UNIVERSITI SAINS MALAYSIA

First Semester Examination
Academic Session 2001/2002

September 2001

CIT505 – Computer Systems and Networks

Duration : 3 hours

INSTRUCTION TO CANDIDATE:

- Please ensure that this examination paper contains **EIGHT** questions in **FOUR** printed pages before you start the examination.
- Answer **ALL** questions.
- You can choose to answer either in Bahasa Malaysia or English.

ENGLISH VERSION OF THE QUESTION PAPER

1. (a) State the names of the 2 registers that facilitate communications with main memory.

   (b) Describe the function of the program counter (PC) register.

   (c) What is the name of the low-level program that is activated by an interrupt?

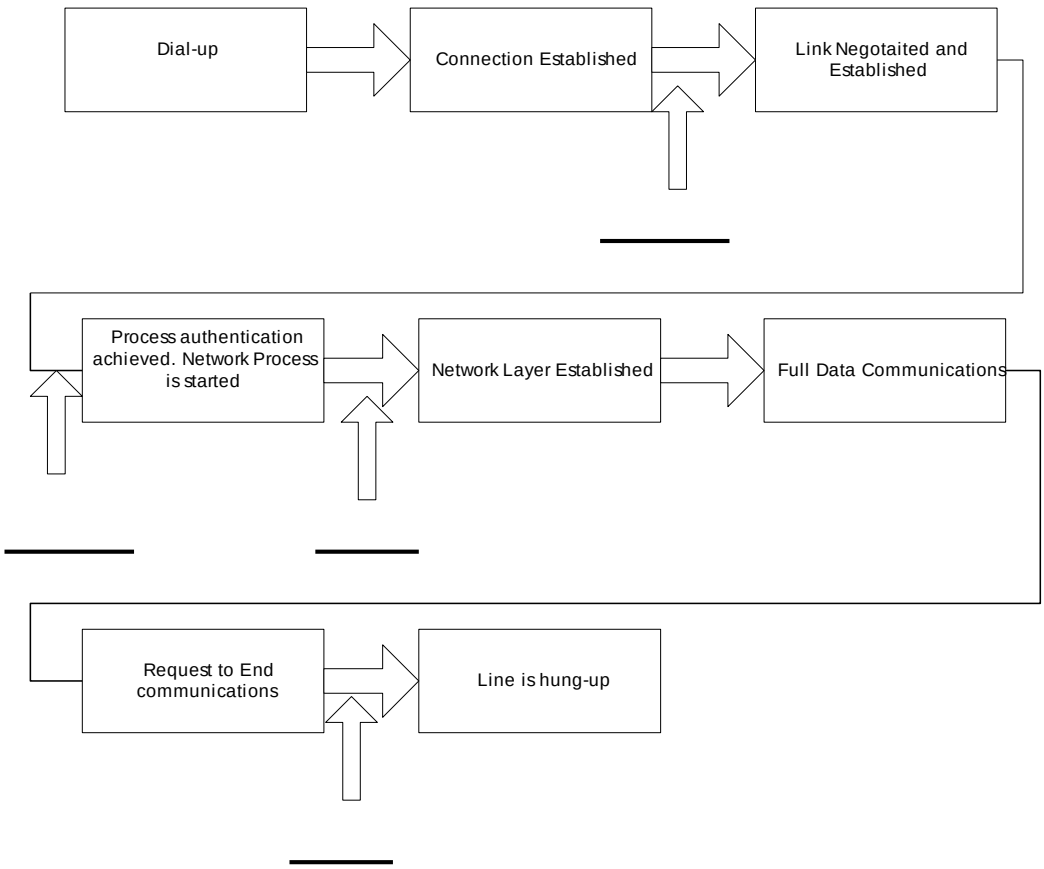
(10/100)

2. A PC is used to access the Internet via a dial-up connection and using PPP (Point to Point Protocol). The application that the user wishes to use is a web browser.

   (a) What is the physical layer for the above situation?

   (b) What are the data link layer, network layer and transport layer protocols that are needed?

   (c) Fill in the blanks below with either LCP (Link Control Protocol) or NCP (Network Control Protocol).



(15/100)

3. Assume a modem uses 32 different voltage levels to transmit data. Use the Nyquist Theorem to calculate the maximum data rate of the modem if the signal can be transmitted via a 33 kHz line which has no noise. What is the buffer rate if the data size to be transmitted is generated at 24Kbits persecond.

(15/100)

4. Draw the transmission diagram of the 0101 1100 bit stream using the following coding techniques:

   - Binary Coding
   - Manchester Coding
   - Differential Manchester Coding

   You can assume that the initial value of the signal is 5V and the 2 different levels are 0V and 5V.

(5/100)

5. You are requested to design and build a computer network with the following features:

   - A lab which is non-deterministic. This section will have 20 PCs and a server that needs to store DOS and Windows based software (Office Automation).
   - A lab which is deterministic. This section will have 10 PCs and a server which is used to store a UNIX based Database.
   - Both this networks must be able to communicate with each other freely because they are connected via a gateway. The labs are located in two different buildings about 1Km apart.

   (a) Show how this network will be connected to each other, as well as the connections to each PC. Explain each layer (Layer 1 to 4) that is to be supported by the PCs.

   (b) You are also required to give the type of network used as well as its bandwidth. Also name the Network Operating System (NOS) used by the servers. Give explanations for your choices. Draw the network map.

(15/100)

6. (a) Name and briefly describe the 5 different IP address classes.

   (b) A LAN is given a class C IP address. The address is as follows: 201.222.111.xxx. State the network address, broadcast address and the netmask for that network.

(10/100)

7. (a) What are the five main assumptions for the Dynamic Channel Allocation Model and give a short explanation for each of those assumptions?

   (b) Explain how non-Persistent CSMA functions.

(15/100)

8. (a) Draw the structure of an Ethernet frame which contains a TCP/IP packet. Draw and label each of the TCP, IP and Ethernet parts. Use 3 separate drawings to label the 3 separate parts.

   (b) Explain the 2 main differences between single mode fiber and multimode fiber. Which mode allows greater distances?

(15/100)

- oooOooo -