

Code No. 3994 / CBCS / Non-CBCS

FACULTY OF SCIENCE

M.Sc. III – Semester (CBCS / Non-CBCS) Examination, December 2014

**Subject: Physics (Spl. Electronics Instrumentation)
Paper – III: Digital Logics Circuits**

Time: 3 Hours

Max.Marks: 80

**Note: Answer all questions from Part - A and Part - B.
Each question carries 4 marks in Part - A and 12 marks in Part - B.**

**PART – A (8 x 4 = 32 Marks)
[Short Answer Type]**

- 1/ ✓ Convert the decimal number 76 into its hexa decimal, binary and octal number equivalents.
- 2/ ✓ Simplify the Boolean expression $x'y' + xy + x'y$
- 3/ ✓ Write the truth tables of R, S and J, K flip flops.
- 4/ ✓ Explain the working of ring counter by drawing its circuit diagram and timing diagram.
- 5/ ✓ Enumerate the ECL logic family characteristics.
- 6 Draw the circuit diagram of CMOS transmission gate (Bilateral switch) and explain its working.
- 7/ ✓ Enumerate the types of ROMs.
- 8/ ✓ Draw the symbolic representation of a dynamic RAM cell and explain its working.

**PART – B (4 x 12 = 48 Marks)
[Essay Answer Type]**

- 9 a) ✓ Simplify the Boolean equation
$$Y = \overline{A} \overline{B} \overline{C} \overline{D} + \overline{A} \overline{B} C \overline{D} + \overline{A} B \overline{C} \overline{D} + \overline{A} B C \overline{D} + A \overline{B} \overline{C} \overline{D} + A B \overline{C} \overline{D}$$
using karnaugh map method and implement the circuit using NAND gates.
OR
 - b) How BCD addition is performed. Explain the working of BCD adder circuit by drawing its circuit diagram.
- 10 a) Draw the circuit diagram of 4-bit ripple counter and explain its working using timing diagram. Convert this circuit into Mod-10 counter.
OR
 - b) ✓ Write an essay on monostable multivibrators (one shot).
- 11 a) ✓ Draw the circuit diagram of TTL NAND gate and explain its working. Discuss the important characteristics of TTL logic families.
OR
 - b) What is multiplexing? Draw the circuit diagram of 8x1 multiplexer and explain its working. Implement the logic function $f = \Sigma (0, 1, 2, 5)$ using it.
- 12 a) ✓ Discuss the ROM architecture and explain the timing for ROM read operation. Enumerate the applications of ROM.
OR
 - b) Describe the PLD architectures PROM, PAL and PLAS.
