Printed Pages : 3 **MCA-301**

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

PAPER ID : 1429 Roll No. | | | | | | | | | | |

M.C.A.

(SEM. III) EXAMINATION, 2008-09

COMPUTER NETWORKS

Time : 3 Hours] *[Total Marks : 100*

*Note : (1) Attempt **all** questions.*
*(2) All questions carry **equal** marks.*

1 Attempt any **two** parts of the following : **10×2=20**

(a) (i) What do you mean by network topology ? Explain in brief any three such network topologies.

(ii) What is the difference between TCP/IP and OSI model ?

(b) What are channel types in ISDN to construct the transmission structure of any access link ? Explain them.

(c) Which types of transmission media are used at physical layer transmission ? Give a comparative study of different transmission media in guided media. When unguided media is suitable for transmission ?

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

(a) What do you mean by ALOHA ? How does slotted ALOHA improve efficiency ?

(b) SEC(7,4) hamming code can be converted into a double error detecting and single error correcting code $(8, 4)$ by using an extra parity check. Construct the generator matrix for the code and show that the code is quasi perfect. Design a decoder for the code.

(c) Explain the IEEE 802.3 MAC sublayer frame format. What is the binary exponential back off algorithm ?

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

(a) What is the congestion in network layer ? Differentiate and explain Leaky-Bucket algorithm and Token Bucket algorithm.

(b) What is the role of routing algorithm ? Explain the working of Distance Vector Routing algorithm with the help of a suitable example.

(c) (i) Explain various phases through which a PPP connection goes using transition state diagram.

(ii) What is the significance of IP address classification ? What problems of IPv4 are being addressed by IPv6 ?

4 Attempt any **two** of the following : **10×2=20**

(a) A TCP connection is using a window size of 1000 B and the previous acknowledgement no. was 22,001. It receives a segment with acknowledgement no. 24,001. Draw a diagram to show the situation of the window after and before the acknowledgement is received. If the window size is changed to 11000B and 9000B separately, then what will be the situation ?

(b) Discuss the issues to be considered in designing different layers.

(c) (i) What is user datagram protocol ? Give its datagram format.

(ii) Would it not have been enough to just let user processes to send raw IP packets ? Give reason in support to your answer.

5 Attempt any **two** of the following : 10×2=20

(a) One secret key encryption method involves the XOR operation. A bit patter (plaintext) of a fixed size in XORed with a block of bits of the same size to create a fixed sized cipher text. What is the encryption algorithm here ? What is the decryption algorithm here ? Remember that an XOR algorithm is a reversible algorithm.

(b) (i) Why do we need Domain name space when we can directly use an IP address ?

(ii) What is trivial file transfer protocol ? How is it different from simple FTP ?

(c) (i) What is the role of digital signature in cryptography ?

(ii) What is JPEG standard ? How is it different from JPEG 2000 ?

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M.C.A.

(SEM. III) EXAMINATION, 2007-08

COMPUTER NETWORKS

Time : 3 Hours] *[Total Marks : 100*

Note : *(i) Attempt **all** questions.*
*(ii) All questions carry **equal** marks.*

1 Attempt any two parts of the following : 10×2=20

(a) What do you mean by a computer network? Explain in detail various goals and applications in real life of computer networks.

(b) Give different categorization of computer networks. What is inter networks? How you will categorize inter networks using above categories of computer networks.

(c) Give a detail description of the functionalities of different layers of OSI model.

2 Attempt any two parts of the following : 10×2=20

(a) What is Hamming code? For the following word pattern (message). find out the number of check bit and the bit at eleventh position. If any error is detectd, show it.
M = 1111 1010 0000 1110

(b) What are Medium Access Control (MAC) protocols? Discuss salient features of CSMA/CD protocol.

(c) (i) Describe the bit stuffing rule used by the HDLC protocol.

(ii) Consider a CSMA/CD network running at 200 Mbps over a 1 km cable with no repeaters. The signal speed is 2×10^8 m/sec. Compute the minimum frame size.

3 Attempt any two of the following : 10×2=20

(a) Answer the following questions : (2+3+3+2)

(i) How is IPV6 different from IP protocol?

(ii) Convert IP address whose hexadecimal representation is C22F1582 to dotted decimal notation.

(iii) A class B network on the internet has a subnet mask of 255.255.240.0. What is the maximum number of hosts per subnet ?

(iv) Explain the purpose of subnetting.

(b) What is Link Control Protocol? Give the format of LCP packet. Also how authentication is supported in PPP? Explain.

(c) (i) 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 a capacity with 8 megabite. How long can the computer transmit at the full 6 Mbps?

(ii) Discuss the token passing technique used in FDDI.

4 Attempt any two of the following : 10×2=2

(a) Why does UDP exist? Would it not have been enough to just let user processes send raw IP packets?

(b) What are two army problem and a three way handshake? State the elements of transport protocol.

(c) Describe the features of the following devices:
   (i) Routers
   (ii) Bridges
   (iii) Gateway.

