2019

(1st Semester)

Time : 3 hours

Full Marks : 60

Answer all the Parts as per directed

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. Fill in the blanks : 1 × 8

   (*a*) 1001011 represent a binary number whose decimal equivalent is _____.

   (*b*) The number of digits in octal system is _____.

   (*c*) In 2's complement representation the number 11100101 represents the decimal number_____.

(e) Write the Boolean expressions in sum of products form of

$$Y = (B + D)(A' + B' + C).$$

(f) Convert decimal number 214 to its octal equivalent.

(g) Write the behavioral model of a simple AND gate.

(h) Briefly explain about EPROM.

(i) Realize the OR gate and AND gate using NOR gate.

(j) State de Morgan's theorem and absorption law.

PART–IV

Answer all questions : 6 × 4

4. (a) Implement the function

$$F = (AB + A'B')(CD' + C'D)$$

using (*i*) NAND gates (*ii*) NOR gates. 6

(f) What is flash memory ?

(g) Subtract $(11010)_2 - (10000)$ by using 2's complement.

(h) What is a PAL ?

(i) Find the unknown base $(240)_{10} = (1430)_x$.

(j) What is FPGA ?

PART–III

3. Answer any *eight* questions : 2 × 8

(a) Simplify the Boolean expression

$$Y = A + AB + ABC$$

(b) Draw a 2 bit by 2 bit Binary multiplier circuit.

(c) Why a pulse transition circuit is used in the clock circuit of an edge triggered JK Flip-Flop ?

(d) Prove the distributive property of Boolean algebra.

(*d*) A device which converts BCD to seven segment is called _____.

(*e*) _____ form of logical expression is suitable for realization of digital circuit using only NAND gates. 2/6

(*f*) The registers which are used to simply store the data are called _____.

(*g*) A 32 × 10 ROM contains a _____ decoder.

(*h*) The Boolean expression $A \cdot B' + A' \cdot B + A \cdot B$ is equivalent to _____.

PART–II

2. Answer any *eight* questions : $1\frac{1}{2} \times 8$

(*a*) What is NOR gates ?

(*b*) What are the outputs of half-subtractor ?

(*c*) What is EEPROM ?

(*d*) What is a latch ?

(*e*) Define shift register.

Or

(*b*) Solve using *k*-map. 6

$$\Sigma (0, 1, 2, 5, 7, 8, 9, 10, 15, 18)$$

5. (*a*) Multiply (+14) and (– 6) using Booth's algorithm. 6

Or

(*b*) Briefly explain a 4 bit carry-look ahead adder. 6

6. (*a*) Design a 3-bit binary counter using *T* flip-flop. 6

Or

(*b*) Explain a 4-to-1 line multiplexer with logic diagram and function table. 6

7. (*a*) Write notes on : 6

(*i*) Asynchronous DRAMS

(*ii*) Flash memory.

Or

(*b*) Write notes on : 6

(*i*) Synchronous DRAMS

(*ii*) PROM.

SH CSE—02
(Model Syllabus)

1st Semester Examination, 2021

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Full Marks : 60

Answer from **all** the Parts as per direction

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(DIGITAL LOGIC)

PART – I

1. Answer the followings within *one* word/*one* sentences : 1×8

   (*a*) The decimal equivalent of the binary number $(101.01)_2$ is _____ .

   (*b*) Number of digits in binary number is _____ .

   (*c*) The 2's complement of a binary number 10010 is _____ .

(*d*) IEEE single precision floating point number is _____ bits.

(*e*) What is register ?

(*f*) What symbol used for NOR gate ?

(*g*) PROM stands for _____ .

(*h*) What is dynamic memory ?

PART – II

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

(*a*) Find the binary equivalent of decimal number $(37.12)_{10}$.

(*b*) State Demorgan's law of Boolean algebra.

(*c*) Define K-map of 3-variable.

(*d*) Find 1's complement of the binary number 100011.

(*e*) Define guard bits.

(*f*) What is sequential circuit ?

(g) Define fast adder.

(h) Give an example of shift register.

(i) What is RAM ?

(j) What is cost of memory ?

PART – III

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

(a) Define the maxterm of the logical expression.

(b) Why NAND and XOR called universal set of gates.

(c) What is underflow condition in addition of signed numbers ?

(d) What is UP counters ?

(e) Define signed number.

(f) What is 4 × 1 multiplexer ?

(g) Define finite state machine.

(h) How to measure size of memory ?

(Turn Over)

(*i*) What is DRAM ?

(*j*) What is semiconductor memory ?

PART – IV

Answer all questions : 6×4

4. (*a*) If $x, y \in B$, where B is Boolean algebra Prove that, $x + (x . y) = x$.

(*b*) Simplify the following Boolean expression :
$(A + B) . (A + C)$

Or

(*c*) Write the Product of Sum (POS) of the expression using K-map
$F (A, B, C, D) = \Sigma (1, 2, 4, 8, 12, 13)$

(*d*) Draw the logic circuit of $(X . Y') + (X' + Y')$.

5. (*a*) Multiple (–5) and (–10) using Booth's algorithm.

Or

(*b*) Add the numbers using 2's complement.

(*i*) 24 + (–11)

(*ii*) (–38) + (–10)

6. (*a*) Discuss state table, diagram and state equation of JK flip-flop.

Or

(*b*) Design a 2 to 4 decoder circuit.

7. Write short notes on (any *two*) :

(*i*) RAMBUS memory

(*ii*) Asynchronous DRAM

(*iii*) Secondary Storage

(*iv*) Flash memory.