
UNIVERSITI SAINS MALAYSIA

First Semester Examination
Academic Session 2004/2005

October 2004

CIT505 – Computer Systems and Networks

Duration : 2 hours

INSTRUCTION TO CANDIDATE:

- Please ensure that this examination paper contains **FOUR** questions in **FIVE** printed pages before you start the examination.
 - Answer **ALL** questions.
 - You can choose to answer either in Bahasa Malaysia or English.
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ENGLISH VERSION OF THE QUESTION PAPER

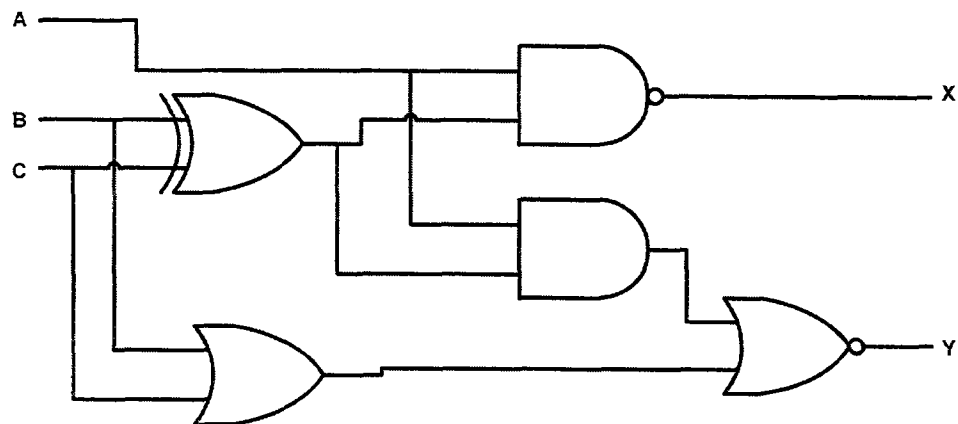
1. (a) For each of the following, multiply the numbers directly in their respective bases (without conversion to decimal). Show all the steps involved.
 - (i) Multiply 111010_2 with 1011_2 . Give your answer in binary.
 - (ii) Multiply 375_8 with 46_8 . Give your answer in octet.
 - (iii) Multiply $2D9_{16}$ with $3A_{16}$. Give your answer in hexadecimal.

(9/100)

- (b) What is the smallest and largest value (in decimal) that can be stored using 6 bits in:
 - (i) pure binary?
 - (ii) excess 25?
 - (iii) two's complement?

(9/100)

- (c) Figure 1 shows a logic circuit diagram.
 - (i) If $A=1, B=1, C=0$, what is the value of X and Y?
 - (ii) State the Boolean function for X and Y (in terms of A, B and C).

Figure 1

(7/100)

2. (a) Provide full definitions of the following acronyms:

- (i) ASCII,
- (ii) SDRAM,
- (iii) TCP/IP,
- (iv) CSMA/CD,
- (v) FDDI.

(10/100)

(b) What is cache memory? How is it used by a computer system?

(5/100)

(c) Assume you have been asked to recommend computer systems for the following purposes:

- (i) A university student needs to do assignments and homework at home.
- (ii) A database server catering for 100 users in an organization.

List the specifications of the recommended computer system for each case above.

(10/100)

3. (a) Assume you have to download a webpage from the Internet using a laptop computer in the office. This laptop computer comes only with a built-in wireless network card. You are supposed to use your company's local area network to access the Internet. By using a diagram, explain how this can be done. List all the steps involved in this operation.

(7/100)

(b) Assume we need to send the bit pattern 00110101_2 using:

- (i) amplitude shift keying,
- (ii) frequency shift keying,
- (iii) phase shift keying.

Show/Draw the equivalent analog sine-wave pattern for each scheme above. Indicate all assumptions made.

(9/100)

- (c) The three most commonly used cables in a network are unshielded twisted pair, coaxial cable and fiber optic. Arrange these cables according to:
- (i) data transmission speed (from slowest to fastest),
 - (ii) data transmission noise (from least noisy to very noisy),
 - (iii) security (from least secure to most secure).

(9/100)

4. (a) Suppose we need to send one thousand (1000) seven-bit characters of data on a network. Calculate the total bits that need to be transmitted using:
- (i) asynchronous transmission,
 - (ii) synchronous transmission (assume all 1000 characters can fit into a single frame).

Explain your answer. Indicate all assumptions made.

(6/100)

- (b) Packet collisions occur quite often in local area networks based on bus topology.
- (i) How/Why does it happen?
 - (ii) What are the consequences/effects?
 - (iii) Can they be eliminated? Explain.

(10/100)

- (c) Figure 2 shows a network that has 2 devices (X and Y) interconnecting three computers (PC1, PC2 and PC3) and a server (S1).

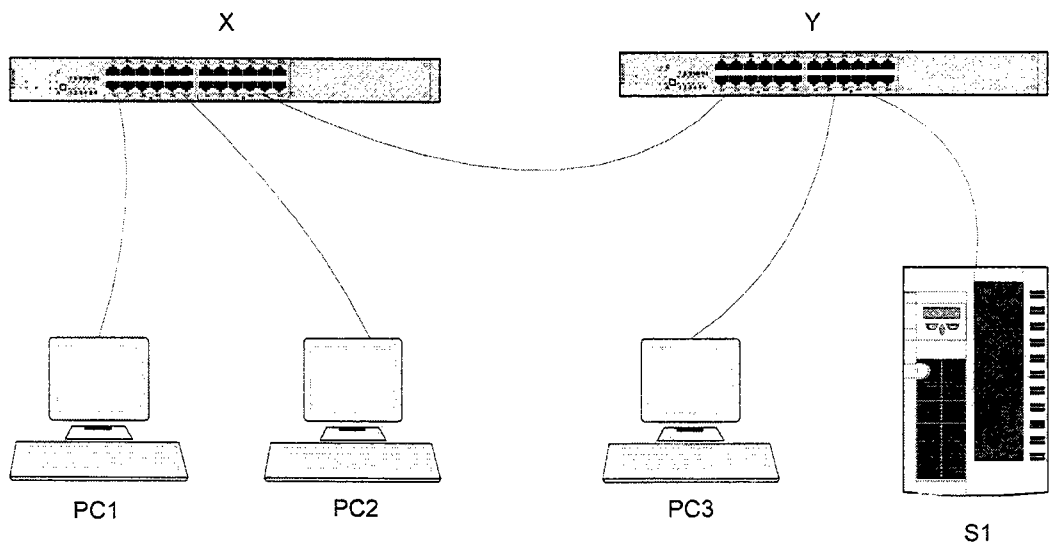


Figure 2

State which computers or server will receive a copy of a packet when:

- PC1 sends a message to PC2,
 - PC2 sends a message to S1,
 - S1 sends a message to PC3,
- (i) if both X and Y are hubs,
- (ii) if both X and Y are switches,
- (iii) if X is a hub and Y is a switch.

(9/100)