Total No. of printed pages = 3

ET-403/DE/4th Sem/2013/N

DIGITAL ELECTRONICS

Full Marks – 70

Pass Marks – 28

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer any *five* questions.

1. (a) Convert the following : 2×5=10

(i) $(257)_8$ to decimal

(ii) $(2AB.IF)_{16}$ to binary

(iii) 10101011_2 to Gray code

(iv) $(57)_{10}$ to Ex-3 code

(v) 1011011.10_2 to octal

(b) (i) Subtract 5 from 9 using 2's complement method. 2

(ii) Subtract 5 from 9 using 1's complement method. 2

2. (a) Define De Morgan's theorem and prove it with logic circuit and truth table. 4

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(b) Realize the equation

$Y = A\bar{B} + B\bar{C} + C\bar{A}$ using only NAND and NOR gates. 4

(c) Convert the equation

$Y = ABC + A\bar{B}D + BC + AD$ into standard SOP form. 4

(d) What is K-map ? 2

3. (a) Minimize the logic function

$F(A, B, C, D) = \sum m\ (0, 1, 4, 5, 7, 8) + d\ (10, 11, 14)$ by using K-map. 7

(b) What is full adder ? Explain it with proper circuit and truth table. 5

(c) What is duality theorem ? 2

4. (a) Classify various types of memory and explain the magnetic memory in details. What is cache memory ? 5+2=7

(b) What is counter ? Describe any one type of synchronous counter in details. 5

(c) What is a Ring counter ? 2

5. (a) Why flip-flop is called 1-bit of memory cell? Describe the operation of a clocked S-R flip-flop. 2+4=6

(b) What is race arround condition in J-K flip-flop ? How can it be overcome ? Explain. 3+5=8

6. (a) Explain the operation of a 4-bit serial in serial out shift register. 6

(b) Explain the operation of an analog to digital converter using neat diagram. 6

(c) Differentiate sequential logic circuit and combinational logic circuit with examples. 2

7. Write short notes on any *four* : 3½×4=14

(a) Seven segment display

(b) TTL IC and CMOS IC

(c) D/A converter

(d) PROM

(e) Multiplexer.