



Digital System Design (1100)

P. Pages : 3

Time : Three Hours

Max. Marks : 100

Instructions to Candidates :

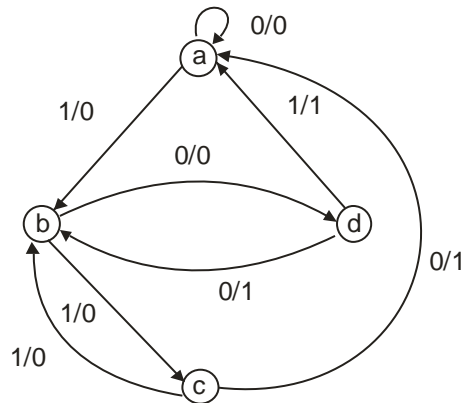
1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Solve **any two** sub - questions from each unit.
5. Assume suitable data wherever necessary.
6. Draw neat diagrams wherever necessary.

UNIT - I

1. a) Design a combinational circuit such that it has 4 inputs W, X, Y, Z and one output F. D_1 & D_2 represents 2 binary number each consisting of 2 - bits Wx & Yz respectively. The output F is to be 1 only if $|D_1 - D_2| < 2$. **10**
b) Design a combinational circuit to convert BCN to gray code. **10**
c) Design a combinational circuit for full adder. **10**

UNIT - II

2. a) Design 4 - bit combinational circuit for following. **10**
i) Output $Y_1=1$ if no. is prime and
ii) Output $Y_2=1$ if no. is divisible by 3 using ROM.
b) Design BCD to Excess - 3 code converter using PLA. **10**
c) Implement following state diagram using PAL, specify size of PAL. **10**



UNIT - III

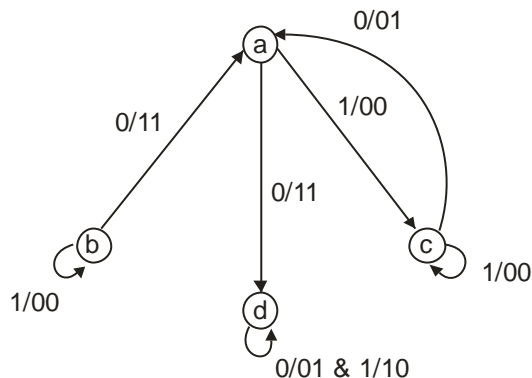
3. a) Minimize the given state table by using method of partition Minimize upto 3 state and also implement the same using D-FF. **10**

P s	N s O p	
	X = 0	X = 1
A	C 0	A 0
B	C 0	D 0
C	B 0	D 1
D	C 0	A 0
E	A 0	D 0
F	A 0	D 1

- b) Design Mod - 10 Ripple Counter. **10**
- c) Detect the sequence 0010 with drawing state table, state diagram and implement the same using J-K FF. **10**

UNIT - IV

4. a) Consider following state diagram and implement it using T-FF. **10**



- b) A sequential circuit has two FF A & B, two i/p x & y and o/p Z. The i/p functions and circuit o/p function are as follow. **10**

$$J_A = xB + \bar{y}\bar{B}$$

$$k_A = x\bar{y}\bar{B}$$

$$J_B = x\bar{A}$$

$$k_B = x\bar{y} + A$$

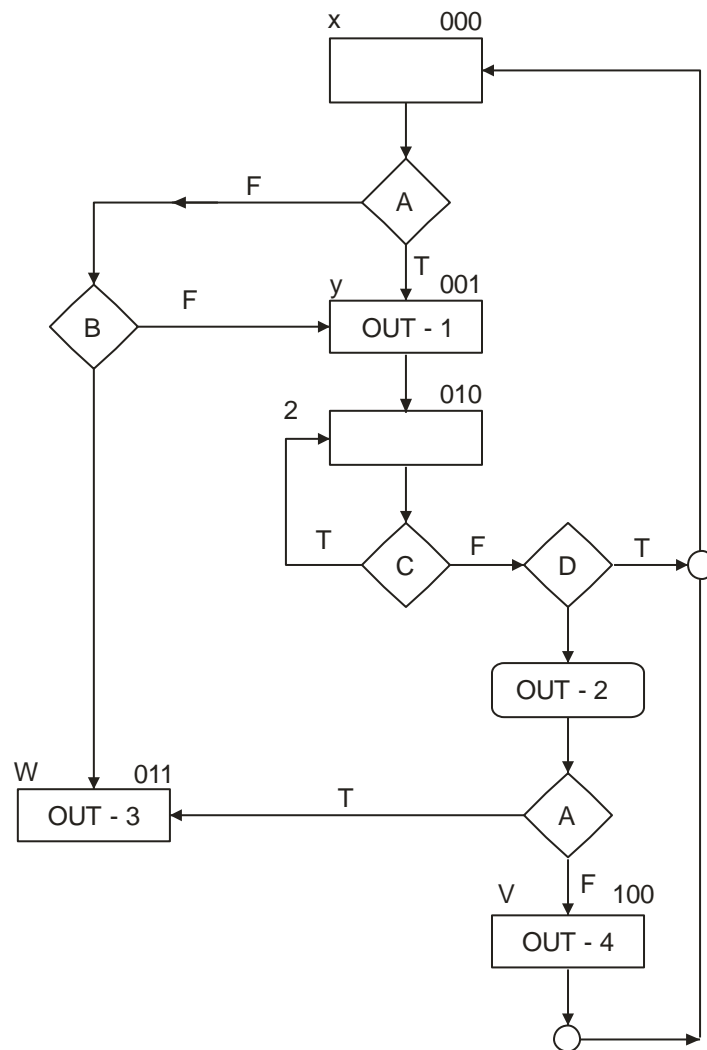
$$Z = xyA + \bar{x}\bar{y}B$$

Obtain state table, state diagram with the help of next state equation and transition table.

- c) Design a sequential circuit with two Dff A & B and one i/p x. When x=0, state of circuit remains same. When x=1, the circuit goes through state transition from 00 → 01 → 11 → 10 & back to 00 and repeat. **10**

UNIT – V

5. a) Develop an ASM chart for the circuit having i/p line x & one o/p Z. In coming data is examined in consecutive groups of 4 digits & o/p z=1 if and only if any one of 3 i/p sequence 1010 ; 0110, 0010. Occurs implement using traditional method. **10**
- b) Implement following ASM chart using. **10**
- MUX - controller method and
 - ROM - controller method.



- c) Explain ASM chart. Which are the notations used while drawing ASM chart. **10**
