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10 (DL)

[18–HRGPKAC–M1S]

MCA/PGDCA/MSc IT 1st Semester Exam., 2018

DIGITAL LOGIC

[MCA (S1) 02]

Full Marks : 80

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Answer any *five* questions from the following : 2×5=10

(a) Convert $(6336 \cdot 45)_8$ into its decimal form.

(b) Write the truth table for AND operation.

(c) Define logic gate.

(d) Define multiplexer.

(e) Define flip-flop.

(f) Which memory is said to be volatile and why?

2. Answer any *three* questions from the following : 4×3=12

(a) Add the following 8-bit numbers and then show the same numbers in hexadecimal notation :

$$\begin{array}{r} 0101\ \ 0111_2 \\ \underline{1001\ \ 0011_2} \end{array}$$

(b) Define maxterm and minterm with example.

(c) Design a 3-bit full-adder.

(d) Explain RS flip-flop with truth table.

3. Answer any *three* questions from the following : 6×3=18

(a) *(i)* Convert 765_8 into its binary form.

(ii) Add $2C_{16}$ and 81_{16}.

(b) Prove that $AB + \overline{A}C + BC = AB + \overline{A}C$.

(c) Draw a logic diagram of OR gate using NOR/NAND gate.

(d) Explain Master-Slave JK flip-flop with truth table and block diagram.

4. Answer any *four* questions from the following : 10×4=40

(a) *(i)* Determine the single-error correcting code for the BCD number 1001 (information bits) using odd parity. 5

(ii) Obtain the canonical sum of product form of the function $Y = AB + ACD$. 5

(b) Reduce the following Boolean expression using K-map method : 10

$$Y = \sum m(0, 2, 4, 7, 8, 9, 12, 14)$$

(c) Draw a logic block diagram of a full-subtractor using two half-subtractors. Write its truth table. 10

(d) Design a 3-bit binary ripple counter. Also give the timing diagram. 10

(e) *(i)* Describe and compare sequential access memory and random access memory. 5

(ii) Explain the different types of fuse technologies used in PROM. 5

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