筆記課題

筆記課題

「ディジタル回路に関する基礎知識」

|  |
| --- |
| 1. 作業時間：60分 2. 注意事項 3. 指導員の指示があるまで問題は見ないでください。 4. 解答用紙に入所期、氏名を記入してください。 |

問題1　次の２進数を10進数に変換しなさい。（５点×２）

①

②

問題２　次の10進数を2進数に変換しなさい。（５点×２）

1. １３
2. ５９

問題3　次の2進数を16進数に変換しなさい。（５点×２）

①

②

問題4　次の論理回路を論理式化しなさい。また真理値表にも出力結果を記入しなさい。（５点×４）

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | S |
| 0 | 0 | 0 |  |
| 0 | 0 | 1 |  |
| 0 | 1 | 0 |  |
| 0 | 1 | 1 |  |
| 1 | 0 | 0 |  |
| 1 | 0 | 1 |  |
| 1 | 1 | 0 |  |
| 1 | 1 | 1 |  |

①



論理式：

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | X |
| 0 | 0 | 0 |  |
| 0 | 0 | 1 |  |
| 0 | 1 | 0 |  |
| 0 | 1 | 1 |  |
| 1 | 0 | 0 |  |
| 1 | 0 | 1 |  |
| 1 | 1 | 0 |  |
| 1 | 1 | 1 |  |

②



論理式：

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | X |
| 0 | 0 | 0 |  |
| 0 | 0 | 1 |  |
| 0 | 1 | 0 |  |
| 0 | 1 | 1 |  |
| 1 | 0 | 0 |  |
| 1 | 0 | 1 |  |
| 1 | 1 | 0 |  |
| 1 | 1 | 1 |  |

問題5　次の論理式を論理回路化しなさい。また真理値表にも出力結果を記入しなさい。（５点×４）

①



回路図：

②

|  |  |  |  |
| --- | --- | --- | --- |
| A | B | C | X |
| 0 | 0 | 0 |  |
| 0 | 0 | 1 |  |
| 0 | 1 | 0 |  |
| 0 | 1 | 1 |  |
| 1 | 0 | 0 |  |
| 1 | 0 | 1 |  |
| 1 | 1 | 0 |  |
| 1 | 1 | 1 |  |



回路図：

問題6　非同期型RS-FFの真理値表とタイムチャートを記述しなさい。（５点×２）

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S | R | Q |  | 状態 |
| ０ | ０ |  |  |  |
| ０ | １ |  |  |  |
| １ | ０ |  |  |  |
| １ | １ |  |  |  |



|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| R |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Q |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Q' |  |  |  |  |  |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| J | K | Q |  | 状態 |
| ０ | ０ |  |  |  |
| ０ | １ |  |  |  |
| １ | ０ |  |  |  |
| １ | １ |  |  |  |

問題7　同期型JK-FFの真理値表とタイムチャートを記述しなさい。（１０点×２）





|  |  |  |  |
| --- | --- | --- | --- |
| 入所期 | 氏名 | 合計点 | 評価判定 |
| 平成　　　年　　　月生 |  |  |  |

（１）（５点×２）

|  |  |
| --- | --- |
| ① | ② |

（２）（５点×２）

|  |  |
| --- | --- |
| ① | ② |

（３）（５点×２）

|  |  |
| --- | --- |
| ① | ② |

（４）（５点×４）

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ①論理式： | |  |  |  |  | | --- | --- | --- | --- | | A | B | C | S | | 0 | 0 | 0 |  | | 0 | 0 | 1 |  | | 0 | 1 | 0 |  | | 0 | 1 | 1 |  | | 1 | 0 | 0 |  | | 1 | 0 | 1 |  | | 1 | 1 | 0 |  | | 1 | 1 | 1 |  |   ①真理値表： |
| ②論理式： | ②真理値表：   |  |  |  |  | | --- | --- | --- | --- | | A | B | C | X | | 0 | 0 | 0 |  | | 0 | 0 | 1 |  | | 0 | 1 | 0 |  | | 0 | 1 | 1 |  | | 1 | 0 | 0 |  | | 1 | 0 | 1 |  | | 1 | 1 | 0 |  | | 1 | 1 | 1 |  | |

（５）（５点×４）

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ①回路図： | ②真理値表：   |  |  |  |  | | --- | --- | --- | --- | | A | B | C | X | | 0 | 0 | 0 |  | | 0 | 0 | 1 |  | | 0 | 1 | 0 |  | | 0 | 1 | 1 |  | | 1 | 0 | 0 |  | | 1 | 0 | 1 |  | | 1 | 1 | 0 |  | | 1 | 1 | 1 |  | |
| ②回路図： | ②真理値表：   |  |  |  |  | | --- | --- | --- | --- | | A | B | C | X | | 0 | 0 | 0 |  | | 0 | 0 | 1 |  | | 0 | 1 | 0 |  | | 0 | 1 | 1 |  | | 1 | 0 | 0 |  | | 1 | 0 | 1 |  | | 1 | 1 | 0 |  | | 1 | 1 | 1 |  | |

（６）（５点×２）

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | S | R | Q |  | 状態 | | ０ | ０ |  |  |  | | ０ | １ |  |  |  | | １ | ０ |  |  |  | | １ | １ |  |  |  |   真理値表 | |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | S |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | | R |  |  |  |  |  |  |  |  |  | |  |  |  |  |  |  |  |  |  |  | | Q |  |  |  |  |  | |  |  |  |  |  | | Q' |  |  |  |  |  |   タイムチャート |

（７）（１０点×２）

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | J | K | Q |  | 状態 | | ０ | ０ |  |  |  | | ０ | １ |  |  |  | | １ | ０ |  |  |  | | １ | １ |  |  |  |   真理値表 |
| タイムチャート |