

Roll No.

24043

**B. Tech. 3rd Semester (IT)
Examination – December, 2015**

DIGITAL ELECTRONICS

Paper : EE-204-F

Time : Three Hours]

[Maximum Marks : 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : The candidate will be required to attempt five questions in all, selecting at least one from each Unit. Question No. 1 is compulsory.

1. (a) Design a single bit magnitude comparator to compare two alphabet A and B. 2
- (b) Write the logic expressions for the difference and borrow of a half subtractor. 2
- (c) Implement the XOR function using ROM. 3
- (d) What are the two types of asynchronous sequential circuits? 2
- (e) State the differences between Mealy and Moore state machines. 3

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- (f) How a D flip-flop (FF) is converted into T FF? 2
- (g) Draw the logic diagram of static RAM cell and bipolar RAM cell. 2
- (h) How many flip flops are required to build a binary counter that counts from 0 to 1023? 2
- (i) What are don't care terms and hazards? 2

UNIT - I

- 2. (a) Express the Boolean function $f = A + B'C$ in a sum of minterms. 6
- (b) What is a BCD code and mention its applications. 2
- (c) Simplify the given Boolean function by using tabulation method : 8
 $F(A, B, C, D) = \sum m(1, 2, 3, 5, 7, 9, 10, 11, 13, 15)$
- (d) What is prime implicants? and state distributive law. 4
- 3. (a) Explain about NAND and NOR implementation. 8
- (b) Multiply $(1010.10)_2$ and $(101)_2$. 2
- (c) Define Radix of a number system. 2
- (d) Convert the binary number 110100 into gray code and write the necessary steps. 4
- (e) Realise : OR gate and AND gate using NOR gates. 4

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UNIT - II

- 4. (a) What is an adder ? Explain its logic diagram with truth table. 4
- (b) Differentiate combinational and sequential logic circuits. 4
- (c) Draw a logic circuit of a 4-bit parallel adder. 8
- (d) Differentiate between decoder and demultiplexer with example. 4
- 5. (a) Draw the logic diagram of a 2-bit by 2-bit binary multiplier and explain its operation. 8
- (b) Design a BCD adder and explain its working with necessary circuit diagram. 7
- (c) Implement following function using suitable multiplexer : 5
 $f(A, B, C, D) = \sum m(1, 3, 4, 11, 12, 13, 14, 15)$

UNIT - III

- 6. (a) Explain the operation of a BCD ripple counter with a JK flip flops. 10
- (b) Explain the operation of clocked RS flip flop using NAND gates. 5

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- (c) Explain the different type of triggering. 5
7. (a) Define modulus of a counter with examples. 2
- (b) Explain the operation of a 4-bit Johnson counter with truth table and timing diagram. 10
- (c) Explain the working of a 4-bit SISO shift register with logic diagram and truth table. 8

UNIT – IV

8. (a) Write short note on memory decoding and memory expansion. 10
- (b) Write short note on races and hazards that occur in asynchronous circuits. Discuss the method used for race free assignment with example. 10
9. (a) Implement a 3-bit up\down counter using PAL device. 8
- (b) Design and explain 32*8 ROM. 12