Reg. No. : | | | | | | | | | | | |

P 1166

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2007.

Fourth Semester

Electronics and Communication Engineering

EC 242 — DIGITAL ELECTRONICS

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Using 2's compliment perform the given subtraction $1001101_2 - 110100_2$.

2. Using Boolean Algebra prove

   $x'y \oplus xy' = x \oplus y$.

3. Draw a 2 input CMOS NOR gate.

4. Define Fanout of a Digital IC.

5. Implement the function $f = \Sigma m\,(0, 1, 4, 5, 7)$ using 8 : 1 Multiplexer.

6. Design a half subtractor using 2 to 4 decoder.

7. Write the excitation tables of Jk and D flip flops.

8. Draw the logic diagram of 3 – bit ring counter.

9. What are the different types of races that occur in fundamental mode circuits.

10. Define cycle in asynchronous sequential circuits.

PART B — (5 × 16 = 80 marks)

11. (a) For the given functions

$$g(w, x, y, z) = \Sigma m\,(0, 3, 4, 5, 8, 11, 12, 13, 14, 15)$$

List all prime implicants and find the minimum product of sum expression. (16)

Or

(b) For the given function

$$f(a, b, c, d) = \Sigma m\,(0, 2, 3, 6, 8, 12, 15) + \Sigma d, (1, 5)$$

Find the minimum sum of products expression using Quine – McCluskey Method. (16)

12. (a) Design a 4 : 1 Multiplexer using Transmission gates and explain its operation. (16)

Or

(b) Draw a 2 input NAND gate using shottky TTL logic and explain its operation. (16)

13. (a) (i) Design a BCD – Excess 3 code converter and implement it using logic gates. (8)

(ii) Design a 4 bit ripple carry adder. (8)

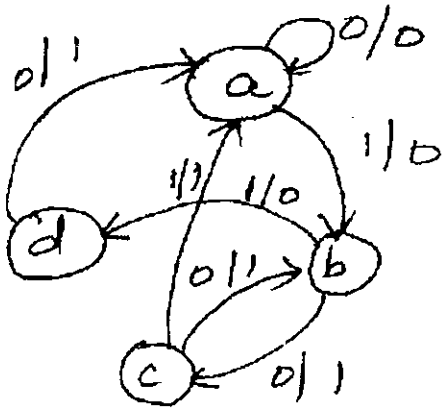
Or

(b) Design the given functions using PAL and PROM. (16)

$$F_1 = \Sigma m\ (0, 1, 4, 5, 7, 9, 11, 13)$$

$$F_2 = \Sigma m\ (1, 3, 5, 6, 9, 11, 14, 15)$$

14. (a) For the state diagram shown, design a sequential circuit using Jk flip flops. (16)



Or

(b) Write short notes on :

(i) Memory Decoding (8)

(ii) RAM. (8)

15. (a) Discuss on the different types of Hazards that occur in asynchronous sequential circuits. (16)

Or

(b) Write short notes on :

(i) Race free assignments (8)

(ii) Pulse mode circuits. (8)