ENGINEERING & MANAGEMENT EXAMINATIONS, JUNE – 2008
DATA COMMUNICATION AND NETWORKING
SEMESTER - 6

Time : 3 Hours]   [Full Marks : 70

GROUP – A
(Multiple Choice Type Questions)

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

 i) For *n*-devices in a network, what is the number of cables required for a mesh topology ?

    a) $n!$ b) $n * n$

    c) nC_r d) none of these.

 ii) In an optical fibre, the inner core is .... the cladding.

    a) denser than   b) less dense than

    c) the same density as   d) another name for.

 iii) Which of the following is true ?

    a) FTP allows systems with different directory structures to transfer file.

    b) FTP allows a system using ASCII and a system using EBCDIC to transfer file.

    c) FTP allows a PC and a SUN work station to transfer file.

    d) All of these.

 iv) In the e-mail address mackenzie@pit.arc.nasa.gov, what is the domain name ?

    a) mackenzie   b) pit.arc.nasa.gov

    c) mackenzie@pit.arc.nasa.gov   d) (a) and (b).

 v) In the string 219.46.123.107, what is the network address of the host we are looking for ?

    a) 219.46.123.0   b) 107.123.0.0

    c) 107.123.46.0   d) 107.0.0.0.

vi) A bridge has access to the .... address of a station on the same network.

    a)   Physical (MAC)   b)   Network

    c)   Service access point   d)   All of these.

vii) Which of the following is an interior routing protocol ?

    a)   RIP   b)   OSPF

    c)   BGP   d)   (a) & (b).

viii) A hub is a

    a)   router   b)   a bridge

    c)   repeater   d)   all of these.

ix) A firewall is

    a)   used to protect a computer room from fires and floods

    b)   a form of virus

    c)   a screen saver program

    d)   none of these.

x) If subnet mask is 255.255.252.0 then how many subnets is available ?

    a)   2   b)   18

    c)   4   d)   24.

xi) Jitter is due to

    a)   large number of packets in the net

    b)   long packet size

    c)   variation in the delay encountered by the packet

    d)   long delay encountered by the packet.

xii) Which channel access method is used in Ethernet network ?

    a)   CSMA/CD   b)   Token Bus

    c)   Token Ring   d)   All of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following.   3 × 5 = 15

2. What is the major disadvantage in using NRZ encoding ? How does RZ encoding attempt to solve the problem ?   3 + 2

3. Why do we need a DNS system, when we can directly use an IP address ? What is the purpose of the inverse domain ?   3 + 2

4. What do you mean by 'classful addressing' ? What are the advantages of classless addressing over classful addressing ? What do you mean by net id and host id ?

3 + 3 + 1

5. What do you mean by the term 'subnet musking' ? Explain how that can be achieved with an example.   1 + 4

6. What is connection oriented protocol ? Briefly explain the services of that protocol.   5

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following.   3 × 15 = 45

7. a) A channel has a data rate of 4kbps and propagation delay of 20ms. For what range of frame size does stop-and-wait give an efficiency of at least 50% ?

b) Why window size of the Go-Back-N protocol is $2^n - 1$, where n is the number of bits required to identify the sequence number of the data frame ?

c) What type of error is not detected by CRC ?

d) Prove that $2^r \geq m + r + 1$, where m is the number of data bits and r is the number of redundancy bits required to correct the error.   6 + 2 + 2 + 5

8. a) What do you mean by Data transparency and Bit stuffing ?

b) Is Bit stuffing needed in the control field of HDLC data frame ?

c) What is the basic difference between CSMA and CSMA/CD ?

d) What do you mean by back off factor in case of CSMA/CD protocal ?

e) Briefly discuss the Token management using priority in IEEE 802.5.

f) Write down the advantages of fibre-optic cable over twisted pair and coaxial cable.   2 + 2 + 2 + 2 + 4 + 3

9. Describe 'Stop & wait ARQ', 'Go-Back-N ARQ' and 'Selective repeat ARQ protocol', with the help of diagram.　　　　5 + 5 + 5

10. a) Find the NRZ-I, Manchester and Differential Manchester encoding for the binary data 100110111.

b) Suppose that a signal has 2^n times the power as a noise signal that is added to it. Find the SNR (Signal to Noise Ratio) in decibels.

c) A message 1010111101 with a CRC arrives at a destination node, the polynomials, are $X^3 + X + 1$. Has there been an error in the transmission ?
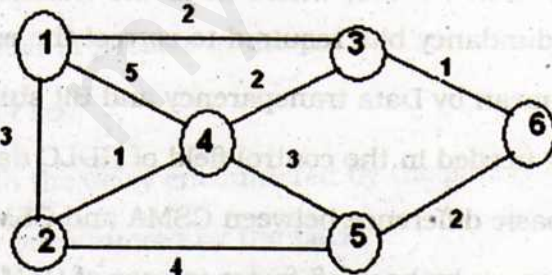
　　　　6 + 4 + 5

11. a) State the advantage of IPV6 over IPV4.

b) What is the purpose of masking ?

c) 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 ?

d) Describe the Bellman-Ford algorithm for shortest path routing and apply it to find out the shortest paths from node 4 to node 6 for the following figure.

　　　　1 + 2 + 3 + (5 + 4)

END