UNIVERSITI SAINS MALAYSIA

First Semester Examination
Academic Session 2008/2009

November 2008

CCS522 – Advanced Data Communication and Computer Networks

Duration : 2 hours

INSTRUCTIONS TO CANDIDATE:

- Please ensure that this examination paper contains **EIGHT** questions in **THREE** printed pages before you begin the examination.

- Answer **ALL** questions.

1. In **Ethernet**, answer the following questions:

    (a) Briefly describe the advantages of dividing an Ethernet LAN with a bridge.

    (b) The MAC sublayer receives 1540 bytes of data from the upper layer. Can the data be encapsulated in one frame? If not, how many frames need to be sent? What is the size of the data in each frame?

    (c) What are the common Ten-Gigabit Ethernet implementations?

    (d) What is the difference between a unicast, multicast, and broadcast address?

    (10/100)

2. Create a system of three LANs with four bridges. The bridges (B1 to B4) connect the LANs as follows:

    - B1 connects LAN 1 and LAN 2.
    - B2 connects LAN 1 and LAN 3.
    - B3 connects LAN 2 and LAN 3.
    - B4 connects LAN 1, LAN 2 and LAN 3.

    Choose B1 as the root bridge. Show the forwarding and blocking ports, after applying the spanning tree procedure.

    (10/100)

3. What do we mean when we say that a bridge can filter traffic? Why is filtering important? Explain what is a transparent bridge?

    (5/100)

4. Answer the following questions on Cellular Telephone and Satellite Networks:

    (a) Draw a cell pattern with a frequency-reuse factor of 3.

    (b) According to Kepler's law, what is the period of an Iridum satellite that located at an orbit approximately 759 km above the Earth?

    (c) What is the relationship between the Van Allen belts and satellites?

    (15/100)

5. Your company applied for IPv6 addresses from a local ISP, and obtained an IPv6 prefix 2001:DA8:E80:F36::/50.

    (a) Perform 4-bit subnetting, and show all the new subnets.

    (b) If a host X with MAC address of 00-13-2B-72-BC-4E is connected to the third subnet, show the global unicast IPv6 address of this host using EUI-64 to get the IPv6 interface identifier.

    (c) Perform another 2-bit subnetting from the new third subnet.

                                                                        (17/100)

6. An IPv4 datagram has arrived with the following information in the header:

    0x45 00 00 54 00 03 58 50 20 06 00 00 7C 4E 03 02 B4 0E 0F 02

    (a) Is the packet corrupted or fragmented?

    (b) What is the size of the data and are there any options?

    (c) How many more routers can the packet travel to and what is the destination address?

    (d) What is the identification number of the packet?

                                                                        (16/100)

7. Answer the following questions on Network Security:

    (a) Clearly state the difference between a proxy and a NAT.

    (b) What network edge device will not be needed if IPv6 is used?

    (c) Clearly state the difference between IDS or IPS. Which came first?

                                                                        (12/100)

8. In a connection, the value of *cwnd* is 5000 and the value of *rwnd* 8000. The host has sent 2500 bytes which has not been acknowledged. How many more bytes the host can send?

                                                                        (15/100)

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