Roll No

CS/EI - 303

B.E. III Semester

Examination, December 2015

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 atone 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) What are universal gates? Why are they called so?
   b) Add and subtract octal numbers 369 and 715.
   c) Design a BCD to Excess-3 code converter.
   d) Minimize the given Boolean function using K-map and implement the simplified function using only NAND gates.

   $F(A, B, C, D) = \sum m(0, 1, 2, 9, 11, 15) + d(8, 10, 14)$

   OR

   Minimize the given Boolean function using Quine-McCluskey method

   $F(A, B, C, D) = \sum m(0, 2, 3, 6, 7, 8, 9, 10)$

2. a) Draw the truth table and logic diagram of full adder.
   b) Draw the logic diagram of BCD adder and explain its working.
   c) Draw the logic diagram of Ex-NOR gate using only NOR gates.

   d) Design a full subtractor circuit using decoder and OR gates.

   OR

   Draw the logic diagram of Look-ahead carry generator and explain its working.

3. a) Explain the terms-monostable, bistable and astable multivibrator.
   b) Write characteristics of digital logic families.
   c) Draw the circuit diagram of 2 input NAND gate (CMOS) and 2 input NOR gate (TTL) and explain their working.
   d) Draw the circuit diagram of Schmitt trigger and explain its working.

   OR

   Compare the following digital logic families RTL, DTL, TTL, ECL and CMOS.

4. a) Draw the logic diagram of priority encoder and explain its working.
   b) How a multiplexer can be used as a ROM?
   c) Design a 4-bit synchronous up counter using J-K flip-flops.
   d) Implement the following Boolean function using 4:1 multiplexer using A and B variables to the selection lines.

   $F(A, B, C) = \Sigma m(1, 4, 5, 7)$

   OR

   What is RAM? Distinguish between SRAM and DRAM. What is PLA?

5. a) What is the need of analog to digital conversion?
   b) Draw the circuit diagram of sample and hold circuit and explain its working.
   c) Write short note on V-F converters.
   d) Enlist the various types of Analog to Digital (A/D) converter and explain any one of them with neat sketch.

   OR

   Explain the operation of R-2R ladder type Digital to Analog (D/A) converter with a neat sketch.

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