ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE – 2007

# DATA COMMUNICATION & COMPUTER NETWORK

SEMESTER – 2

Time : 3 Hours ] [ Full Marks : 70

## Group – A

## ( Multiple Choice Type Questions )

1. Choose the correct alternatives for *all* of the following : 10 × 1 = 10

i) Given the IP address 18.250.31.14 and subnet mask 2255.240.0.0, The calculated subnet address should be

a) 18.0.0.14 b) 18.31.0.14

c) 18.240.0.0 d) 18.9.0.14. ☐

ii) If the baud-rate is 400 for a 4-PSK signal, the bit-rate is ..... bps.

a) 100 b) 400

c) 800 d) 1600. ☐

iii) In FTP, when you ....., it is copied from the server to the client.

a) retrieve a file b) store a file

c) retrieve a list d) both (a) and (c). ☐

iv) TCP is a

a) reliable connection oriented protocol

b) unreliable connection oriented protocol

c) reliable connection less protocol

d) unreliable connection less protocol. ☐

v) Repeater operates in

a) physical layer b) data link layer

c) network layer d) transport layer. ☐

vi) Which topology requires a multipoint connection ?

a) Mesh b) Star

c) Bus d) Ring. ☐

vii) In a Go-Back-N ARQ, if the window size is 63, what is the range of sequence numbers ?

a) 0 — 63 b) 0 — 64

c) 1 — 63 d) 1 — 64. ☐

viii) ..... is the access protocol used by traditional Ethernet LAN.

a) CSMA b) CSMA / CD

c) ALOHA d) Token Passing. ☐

ix) Error detection at the data link level is achieved by

a) bit stuffing b) CRC

c) hamming codes d) equalization. ☐

x) In symmetric-key cryptography the publicly known key is

a) decryption key b) encryption key

c) both (a) and (b) d) none of these. ☐

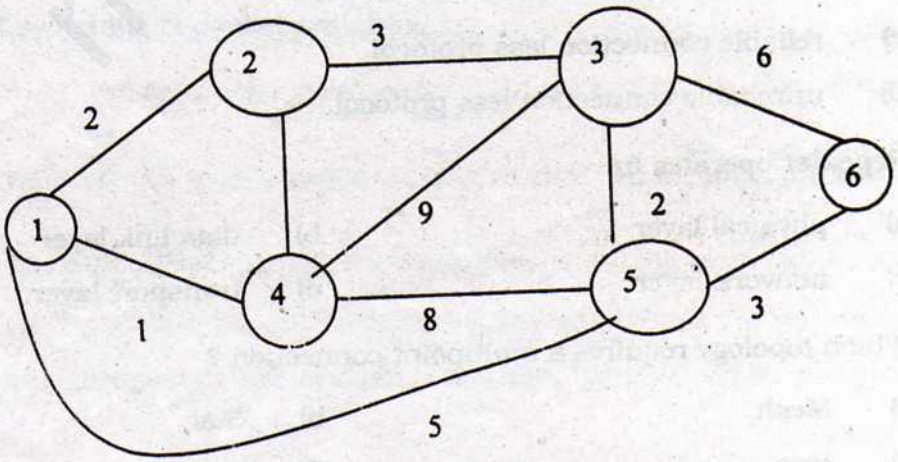
## Group - B

### ( Short Answer Type Questions )

Answer any *three* questions. $3 \times 5 = 15$

2. Explain the FDDI frame format.

3. Using Dijkstra's routing algorithm, find out a least cost route to all other nodes 1 through 6 for the following network.



4. "TCP provides reliable connection-oriented delivery service, IP provides unreliable connection-less delivery service". Explain.

5. What are the advantages of IPv6 over IPv4 ?

6. a) Distinguish between open-loop congestion control and closed-loop congestion control.

   b) What is QOS ?

## Group - C

## ( Long Answer Type Questions )

Answer any *three* questions. 3 × 15 = 45

7. a) How is CSMA a clear improvement over ALOHA ? How is it further improved by implementing CSMA / CD ? 5

   b) Assume six devices are arranged in a mesh topology. How many cables are needed ? How many ports are needed for each device ? 5

   c) Draw a hybrid network with a star backbone and three ring networks. 5

8. a) What is baud rate and what is bit rate ? Establish the relationship between these two. 4

   b) Write the advantages of FM technique over AM technique. 2

   c) Why is star topology not suitable for a large network ? How the risk factor can be reduced of star topology using other topologies ? 3

   d) Using the TDM technique, calculate throughput of the following system :

   There are four nodes in the network having loads 20k, 35k, 58k and 10k respectively. Each time slot accommodates 5k of data. Propose a method to improve of the system and also calculate the throughput using the improved method. 6

9. a) Applying the CRC algorithm, determine the checksum and the transmitted frame for the data 11010111 and for the generator polynomial $x^3 + x^2 + 1$. 6

b) In sliding window flow control, if the sequence number is of n bits, then show that the maximum size of the window is $2^n - 1$. 6

c) In HDLC, what is bit stuffing and why is it required ? 2

d) Why is the address field of a PPP frame always set to all 1's ? 1

10. a) What is the default mask and broadcast address for class B ? Specify the private IP range for class A address. 2

b) Discuss the different steps of Distance Vector Routing. 4

c) Draw the header format of an IP packet. Explain which parts of it are used for fragmentation and how they are used. 3

d) "Data link layer ensures delivery within the same physical network, but transport layer ensures delivery across networks". Explain. 3

e) Explain how traffic shaping controls the congestion in a network. 3

11. Write short notes on any *three* of the following : $3 \times 5$

a) ISDN

b) Fire wall

c) X.25

d) Circuit switching & packet switching.