

Roll No .....

**CS/EI/IC - 303**

**B.E. III Semester**

Examination, December 2016

**Digital Circuit and System**

*Time : Three Hours*

*Maximum Marks : 70*

**Note:** i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each question are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

1. a) Show that a positive logic NAND gate is a negative logic NOR gate.
- b) Simplify the given Boolean Expression :  
 $F = x' + xy + xz' + xy' z'$ .
- c) Draw the XOR logic using only NAND gates.
- d) Realize OR, AND, NOT, NOR, EX-OR gates using NAND gates only.

OR

A four variable function is given as  $f(A, B, C, D) = \sum m(0, 2, 8, 10)$  with  $\sum m(4, 6, 12, 14)$  as don't care use k-map to minimize the function.

2. a) Write an expression for borrow and difference in a full Subtractor circuit.

- b) Design Half-adder using only NAND gates.
- c) Relate carry generate, carry propagate, sum and carry-out of a carry look ahead adder.
- d) Design a full adder circuit using NAND gates only.

OR

Realize the circuit of a full adder in terms of two half adders from its truth table.

3. a) How a multiplexer can be used as a ROM?
- b) What are the advantages of Schottky TTL family?
- c) Define noise margin. What is its importance?
- d) Compare and contrast the features of TTL and CMOS logic families.

OR

Explain the working of a basic totem-pole TTL 2 input NAND gate.

4. a) Differentiate Asynchronous and Modulus counter.
- b) Compare and contrast static RAM and dynamic RAM.
- c) Implement the Exclusive-OR function using PROM.
- d) Draw the logic diagram of a 2-bit by 2-bit binary multiplier and explain its operation.

OR

Realize  $F(w, x, y, z) = \sum (1, 4, 6, 7, 8, 9, 10, 11, 15)$  using 8 to 1 Mux.

5. a) Explain the term Accuracy and resolution of A/D converter.
- b) On what basis do we select a particular type of A/D converter for use?
- c) Explain why a tracking type A/D converter is particularly suitable for fast-changing analogue signals.
- d) With the help of circuit diagram explain the working of successive approximation type of A/D converter.

OR

Explain the working of Binary weighted digital to analog converter.

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