**COE 200, Term 001**
**Fundamentals of Computer Engineering**
**Quiz# 3**

Date: Saturday, Nov. 4

**Q.1.** Implement the following Boolean function F(A, B, C, D)= A` C` + B C` + A` D + B D using only:

(i) Four 2x4 decoders and four 3-input OR gates.

(ii) Three 2x1 multiplexers.

**Q.2.** It is required to design a Combinational circuit that compares two n-bit numbers, $A=A_{n-1}-A_0$ and $B=B_{n-1}-B_0$, to check if **A is less than B** or not. Design a circuit that has three inputs and one output, that can be used for each of the n bits, such that the circuit is connected in cascade by carry-like signals. One of the inputs to each circuit is a carry input, and the single output is a carry output. If the final output from the last circuit is 1, then this indicates that A is less than B, otherwise A is greater than or equal to B. Using this circuit, show the design of a 4-bit less than comparator.