

IE1204 Digital Design Answer Form 2023-10-26

| Full Name | | Personal Number | Program | | | | | | | | |
|------------------------|--|--|-----------|---|---|---|----------|---|---|---|----------|
| Exam 2023-10-26 | | YYYYMMDD-XXXX | NN | | | | | | | | |
| # | Answer with | Answer | Points | | | | | | | | |
| 1 | Decimal number | 126 | 1 | | | | | | | | |
| 2 | 8 bit two's complement hexadecimal number | 0xE3 | 1 | | | | | | | | |
| 3 | 8 bit two's complement hexadecimal number | 0x22 | 1 | | | | | | | | |
| 4 | Boolean expression, Y = | $Y = C + \bar{A} \cdot B$ | 1 | | | | | | | | |
| 5 | Circuit number | #4 | 1 | | | | | | | | |
| 6 | Boolean expression, Y = | $\bar{A} \cdot \bar{C} + \bar{B} \cdot \bar{C} \cdot D + \bar{A} \cdot B \cdot \bar{D}$ | 1 | | | | | | | | |
| 7 | MUX connections, Boolean expression or Gate | $\overline{A \cdot B}$ | 1 | | | | | | | | |
| | Row CD = 00 | $A \cdot B$ | | | | | | | | | |
| | Row CD = 01 | $\overline{A \oplus B}$ | | | | | | | | | |
| | Row CD = 10 | $A \oplus B$ | | | | | | | | | |
| | Row CD = 11 | $A \oplus B$ | | | | | | | | | |
| 8 | Timing diagram | | 1 | | | | | | | | |
| 9 | Flip-Flop or Latch # | #1 | 1 | | | | | | | | |
| 10 | Maximum clock frequency = Is the Hold time constraint ok? | 4 GHz <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | 1 | | | | | | | | |
| 11 | Number of states = Final state $Q_3 Q_2 Q_1 Q_0 =$ | 9 <table style="display: inline-table; border-collapse: collapse;"><tr><td style="border: 1px solid black; padding: 2px 5px;">1</td><td style="border: 1px solid black; padding: 2px 5px;">0</td><td style="border: 1px solid black; padding: 2px 5px;">1</td><td style="border: 1px solid black; padding: 2px 5px;">1</td></tr></table> | 1 | 0 | 1 | 1 | 1 | | | | |
| 1 | 0 | 1 | 1 | | | | | | | | |
| 12 | Boolean expression Y = Input $D_3 D_2 D_1 D_0 =$ | $Y = Q_2 \cdot Q_1$ <table style="display: inline-table; border-collapse: collapse;"><tr><td style="border: 1px solid black; padding: 2px 5px;">0</td><td style="border: 1px solid black; padding: 2px 5px;">0</td><td style="border: 1px solid black; padding: 2px 5px;">0</td><td style="border: 1px solid black; padding: 2px 5px;">1</td></tr></table> | 0 | 0 | 0 | 1 | 1 | | | | |
| 0 | 0 | 0 | 1 | | | | | | | | |
| 13 | 16 bit two's complement hexadecimal Product A x B | P 0x3234 | 1 | | | | | | | | |
| 14 | 8 bit two's complement hexadecimal Quotient (A / B) and Remainder | Q 0x03 R 0x01 | 1 | | | | | | | | |
| 15 | 8 result bits ($S_7 S_6 S_5 S_4 S_3 S_2 S_1 S_0$) | <table style="display: inline-table; border-collapse: collapse;"><tr><td style="border: 1px solid black; padding: 2px 5px;">1</td><td style="border: 1px solid black; padding: 2px 5px;">0</td><td style="border: 1px solid black; padding: 2px 5px;">0</td><td style="border: 1px solid black; padding: 2px 5px;">0</td><td style="border: 1px solid black; padding: 2px 5px;">1</td><td style="border: 1px solid black; padding: 2px 5px;">1</td><td style="border: 1px solid black; padding: 2px 5px;">0</td><td style="border: 1px solid black; padding: 2px 5px;">0</td></tr></table> | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |
| 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | | | | |
| 16 | Memory contents, 8 decimal digits | 3 1 4 1 5 9 2 7 | 1 | | | | | | | | |
| TOTAL POINTS | | Examiner sign | 16 | | | | | | | | |