筆記課題解答

筆記課題解答

「ディジタル回路に関する基礎知識」

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| --- |
| 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。 |

（１）（５点×２）

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| ①11 | ②109 |

（２）（５点×２）

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| ①1101 | ②111011 |

（３）（５点×２）

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| --- | --- |
| ① B | ②６D |

（４）（５点×４）

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

（５）（５点×４）

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

（６）（５点×２）

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

（７）（１０点×２）

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

解説

問題４

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| --- | --- | --- | --- |
| 番号 | 解答 | 解説 | 備考 |
| ① |  | 論理式 |  |
| ② | |  |  |  |  | | --- | --- | --- | --- | | A | B | C | X | | 0 | 0 | 0 | 1 | | 0 | 0 | 1 | 0 | | 0 | 1 | 0 | 1 | | 0 | 1 | 1 | 0 | | 1 | 0 | 0 | 1 | | 1 | 0 | 1 | 1 | | 1 | 1 | 0 | 1 | | 1 | 1 | 1 | 0 | | 真理値表  Ａ、Ｂに関係なくＣ：０のときはＸ：１となる。  Ａ：１、Ｂ：０のみＸ：１である。 |  |

問題５

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| --- | --- | --- | --- |
| 番号 | 解答 | 解説 | 備考 |
| ① | |  |  |  |  | | --- | --- | --- | --- | | A | B | C | X | | 0 | 0 | 0 | 0 | | 0 | 0 | 1 | 1 | | 0 | 1 | 0 | 0 | | 0 | 1 | 1 | 0 | | 1 | 0 | 0 | 0 | | 1 | 0 | 1 | 1 | | 1 | 1 | 0 | 0 | | 1 | 1 | 1 | 1 | | 真理値表  Ｃ：０のときはＸ：０となる。  Ｃ：１でＡ：１またはＢ：０の場合はＸ：１となる。 |  |

問題５

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| ② | |  |  |  |  | | --- | --- | --- | --- | | A | B | C | X | | 0 | 0 | 0 | 0 | | 0 | 0 | 1 | 0 | | 0 | 1 | 0 | 0 | | 0 | 1 | 1 | 0 | | 1 | 0 | 0 | 1 | | 1 | 0 | 1 | 1 | | 1 | 1 | 0 | 0 | | 1 | 1 | 1 | 1 | | 論理式  真理値表  Ａ：０の場合Ｘ：０になる。  Ａ：１でＢ：０またはＣ：１の場合Ｘ：１になる。 |  |

問題６

|  |  |  |  |
| --- | --- | --- | --- |
| 番号 | 解答 | 解説 | 備考 |
|  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | S | R | Q |  | 状態 | | ０ | ０ | Q |  | 保持 | | ０ | １ | 0 | 1 | R | | １ | ０ | 1 | 0 | S | | １ | １ | X | X | 禁止 | | 真理値表  ＲＳフリップフロップのためＳ：１の場合Ｑ：１となる。  Ｒ：１の場合：１となる。  なおＳ：０、Ｒ：０の場合は前状態を保持し、Ｓ：１、Ｒ：1の場合は禁止となる。 |  |

問題７

|  |  |  |  |
| --- | --- | --- | --- |
| 番号 | 解答 | 解説 | 備考 |
|  | |  |  |  |  |  | | --- | --- | --- | --- | --- | | J | K | Q |  | 状態 | | ０ | ０ | Q |  | 保持 | | ０ | １ | 0 | 1 | K | | １ | ０ | 1 | 0 | J | | １ | １ |  | Q | 反転 | | 真理値表  ＪＦフリップフロップのためＫ：１の場合Ｑ：１となる。  Ｊ：１の場合：１となる。  なおＪ：０、Ｋ：０の場合は前状態を保持し、Ｊ：１、Ｋ：1の場合は状態を反転する。 |  |