

1st Semester Examination, 2022

Time : 3 hours

Full Marks : 60

Answer from all the Parts as per direction

The figures in the right-hand margin indicate marks

*Candidates are required to answer in their own words
as far as practicable*

(DIGITAL LOGIC)

PART – I

- 1. Answer all the questions and fill in the blanks
as required :**

1 × 8

**(i) The decimal equivalent of the binary number
(1111.011)₂ is _____.**

(a) $(15.375)_{10}$

(b) $(10.123)_{10}$

(Turn Over)

- (c) $(11.175)_{10}$
(d) $(9.23)_{10}$
- (ii) There are _____ cells in a 3-variable K-map.
- (a) 6
(b) 8
(c) 16
(d) 9
- (iii) IEEE double precision floating point number is 64 bit.
- (iv) Booth algorithm is used for binary multiplication.
- (v) The primary difference between a counter and a register is
- (a) A counter has the capability to store n bit of information whereas a register has one bit.
(b) A register counts data

- (c) A register has no specific sequence of states
 - (d) A counter has no particular sequence of states
- (vi) Decoders and Encoders are doing reverse operation.
- (a) True
 - (b) False
 - (c) Can't say
 - (d) None of these
- (vii) EPROM uses an array of _____.
- (a) *p*-channel enhancement type MOSFET
 - (b) *n*-channel enhancement type MOSFET
 - (c) *p*-channel depletion type MOSFET
 - (d) *n*-channel depletion type MOSFET
- (viii) Flash memory is a non-volatile storage device in which data
- (a) Can be erased physically

- (b) Can be erased magnetically
- (c) Can be erased electrically
- (d) Cannot be erased.

PART – II

2. Answer any *eight* of the following questions within *two to three* sentences each : $1\frac{1}{2} \times 8$

- (a) What is use of Karnaugh Maps ?
- (b) Why NAND and NOR gate are called universal set of gates ?
- (c) What is fast adder ?
- (d) 2's complement of the binary number (101100) is _____.
- (e) Define Guard Bits.
- (f) What is flip-flop ?
- (g) What is the use of counter ?
- (h) Define finite state machine.

- (i) What is EPROM ?
- (j) Define size of memory.

PART – III

3. Answer any *eight* of the following questions within 75 words each : 2 × 8

- (a) Define character code.
- (b) Define absorption law of Boolean algebra.
- (c) Add the numbers +16 and -8 using 2's complement method.
- (d) Draw logic gate of the Boolean expression :
 $(A + B) + (A.B)'$
- (e) What are the uses of register ?
- (f) What is multiplexer ?
- (g) Define Programmable Array Logic.
- (h) Define synchronous DRAM.

- (i) Why we use optical disks ?
- (j) Define cost of memory.

PART – IV

Answer all questions within 500 words each : 6×4

4. (a) Simplifying the Boolean expression
 $f(A,B,C,D) = \sum m(0,1,2,3,4,8,10,11,12,13)$
using K-maps.

Or

- (b) Define logic gates. Design NAND gate and NOR gate.
5. (a) Discuss the steps of Booth Algorithm with examples.

Or

- (b) Write notes on :
- (i) IEEE single precision floating point numbers

(ii) Fast Adder.

6. (a) Explain Master-Slave flip-flop with its truth table and timing diagram.

Or

(b) What is multiplexer ? Design (4×1) multiplexer circuit.

7. Write short notes on : (Any two)

(i) Flash memory

(ii) PROM

(iii) DRAM

(iv) Magnetic hard disk.
