



II B.Tech II Sem Supply End Examination, March 2022

Digital Electronics**(EEE)****Time: 3 Hours.****Max. Marks: 70**

Note: 1. Answer any FIVE questions.

2. Each question carries 14 marks and may have a, b as sub questions.

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|---|----|--|-----|-----|-----|
| 1 | a) | (i) Convert the $(A4C2)_{16}$ to decimal | 8M | CO1 | BL1 |
| | | (ii) $(16)_{10} = (100)_b$ find the value of b? | | | |
| | | (iii) Multiply 10110.11 and 101.10 | | | |
| | | (iv) Divide 1110.01 and 110.01 | | | |
| | b) | Obtain the weights of three different four-bit self-complementing codes whose only negative weight is -4 . | 6M | CO1 | BL3 |
| 2 | a) | Construct a seven-bit error-correcting code to represent the decimal digits by augmenting the Excess-3 code and by using an odd-1 parity check | 7M | CO1 | BL3 |
| | b) | Draw the circuit diagram of TTL NAND gate and explain its function with the truth table | 7M | CO1 | BL2 |
| 3 | a) | Find the minimal sum-of-products expression using k-map. | 7M | CO2 | BL2 |
| | | $f(u, w, x, y, z) = \sum (1, 2, 6, 7, 9, 13, 14, 15, 17, 22, 23, 25, 29, 30, 31)$ | | | |
| | b) | Show maps for four-variable functions with the following specifications. If this is impossible, explain why? | 7M | CO2 | BL3 |
| | | (i) There are no essential prime implicants. | | | |
| | | (ii) All the prime implicants are essential | | | |
| 4 | a) | Design a 4 to 16 decoder and draw a logic diagram and explain its working. | 7M | CO2 | BL3 |
| | b) | Write excitation table, truth table and explain function of JK flip-flop with neat logic diagram. | 7M | CO2 | BL1 |
| 5 | a) | Design a modulo-8 binary counter and write its transition and output tables and implement it using T flip-flops. | 7M | CO2 | BL3 |
| | b) | What are the advantages of latch and compare its performance with flip-flops. | 7M | CO2 | BL2 |
| 6 | a) | A 5-bit DAC has a current output. For a digital input of 101000, an output current of 10mA is produced. What will be the output for a digital input of 1110? | 4M | CO3 | BL1 |
| | b) | Write all specifications of A/D converter and compare different types of A/D converters. | 10M | CO3 | BL2 |

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|---|----|--|----|-----|-----|
| 7 | a) | Explain the working of counting A/D converter with neat circuit diagram. | 7M | C03 | BL2 |
| | b) | What is SRAM? What are the disadvantages of it? How to read and write operations are performed in it? | 7M | C05 | BL1 |
| 8 | a) | Design the following function using PLAs:
$F1 = ab' + ac + a'b + b'c'$
$F2 = ab' + ac' + a'c' + b'c$ | 7M | C05 | BL2 |
| | b) | Draw the structure of FPGA and explain how LUTs are used in the design of digital circuits? | 7M | C05 | BL1 |

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