2011

PGDCA

Paper : 1.3

(Digital Logic)

Full Marks : 100

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Multiple choice questions (one of the four options in each question is correct, choose the correct one) : 1×10=10

(a) A number system that uses only two digits, 0 and 1 is called as

(i) decimal number system

(ii) binary number system

(iii) bits number system

(iv) base number system

(b) Which of the following is a unit of measurement with computer systems?

(i) Byte

(ii) Megabyte

(iii) Kilobyte

(iv) All of the above

(c) The 1's complement of $1001_{(2)}$ is

(i) 0010

(ii) 0110

(iii) 1111

(iv) 0101

(d) 101+1 is equal to

(i) 100

(ii) 111

(iii) 011

(iv) 110

(e) SOP stands for

(i) sum on product

(ii) sum output product

(iii) sum of all products

(iv) sum of product

(f) NAND gate, like a NOR gate, universal and

(i) functionally complete

(ii) functionally incomplete

(iii) logically complete

(iv) logically incomplete

(g) Octal equivalent of $(34)_{10}$ is

(i) 42

(ii) 27

(iii) 44

(iv) 40

(h) AND gate produces a high output only when both the inputs are

(i) low

(ii) augend

(iii) high

(iv) added

(i) Demultiplexer performs the reverse operation of

(i) decoder

(ii) multiplexer

(iii) combinational circuit

(iv) encoder

(j) The value of each bit in the BCD number is represented by a

(i) binary number

(ii) decimal number

(iii) gray code

(iv) ASCII code

2. State whether the following statements are true or false : 1×10=10

(a) Digital computer prefers counting rather than measuring data.

(b) Binary number system is an example of non-positional number system.

(c) A binary number with 4 bits is called a byte.

(d) Binary equivalent octal number 56 is 101110.

(e) The NAND function is the complement of the OR function.

(f) Half adder is an example of combinational circuit.

(g) The basic multiplexer has several input lines and single output line.

(h) A processor's speed is measured in gigabytes.

(i) The logic function NOT operation is logical complementation.

(j) Number of cells in K-map depends upon the number of variables of Boolean expression.

3. Fill in the blanks : 1×10=10

(a) A computer performs the given task using set of ——.

(b) The two symbols 0 and 1 are known as ——.

(c) A binary number with 4 bits, is called a ——.

(d) Decimal equivalent of binary 1001 is ——.

(e) A hexadecimal number system uses —— digits.

(f) A register stores the —— information ——.

(g) Double dabble method is also termed as ——.

(h) Boolean multiplication is same as the logical —— operation.

(i) A combination of NOT and AND gate is termed as ——.

(j) Decoder converts binary information from *n* input lines to a maximum —— unique output lines.

4. Match Column—A with Column—B : 1×10=10

	Column—A		*Column—B*
(a)	Computer programs are written using	*(i)*	Data processing
(b)	Digital computers are used for	*(ii)*	Stable states
(c)	Base two system	*(iii)*	Logic operation
(d)	BCD code	*(iv)*	Cells
(e)	The AND function is referred as a	*(v)*	Binary number system
(f)	NOT gate produces a	*(vi)*	Weighted binary code
(g)	The Karnaugh map (K-map) contains boxes called	*(vii)*	Negation
(h)	The half adder functions according to the	*(viii)*	Addition
(i)	A flip-flop is an electronic circuit which has two	*(ix)*	Truth table
(j)	The Arithmetic Logic Unit (ALU) performs arithmetic and	*(x)*	Programming languages
		(xi)	Addition
		(xii)	Octal number system
		(xiii)	Product
		(xiv)	Unstable

5. Answer the following : 3×10=30

(a) Explain the octal number system.

(b) How can you get 1's complement of a binary number?

(c) What is Excess-3 code?

(d) What is a logic gate?

(e) Find the binary equivalent of the decimal number 120.

(f) Define OR and AND operation.

(g) What is a NAND and NOR gate?

(h) What is Karnaugh map? Explain with examples.

(i) What are universal gates?

(j) What is a half adder? Explain.

Answer any *two* from the following :

6. *(a)* Perform the following : 3×3=9

(i) Find the octal equivalent of 100110101.

(ii) Find the hexadecimal equivalent of 100110101.

(iii) Convert the decimal 123 to base-8 system.

(b) Differentiate among ASCII, BCD and EBCDIC code. 6

7. *(a)* Write the symbols and truth tables for the following gates : 9

(i) AND

(ii) OR

(iii) NAND

(iv) NOR

(b) Prove the following : 6

(i) $A + AB = A$

(ii) $A + A'B = A + B$

8. *(a)* Convert $A + B$ to minterms. 6

(b) Explain with logic diagram the function of a full adder. Write its truth table. 9

★ ★ ★