



FOURTH SEMESTER EXAMINATION-2012
DIGITAL ELECTRONICS CIRCUITS
EC-401

Full Marks: 60

Time: 3 Hours

Answer any six questions including question No.1 which is compulsory.

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable and
All parts of a question should be answered at one place only.

1. a) Obtain the 1's and 2's complements of the binary number 11101010. (2 x 5)
b) Convert $[10110]_2$ to Gray Code and $[1011]_{\text{gray}}$ to binary code.
c) What is the major difference between combinational circuits and sequential circuits?
d) Draw a half order circuit and write the truth table.
e) Explain the term fan-in and fan-out as applicable to gates.
2. a) Design a full adder circuit using two half adder circuits and also write the sum and carry equation of the full adder. (5)
b) Reduce the following expression to simplest SOP form and implement it using minimum number of NAND gates. (5)
 $F = \sum m(1, 2, 3, 5, 6, 7, 12) + \sum d(4, 11)$
3. a) Design a 3 bit odd and even parity generator. (5)
b) Convert SR flip flop to JK flip flop. (5)
4. a) Design a 3 bit asynchronous / ripple up counter using JK flip flop. (5)
b) Design a MOD - 6 synchronous counter using T flip flop. (5)
5. a) Explain the operation of a 555 Astable multi vibrator with proper logic diagram. (5)
b) Explain the operation of a serial in serial out (SISO) shift register. (5)
6. a) Design a 4:1 multiplexer and show the difference between multiplexer and demultiplexer. (5)
b) Design a 3 bit magnitude comparator. (5)
7. a) Explain a 3 to 8 line decoder and implement the following functions using 3 to 8 line decoder. (5)
 $F1 = \sum m(1, 2, 4, 7)$
 $F2 = \sum m(3, 5, 6, 7)$
b) Describe the successive approximation type of A/D converter with neat diagram. (5)
8. Write short notes on (any four) (2.5x4)
 - a) Read only memory (ROM)
 - b) TTL logic family
 - c) Priority encoder
 - d) Ring counter
 - e) Parallel binary adder
