COMPUTER NETWORK
(INFO 3202)

Time Allotted : 3 hrs   **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and
<u>any 5 (five)</u> from Group B to E, taking <u>at least one</u> from each group.

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

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

    (i) Length of Port addresses in TCP/IP are
        (a) 4 bit long   (b) 16 bit long
        (c) 32 bit long   (d) None of Above

    (ii) When a ring is initialized in Token Bus protocol, stations are inserted
        (a) from highest to lowest address   (b) from lowest to highest address
        (c) in random order   (d) None of these

    (iii) The network layer is concerned with _____ of data.
        (a) bits   (b) frames
        (c) packets   (d) bytes

    (iv) A 4 byte IP address consists of _____
        (a) only network address   (b) only host address
        (c) network address & host address   (d) network address & MAC address

    (v) Automatic repeat request error management mechanism is provided by _____
        (a) logical link control sublayer   (b) media access control sublayer
        (c) network interface control sublayer   (d) application access control sublayer

    (vi) Which protocol gives a full route table update every 30 seconds?
        (a) IEGRP   (b) RIP
        (c) ICMP   (d) IP

    (vii) In OSPF database descriptor packet, which field is used to detect a missing packet?
        (a) LSA header   (b) MS
        (c) Database descriptor sequence number (d) Options

(viii) The process-to-process delivery of the entire message is the responsibility of the _____ layer.
    (a) Network   (b) Transport
    (c) Application   (d) Physical

(ix) An endpoint of an inter-process communication flow across a computer network is called
    (a) socket   (b) pipe
    (c) port   (d) none of these

(x) The value of acknowledgement field in a segment defines _____
(a) sequence number of the byte received previously
(b) total number of bytes to receive
(c) sequence number of the next byte to be received
(d) sequence of zeros and ones

Group – B

2.   (a)   Prove that CRC can detect single bit error.

    (b)   Suppose a header consists of four 16-bit words: (11111111 11111111, 11111111 00000000, 11110000 11110000, 11000000 11000000). Find the internet checksum for this code

6 + 6 = 12

3.   (a)   Explain the functions of Data Link layer and Physical layer in brief.

    (b)   In CRC, assume that given frame for transmission is 1101011011 and the generator polynomial is $G(x) = x^4 + x + 1$. Find the codeword.

(3 + 3) + 6 = 12

Group – C

4.   (a)   What is the IEEE standard for Token Bus protocol? Explain with diagram how the virtual ring of a token bus is re-established when the successor node of a token holder node fails? How the priority traffic is handled in a Token Bus protocol?

    (b)   Compare the operation of Stop-and-Wait ARQ with bidirectional Go-Back-N ARQ with a window size of 1. Sketch out a sequence of frame exchanges using each of these protocols and observe how the protocols react to the loss of an information frame and to the loss of an acknowledgment frame.

(1 + 3 + 3) + 5 = 12

5.   (a)   Explain how a collision is detected in CSMA/CD with the help of a diagram? Justify the use of jamming signal in CSMA/CD.

    (b)   What is the significance of monitor bit in Token Ring frame?

(c) A telephone modem is used to connect a personal computer to a host computer. The speed of the modem is 56 kbps and the one-way propagation delay is 100 ms. Find the efficiency for Stop-and-Wait ARQ if the frame size is 256 bytes; 512 bytes. Assume a bit error rate of 10^{-4}.

(3 + 2) + 2 + 5 =12

Group – D

6. (a) Explain counting to infinity problem using Bellman-Ford algorithm.

   (b) Draw the ARP packet format.

   (c) Compare Distance vector & path vector routing algorithm

   4 + 5 + 3 = 12

7. (a) Compare RIP and OSPF with respect to convergence time and the number of messages exchanged under several trigger conditions, that is, link failure, node failure, link coming up.

   (b) Draw the IP packet format.

   6 + 6 = 12

Group – E

8. (a) What is Socket address? What is the significance of socket address in data communications?

   (b) Explain diagrammatically the process of TCP connection establishment indicating the sequence number and acknowledgement number.

   (c) Suppose a TCP connection is transferring a file of 1000 bytes. The first byte is numbered 10001. What is the sequence number of the segment if all data is sent in only one segment?

   (2 + 2) + 6 + 2 = 12

9. (a) Why is flow control important in data transmission between two nodes? Explain with example and diagram how TCP accomplishes flow control?

   (b) What is the advertised value of the receiver window (rwnd) for a host say, A, if the receiver (say, B) has a buffer size of 5000 bytes and 1000 bytes of received and unprocessed data?

   (c) What is the size of the window for host A if the value of receiver window (rwnd) is 3000 bytes and the value of congestion window (cwnd) is 3500 bytes?

   (2 + 6) + 2 + 2 = 12

Department & Section	Submission Link
IT	https://classroom.google.com/c/MzY5MTEzMDY1ODg4/a/MzY5MTE4OTI3Njkw/details