that an organization is having a LAN with 100 machines, then what type of Internet connection is suitable for it and why ?

(f) Differentiate among the following :

(i) Protocol

(ii) Interface

(iii) Standard

(iv) Service.

2. Attempt any **two** parts of the following : **(10×2=20)**

(a) A large population of ALOHA users manage to generate 50 requests/sec, including both originals and retransmissions. Time is slotted in units of 40 msec.

(i) What is the chance of success on the first attempt ?

(ii) What is the probability of exactly k collisions and then a success ?

(iii) What is the expected number of transmission attempts needed ?

(b) Differentiate between Token ring and Token bus LAN standards. 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 2,00,000 km/sec. What is the minimum frame size ?

(c) Discuss the following in the context of IEEE 802.3 standard :

(i) The binary exponential backoff algorithm

(ii) 802.3 cabling

(iii) Encoding techniques

(iv) 802.3 performance.

3. Attempt any **two** parts of the following : **(10×2=20)**

(a) Describe and compare the following **two** approaches to congestion handling :

(i) The token bucket algorithm

(ii) Hop-by-hop choke packets.

(b) Explain token bucket algorithm. A computer on a 6-Mbps network is regulated by a token bucket. The token bucket is filled at a rate of 1 Mbps. It is initially filled to capacity with 8 megabits. How long can the computer transmit at the full 6 Mbps ?

(c) Draw and explain IPv 4 header format. A router has just received the following new IP addresses : 57.6.96.0/21, 57.6.104.0/21, 57.6.112.0/21, and 57.6.120.0/21. If all of them use the same outgoing line, can they be aggregated ? If so, to what ? If not, why not ?

4. Attempt any **two** parts of the following : **(10×2=20)**

(a) (i) What are different presentation layer design issues ? Explain.

(ii) Explain transport layer quality of service parameters in detail.

(b) If the TCP round-trip time, RTT, is currently 30 msec and the following acknowledgements come in after 26.32, and 24 msec, respectively. What is the new RTT estimate using the Jacobson algorithm ? Use $\alpha = 0.9$.

(c) Draw TCP segment Header Format and explain its various fields.

5. Attempt any **two** parts of the following : **(10×2=20)**

(a) Discuss the following :

(i) RSA Algorithm

(ii) Transport Layer Security.

(b) What is MIME ? Explain Standard content-Types of MIME in detail.

(c) Write short notes on any **two** of the following :

(i) FTP

(ii) IPSec.

(iii) VDN.