

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-III EXAMINATION – WINTER 2015

Subject Code:130701

Date:29/12/2015

Subject Name: Digital logic design

Time: 2:30pm to 5:00pm

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 Hexadecimal numbers to Octal **06**
(a) 4F7.A8 (b) BC70.OE (c) 42FD

(b) Prove that **08**
(i) $A[B+C(\overline{AB+AC})] = AB$
(ii) $A\overline{B}(C+BD) + \overline{A}\overline{B} = \overline{B}C$

Q.2 (a) Minimize the following multiple output functions using K-Map **07**

(i) $F1 = \sum m(0,2,6,10,11,12,13) + d(3,4,5,14,15)$

(ii) $F2 = \pi M(0,4,9,10,11,14,15)$

(b) Describe briefly TTL fanin, fanout & noise margin with suitable sketches **07**

OR

(b) Design a combinational circuit whose input is a four bit number & whose output is the 2's complement of the input number **07**

Q.3 (a) Draw the logic diagrams of NAND & NOR gates & explain why they are called as universal gates **07**

(b) Explain error detecting & correcting codes with the help of a suitable example. **07**

OR

Q.3 (a) Explain excess -3 code & gray code **07**

(b) State & explain Demorgan's theorem **07**

Q.4 (a) Convert the following to other canonical form **07**

(i) $F(x,y,z) = \sum(1,3,7)$

(ii) $F(A,B,C,D) = \pi(0,1,2,3,4,6,12)$

- (b) Implement combinational logic using 8:1line MUX for **07**
 $F(A,B,C,D) = \sum m(0,2,4,5,7,9,12,15)$

OR

- Q.4 (a)** Draw & explain the operation of 4 bit binary parallel adder **07**
Q.4 (b) Draw the logic diagram of 3 to 8 line decoder. Explain **07**
its operation with truth table

- Q.5 (a)** State & explain any four operating characteristics of a flip **07**
flop
(b) Draw the state diagram & state table for Moore type **07**
sequence detector to detect the sequence 110

OR

- Q.5 (a)** Explain arithmetic micro operations with the help of a **07**
block diagram
(b) Discuss the differences between hard wired control & **07**
micro program control. State the merits of one over the
other
