**20EI303**

**Hall Ticket Number:**

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| **II/IV B.Tech (Regular / Supplementary) DEGREE EXAMINATION** | | | |
| **February, 2023** | **Electronics and Instrumentation Engineering** | | |
| **Third Semester** | **Digital Electronics** | | |
| **Time:** Three Hours | | **Maximum: 7**0 Marks | |
| *Answer Question No.1 compulsorily.* | | | (14X1 = 14 Marks) |
| *Answer ONE question from each unit.* | | | (4X14=56 Marks) |
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| 1. | a) | | | Convert the Octal number (4107)8 to Hexadecimal number. | CO1 | L1 | 1M |
|  | b) | | | Convert the given number (234)5 into Decimal number. | CO1 | L1 | 1M |
|  | c) | | | Represent (-56) in signed 1’s and Signed 2’s compliment forms. | CO1 | L1 | 1M |
|  | d) | | | Draw the logic diagram of NOR gate using minimum number of NAND gates | CO2 | L3 | 1M |
|  | e) | | | Determine the complement of the function F = AB + (AC)’+AB’C | CO2 | L2 | 1M |
|  | f) | | | Write any 4 postulates of Boolean Algebra | CO2 | L1 | 1M |
|  | g) | | | Write the truth table of Full subtractor. | CO3 | L1 | 1M |
|  | h) | | | Draw the logic diagram of 2x4 decoder using logic gates. | CO3 | L3 | 1M |
|  | i) | | | What is the difference between decoder and De-multiplexer? | CO3 | L1 | 1M |
|  | j) | | | How many number of Flip-flops are required to construct a mod-4 Counter? | CO3 | L1 | 1M |
|  | k) | | | Draw the logic diagram of a 4-bit Ring counter. | CO4 | L3 | 1M |
|  | l) | | | What are the applications of Shift Registers? | CO4 | L1 | 1M |
|  | m) | | | What are the advantages of CMOS Logic? | CO4 | L1 | 1M |
|  | n) | | | Compare PROM, PAL & PLA. | CO4 | L3 | 1M |
|  | | **Unit - I** | | | | | |
| 2. | a) | | Convert the following numbers to Decimal and then to Binary.  i) (A6B)16 ii) (1206)8 | | CO1 | L1 | 7M |
|  | b) | | Perform the following operations using 2’s complement arithmetic:  i) (75)16 − (32)10  ii) (5BE)16 − (2FB)16 | | CO1 | L1 | 7M |
|  | | **(OR)** | | | | | |
| 3. | a) | | Perform the following subtraction using BCD code with 9’s complement and 10’s complement methods.   1. (78)10-(32)10 (ii) (32.41)10-(41.07)10 | | CO1 | L2 | 7M |
|  | b) | | Express the following function in canonical SOP & Canonical POS forms. F(A,B,C,D) = AB’D + A’C + BC’ | | CO1 | L3 | 7M |
|  | | **Unit - II** | | | | | |
| 4. | a) | | Simplify the following Boolean function using K-map and implement it using basic gates only.  F(A,B,C,D) = Σ(0, 2, 8, 9, 10, 15) + Σd (1, 3, 6,7) | | CO2 | L1 | 7M |
|  | b) | | Design a BCD to Excess-3 code converter and draw the logic diagram. | | CO2 | L2 | 7M |
|  | | **(OR)** | | | | | |
| 5. | a) | | Minimize the following function using Quine-McCluskey method  F(W,X,Y,Z) = Σm(0,2,3,5,7,8,10,11,14,15). | | CO2 | L4 | 7M |
|  | b) | | Design a Full adder circuit and implement it using Logic gates | | CO2 | L3 | 7M |
|  | | **Unit - III** | | | | | |
| 6. | a) | | Design a 16x1 multiplexer using 4x1 multiplexers. | | CO3 | L4 | 7M |
|  | b) | | Draw the logic diagram of a SR Flip-flop using NAND gates and explain its operation using characteristic table. | | CO3 | L3 | 7M |
|  | | **(OR)** | | | | | |
| 7. | a) | | Design a 4-bit Binary to Gray code converter. | | CO3 | L3 | 7M |
|  | b) | | Convert i) T flip-flop to JK Flip-flop ii) D flip-flop to SR Flip-flop | | CO3 | L2 | 7M |
|  | | **Unit - IV** | | | | | |
| 8. | a) | | Explain how a shift register can be used as twisted Ring counter and explain its operation. | | CO4 | L1 | 7M |
|  | b) | | Design a synchronous mod-6 counter using JK Flip-Flops and draw its logic diagram. | | CO4 | L2 | 7M |
|  | | **(OR)** | | | | | |
| 9. | a) | | Design a two-input CMOS NOR gate and explain its operation with the help of function table. | | CO4 | L2 | 7M |
|  | b) | | Implement the following Boolean functions using PROM F1 (A, B, C) = Σm (1, 2, 4)  F2 (A, B, C) = Σm (0, 3, 6, 7) | | CO4 | L3 | 7M |

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