

FACULTY OF SCIENCE

M. Sc. III – Semester (CBCS / Non-CBCS) Examination, December 2013

Subject : Physics

(Specialization: Electronics Instrumentation)

Paper – III (303) : Digital Logic 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 binary code 1001111 into its Hexadecimal, octal and decimal equivalents.
2. Simplify the Boolean equation $Y = ABC + A\bar{C}$ and draw its circuit diagram.
3. Draw the circuit diagram of NAND latch and explain its working.
4. Explain the working of Johnson counter by drawing its circuit diagram and Timing diagram.
5. Explain the terms Noise immunity and Fan out of a digital IC.
6. Write a short note on LCD display.
7. Distinguish between static RAM and dynamic RAM.
8. Write a note on types of ROMs.

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

- 9.(a) Simplify the Boolean expression.
$$Y = \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}B\bar{C}\bar{D} + A\bar{B}\bar{C}\bar{D} + A\bar{B}C\bar{D} + \bar{A}BCD + A\bar{B}CD$$
using K-map method and implement the circuit using NAND gates.
OR
- (b) Explain how BCD addition is performed. Draw the circuit diagram of BCD adder and explain its working.
- 10.(a) Distinguish between synchronous and asynchronous counters. Draw the circuit diagram of a 4-bit asynchronous counter and explain its working using timing diagrams.
OR
- (b) What is a shift register? Enumerate the topologies of shift registers. Explain the working of left and right shift register.
- 11.(a) Explain the working of TTL NAND gate by drawing its logic diagram. Discuss the important characteristics of TTL logic families.
OR
- (b) Explain the operation of a 4-bit magnitude comparator with 74HC85 by giving its functional table. How two 74HC85 ICs are connected to perform 8-bit comparison.
- 12.(a) Discuss the dynamic RAM internal architecture and explain the DRAM refreshing modes.
OR
- (b) Write about programmable logic devices. Give the basic structures of PAL and PLA and mention few applications.
