CS/B.TECH (CSE)/SEM-6/CS-601/2011

2011
COMPUTER NETWORKS

Time Allotted : 3 Hours   *Full Marks* : 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words
as far as practicable.

GROUP – A
(Multiple Choice Type Questions)

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

    $10 \times 1 = 10$

    i)   The total number of links required to connect *n* devices
         using Mesh topology is

         a) 2^n b) $n(n+1)/2$

         c) $n(n-1)/2$ d) n^2.

    ii) Flow control is the responsibilities of the

         a)   Data link layer   b)   Transport layer

         c)   Both of these   d)   none of these.

    iii) In selective repeat sliding window protocol, the receiver
         window size is

         a)   greater than one   b)   one

         c)   two   d)   none of these.

iv) ICMP resides at the same layer as which of the following protocols mentioned below ?

a) TCP   b) UDP

c) IP   d) ARP.

v) In HDLC inserts a 0 bit after _____ consequtive 1 bits in the message data.

a) 4   b) 6

c) 5   d) 7.

vi) The Hamming code is used for

a) error detection   b) error correction

c) error encapsulation   d) both (a) and (b).

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

a) CSMA/CD   b) Token bus

c) Token ring   d) all of those.

viii) When a host knows its IP address but not its physical address, it can use

a) RARP   b) ICMP

c) ARP   d) IGMP.

ix) Which of the following is a valid host for network 192.168.10.32/28 ?

a) 192.168.10.39   b) 192.168.10.47

c) 192.168.10.14   d) 192.168.10.54.

x) Pure ALOHA has a maximum efficiency of

   a) 18%   b) 37%

   c) 10%   d) none of these.

xi) If user A wants to send a message to user B confidentially, the plain text is encrypted with the public key of

   a) A b) B

   c) the network   d) Either A or B.

xii) A) DNS   i) Name service

     B) FTP   ii) Rile sharing

     C) NFS   iii) File transfer

     D) SMTP   iv) Mail service.

Which of the following is the correct match ?

	A	B	C	D
a)	(iv)	(iii)	(ii)	(i)
b)	(i)	(ii)	(iii)	(iv)
c)	(i)	(iii)	(ii)	(iv)
d)	(ii)	(iv)	(iii)	(i).

GROUP – B

(Short Answer Type Questions)

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

2. a) How does Manchester encoding differ from differential Manchester encoding ?

b) Draw the following encoding scheme for the bit stream :

0001110101

    i)   NRZ-I

    ii) Manchester coding

    iii) Differential Manchester coding.   2 + 3

3. Suppose a system uses Stop and Wait protocol with propagation delay 20ms. If the frame size is 160 bits and band width is 4kbps then calculate channel utilization or efficiency.

4. Applying CRC algorithm, determine the checksum and the transmitted frame for the bit stream 11010111 and for the generator polynomial $x^3 + x^2 + 1$.

5. What is Bit rate ? What is Baud rate ?

An analog signal carries 4 bits in each signal unit. If 1000 signal units are sent per second, find the baud rate and bit rate.   1 + 1 + 3
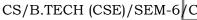
6. a) What is the purpose of subnetting ? Find the netid and the hostid of the following IP addresses.

    i)   19.34.21.5

    ii) 220.34.8.9

   b) A network has subnet mask 255.255.255.224

Determine the maximum or number of Host in this network.

Also determine the broadcast address of this network.

                                        1 + 2 + 2

GROUP – C

(Long Answer Type Questions)

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

7. a) Suppose a system uses Go Back N protocol with window size 3. If a sender wants to transmit 6 frames and every 4th frame is error then calculate how many number of extra frames to be transmitted to the receiver.

   b) Find the expressions for average delay and throughput for both pure ALOHA and slotted ALOHA. Compare their performances as well.

   c) Why are medium access control techniques required ? Discuss three popular medium access control techniques in brief.　　　4 + 4 + (1 + 6)

8. a) A 10 bit data bit block 011101010111 is to be sent using hamming code for error detection and correction. Show how the receiver corrects an error that occurs in 6th bit position from righ.

   b) Explain the utility of layered network architecture. Compare ISO-OSI and TCP/IP models.

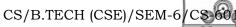   c) Differentiate circuit switching and packet switching.

   　　　　　　6 + (2 + 4) + 3

9. a) What is congestion ?

   b) Why does congestion occur ?

   c) Explain Leaky Bucket algorithm for congestion control.

   d) State the basic difference between TCP and UDP.

   e) Compare IPv4 and IPv6.   2 + 2 + 4 + 3 + 4

10. a) Distinguish between adapting routing and fixed routing. Why is adaptive routing preferred over fixed routing ?

   b) Differentiate between Link State and Distance Vector routing algorithms.

   c) How are 'iterative query resolution' and 'recursive query resolution' different from each other in the context of DNS ? Explain with example.

   d) What do you understand dy data privacy ? How can authentication, integrity and non-repudiation be implemented by digital signature ?   4 + 3 + 4 + 4

11. Write short notes any *three* of the following   3 × 5

    a)   Firewall

    b)   NAT

    c)   VLAN

    d)   IEEE 802.11

    e)   ISDN

    f)   IPv6.

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