USN | | | | | | | | | | |

PES Institute of Technology, Bangalore

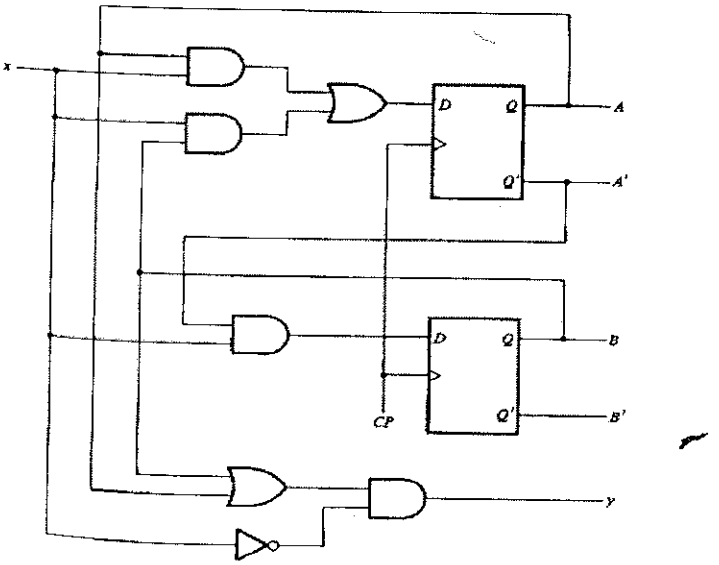
(Autonomous Institute under VTU, Belgaum)

CS 202

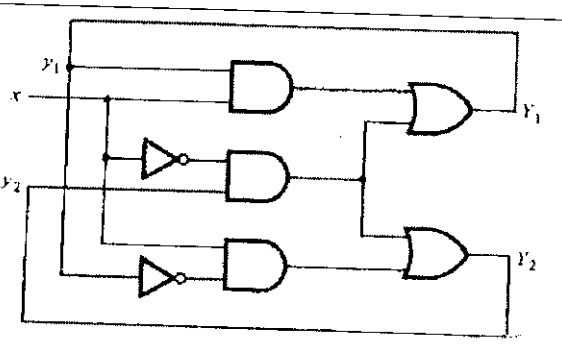
SEMESTER END EXAMINATION (SEE) B. E. III SEMESTER – AUG. 2010

CS 202 – DIGITAL DESIGN

Hrs | Answer All Questions | Max Marks: 100

Convert decimal +49 and +29 to binary using the signed 2's complement representation and enough digits to accommodate the numbers. Then perform the binary equivalent of (+29) + (-49), (-29) + (-49). Convert the answers back to decimal and verify that they are correct	6
The state of 12 bit register number is 100010010111. What is its content if it represents i. Three decimal digits in BCD ii. Three decimal digits in the excess-3 code iii. Three decimal digits in the 8421 code iv. A binary number	6
For the Boolean function F = xy'z + x'y'z + w'xy + wx'y + wxy a. Obtain the truth table of F b. Draw the logic diagram, using the original Boolean expression c. Use Boolean algebra to simplify the function to a minimum number of literals d. Obtain the truth table of the function from the simplified expression and show that it is the same as the one in part (a)	8
Simplify the following Boolean functions, using four variable map i. F (w, x, y, z) = ∑(1, 4, 5, 6, 12, 14, 15) ii. A'B'C'D' + AC'D' + B'CD' +A'BCD + BC'D	8
Design a code converter that converts a four bit gray code to a four bit binary number. Implement the circuit with exclusive OR gate	12
For the circuit shown below draw the state table and state diagram(Fig 3(a))  Fig 3 (a)	10

USN | | | | | | | | | | |

Design a sequential circuit with two JK flip-flops A and B and two inputs E and F. When E = 0, the circuit remains in the same state regardless of the value of F. When E =1 and F = 1, the circuit goes through the state transitions from 00 to 01, to 10.to 11, back to 00, and repeats. When E =1 and F = 0, the circuit goes through the state transitions from 00 to11, to 10, to 01, back to 00 and repeats	1(
The digital system to be designed consists of two registers R1 and R2 and a flip flop E. the system counts the number of 1's in the number loaded into register R1 and sets the register R2 to that number. This is done by shifting each bit from register R1 one at a time into flip flop E. The value in E is checked by the control and each time it is equal to 1, the registerR2 is incremented by 1. The control uses one external input S to start the operation and two status inputs E and Z from the data path. E is the output of the flip flop. Z is the output of the circuit that checks the contents of register R1 for all 0's. The circuit produces an output Z = 1, when R1 is equal to 0. Construct ASM chart and design data path and Control Logic	20
 **Fig 5(a)** Obtain a table that describes the sequence of internal states and outputs as function of changes in the input variables for the asynchronous sequential circuit shown in Fig 5(a). Also write the procedure for obtaining the transition table from the circuit diagram	10
Draw the portion of an ASM chart starting from an initial state. There are two control signals x and y. if xy = 10, register R is incremented by one and control goes to a second state. If xy = 01, register R is cleared to zero and control goes from the initial state to third sate. Otherwise, control stays in the initial state.	10