

Code : 041402

B.Tech 4th Semester Exam., 2019

DIGITAL ELECTRONICS

Time : 3 hours

Full Marks : 70

Instructions :

- (i) The marks are indicated in the right-hand margin.
- (ii) There are **NINE** questions in this paper.
- (iii) Attempt **FIVE** questions in all.
- (iv) Question No. 1 is compulsory.

1. Choose the correct answer from the following
(any seven) : $2 \times 7 = 14$

(a) Binary number 110011011001 is equal to decimal number

(i) 3289

(ii) 2289

(iii) 1289

(iv) 289

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(2)

(b) If number of information bits is 11, the number of parity bits in hamming code is

(i) 5

(ii) 4

(iii) 3

(iv) 2

✓ (c) The problem of logic race occurs in

(i) SOP function

(ii) POS function

✓ (iii) hybrid function

(iv) SOP and POS function

(d) As compared to TTL, ECL has

(i) lower power dissipation

✓ (ii) lower propagation delay

(iii) higher propagation delay

(iv) higher noise margin

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(3)

(e) When two 4-bit parallel adders are cascaded, we get

- (i) 4-bit parallel adder
- (ii) 8-bit parallel adder
- (iii) 16-bit parallel adder
- (iv) None of the above

(f) To implement the expression of $\overline{A}BCD + A\overline{B}CD + AB\overline{C}D$ it takes one OR gate and

- (i) one AND gate
- (ii) three AND gates
- (iii) three AND gates and four inverters
- (iv) three AND gates and three inverters

(g) A binary ladder network D/A converter requires

- (i) resistor of one value only
- (ii) resistors of many different values
- (iii) resistor of two different values
- (iv) None of the above

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(Turn Over)

(4)

(h) In a clocked NAND latch race condition occurs when

- (i) R and S are high and CLK is low
- (ii) R and CLK are high and S is low
- (iii) R, S, CLK are high
- (iv) R, S, CLK are low

(i) In a 4-bit ripple counter clock pulse is applied to

- (i) clock input of first FF
- (ii) clock input of second FF
- (iii) clock input of all FF
- (iv) clock input of last FF

(j) A bistable multivibrator acts as a

- (i) logic switch
- (ii) flip-flop
- (iii) square wave form generator
- (iv) None of the above

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2. (a) Convert the following octal numbers into hexadecimal :
- (i) $(362)_8$
- (ii) $(241)_8$
- (b) Convert the following numbers into binary numbers :
- (i) $(539)_{10}$
- (ii) $(338.2)_{16}$
- (c) Convert the gray code number 110011 to binary.
- (d) Explain weighted and non-weighted codes. $3+3+4+4=14$
3. (a) What are De Morgan's theorems? Write them in equation form. Prepare their truth table.
- (b) Simplify the function and draw a circuit to realize the function :
- $$Y = (A + B) (A + \overline{AB}) C + \overline{A} (B + \overline{C}) + \overline{AB} + ABC$$
- $6+8=14$
4. (a) Draw a circuit diagram of DTL gate and explain it. What are fan in and fan out?
- (b) Draw a circuit diagram of RTL gate and explain its working. $7+7=14$

5. (a) Draw the circuit of half adder and full adder and discuss their working. Draw their truth table.
- (b) What is a decoder? Draw the complete circuit and truth table of a 4 line to 16 line decoder. $7+7=14$
6. (a) Explain the following flip-flops with their diagrams and truth tables :
- (i) SR
- (ii) J-K
- (iii) DFF
- (iv) TFF
- (b) Design DFF from JK FF. $7+7=14$
7. (a) Draw the circuit of a 3-bit synchronous counter and explain its working.
- (b) Draw the circuit of a parallel IN—serial OUT shift register and explain its working. $7+7=14$
8. (a) Draw the circuit of parallel A/D converter and explain its working.
- (b) Draw the circuit of a monostable multivibrator using timer 555 and explain its working. $7+7=14$

9. Write short notes on any *two* of the following : 7×2=14

- (a) Static and dynamic RAM
- (b) Synchronous and Asynchronous counters
- (c) Magnitude comparators
- (d) Number system

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