5 Attempt any two of the following : 10×2=20

(a) One secret key encryption method involves the permutation of bits. For example an 8 bit plain text is permuted, bit 8 becomes bit3, bit 1 becomes bit 2 and so on. Draw a diagram to show the mapping of each bit to its new designation. Scramble the bits as you please. What is encryption and decryption algorithm?

(b) What do you mean by following :
   (i) HTTP
   (ii) SNMP

(c) How MPEG file format is different from JPEG file format? Encode the following message using Huffman coding:
"INDIAN INNING"

(d) Write short note on one of the following:
   (i) Network security and cryptography.
   (ii) Electronic mail and FTP.

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MCA

THIRD SEMESTER EXAMINATION, 2006-07

COMPUTER NETWORK

Time : 3 Hours *Total Marks : 100*

Note : *(i) Attempt **ALL** questions.*

(ii) All questions carry equal marks.

(iii) In case of numerical problems assume data wherever not provided.

(iv) Be precise in your answer.

1. Attempt ***any four*** parts of the following : **(5x4=20)**

(a) What are the various components of computer Network structure ? Explain in brief.

(b) Write down the differences between connection oriented and connectionless service.

(c) Explain in brief the topologies that are used for broadcasting type of communication.

(d) Television channels are 6 MHz wide. How many bits/sec. can be sent if four levels digital signals are used ? Assume a noiseless channel.

(e) Which of the OSI layers handles each of the following :

(i) Breaking the transmitted bit stream into frames.

(ii) Determining which route through the subnet to use.

(iii) Providing compatibility in data and text.

(iv) Providing terminal compatibility.

(v) Providing facility for remote login.

(f) Sketch the Manchester and Differential Manchester encoding for the following bit stream: 011100011101001101

For differential Manchester encoding assume the line is initially in the low state.

Attempt *any four* parts of the following : (5x4=20)

(a) Suppose that the string 0101 is used as the bit string to indicate the end of a frame and the bit stuffing rule is to insert a 0 after each appearance of 010 in the original data ; thus 010101 would be modified by stuffing to 01001001. In addition, if the frame proper ends in 01, 0 would be stuffed after the first 0 in the actual terminating string 0101.

Show how the following would be modified by this rule ?

11011010010101011101

(b) Measurements of an infinite user slotted ALOHA channel show that 10% of the slots are idle :

(i) What is the channel load, G ?

(ii) What is throughput ?

(iii) Is the channel underloaded or overloaded ?

(c) Consider an error free 64-Kbps satellite channel used to send 512 byte data frames in one direction, with very short acknowledgement coming back the other way. What is the maximum throughput for window sizes of 01 and 07 ?

(d) A bit stream 10011101 is transmitted using the standard CRC method. The generator polynomial is x^3+1. Show the actual bit string transmitted. Suppose the third bit from the left is inverted during transmission. Show that this error is detected at the receiver's end.

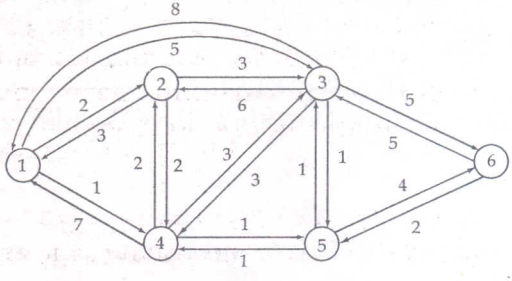
(e) Explain Basic-Bit-Map (a collision free protocol) used at MAC sublayer.

(f) Sixteen stations, numbered 1 through 16, are contending for the use a shared channel by using the adaptive Free Walk Protocol. If all the stations whose addresses are prime numbers suddenly become ready at once, how many bit slots are needed to resolve the contention ?

3. Attempt *any two* parts of the following : **(10x2=20)**

(a) Write and explain the kinds of shortest path routing Algorithm is brief.

Find the shortest path in the following subnet using Dijsktra Algorithm, when the source is fixed but destination is not fixed.



(b) Describe the choke-packet method of congestion control. You are also required to explain the variation in the above mentioned algorithm.

(c) Explain the concept of Tunnelling in internetworking. Write down the differences in IPv4 and IPv6.

4. Attempt *any two* parts of the following : **(10x2=20)**

(a) Describe Transmission Control Protocol's (TCP) Transmission policy.

(b) Explain the Remote Procedure Call with suitable diagram. You are also required to explain the use of RPC in transport layer.

(c) Imagine that a two-way handshake rather than a three-way handshake were used to set up connections. In other words, third message was not required. Are deadlocks now possible ? Give an example or show that none exist.

5. Attempt *any two* parts of the following : **(10x2=20)**

(a) Explain the architecture of Electronic Mail (i.e., E-mail)

(b) Describe the concept of domain name system in brief.

(c) Explain the working of serverside in the architectural overview of 'World-Wide-Web (WWW).

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