

1. Explain briefly the following terms:
 - (1) memory interleaving, (3%)
 - (2) locality of reference, (3%)
 - (3) watchdog timer, (3%)
 - (4) packet switching, (3%)
 - (5) zero-page addressing, (3%)
 - (6) state assignment. (3%)
2. Multiply the signed 6-bit numbers, $A=010111$ (multiplicand) and $B=110110$ (multiplier), using the Booth algorithm. (8%)
3. (a) Why digital multiplexer is a universal logic module? (3%)
 (b) How to use a 4-to-1 multiplexer to realize the Boolean function $F(A,B,C,D) = (1,2,4,5,6,9,12,13)$? (7%)
4. (a) What is a Johnson counter? (4%)
 (b) Construct a Johnson counter with ten timing signals. (6%)
5. (a) What is virtual memory? (4%)
 (b) What is the difference between page-based virtual memory scheme and segment-based virtual memory scheme? (6%)
6. Give three commonly used schemes for scheduling the use of the transmission line in a multipoint line configuration. (8%)
7. (a) Describe the organization of data on a disk. (6%)
 (b) Describe the similarity and difference between Winchester disk and floppy disk? (4%)
8. Describe two different techniques to implement Intel 8086's bus request/bus grant functions. (7%)
9. Describe the dynamic memory refresh mechanism in IBM PC/AT. (7%)
10. The state diagram of a control unit is shown in Fig. 1. It has four states and two inputs x and y . Design the control unit by the sequence register and decoder method with two JK flip-flops. (12%)

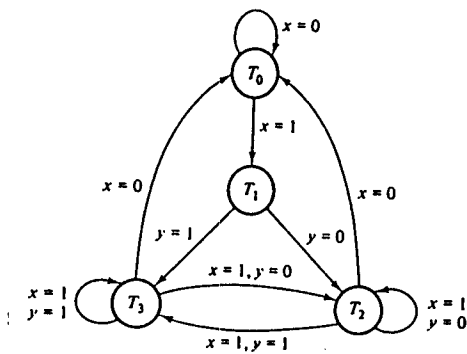


Figure 1.