

GUJARAT TECHNOLOGICAL UNIVERSITY**B.E. Sem-III Regular / Remedial Examination December 2010****Subject code: 130701****Subject Name: Digital Logic Design****Date: 15 /12 /2010****Time: 10.30 am – 01.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a)** Convert the following Numbers as directed: **07**
- (1) $(52)_{10} = (\quad)_2$
- (2) $(101001011)_2 = (\quad)_{10}$
- (3) $(11101110)_2 = (\quad)_8$
- (4) $(68)_{10} = (\quad)_{16}$
- (b)** Reduce the expression: **07**
- (1) $A+B(AC+(B+C')D)$ (2) $(A+(BC)')'(AB'+ABC)$
- Q.2 (a)** Simplify the Boolean function: **07**
- (1) $F(w,x,y,z) = \sum (0,1,2,4,5,6,8,9,12,13,14)$
- (2) $F(w,x,y) = \sum (0,1,3,4,5,7)$
- (b)** Explain with figures how NAND gate and NOR gate can be used as Universal gate. **07**
- OR**
- (b)** Simplify the Boolean function: **07**
- (1) $F = A'B'C' + B'CD' + A'BCD' + AB'C'$
- (2) $F = A'B'D' + A'CD + A'BC$
- $d = A'BC'D + ACD + AB'D'$ Where “d” indicates Don't care conditions.
- Q.3 (a)** With logic diagram and truth table explain the working of 3 to 8 line decoder. **07**
- (b)** With logic diagram and truth table explain the working JK Flipflop. Also obtain its characteristic equation. How JK flip-flop is the refinement of RS flip-flop? **07**
- OR**
- Q.3 (a)** Design a counter with the following binary sequence: **07**
- 0, 4, 2, 1, 6 and repeat. Use JK flip-flops
- (b)** With logic diagram and function table explain the operation of 4 to 1 line multiplexer. **07**
- Q.4 (a)** What is the function of shift register? With the help of simple diagram explain its working. With block diagram and timing diagram explain the serial transfer of information from register A to register B. **07**
- (b)** With respect to Register Transfer logic, explain Interregister Transfer with necessary diagrams. **07**
- OR**
- Q.4 (a)** With logic diagram explain the operation of 4 bit binary ripple counter. Explain the count sequence. How up counter can be converted into down counter? **07**
- (b)** Prepare a detailed note on: Instruction Codes. **07**
- Q.5 (a)** What is scratchpad memory? With diagram explain the working of a processor unit employing a scratchpad memory. **07**
- (b)** Briefly explain control organization. With diagram explain control logic with one flip-flop per state. **07**
- OR**
- Q.5 (a)** Draw the block diagram of a processor unit with control variables and explain its operation briefly. **07**
- (b)** With simple diagram explain the working of control logic with sequence register and decoder. **07**
