Use a K-map to find simplified Boolean formulas for the following truth tables.

1.

|  |  |  |  |
| --- | --- | --- | --- |
| # | A | B | F(A,B) |
| 0 | 0 | 0 | 1 |
| 1 | 0 | 1 | 0 |
| 2 | 1 | 0 | 1 |
| 3 | 1 | 1 | 1 |

|  |  |  |
| --- | --- | --- |
| B\A | 0 | 1 |
| 0 | 1 | 1 |
| 1 |  | 1 |

F = A (green) + B’ (red)

2.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| # | A | B | C | F(A, B, C) |
| 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 0 | 1 | 1 |
| 2 | 0 | 1 | 0 | 0 |
| 3 | 0 | 1 | 1 | 1 |
| 4 | 1 | 0 | 0 | 1 |
| 5 | 1 | 0 | 1 | 1 |
| 6 | 1 | 1 | 0 | 1 |
| 7 | 1 | 1 | 1 | 1 |

Find simplified Boolean formulas from the following K-Maps.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| C\AB | 00 | 01 | 11 | 10 |
| 0 |  |  | 1 | 1 |
| 1 | 1 | 1 | 1 | 1 |

F = A (yellow) + C (green)

3.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 00 | 01 | 11 | 10 |
| 0 | 1 |  | 1 | 1 |
| 1 |  |  | 1 | 1 |

F = A (green) + B’C’ (yellow)

4.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 00 | 01 | 11 | 10 |
| 0 | 1 |  | **1** |  |
| 1 |  | 1 | **1** | 1 |

F = BC (green) + AC (yellow) + AB (red) + A’B’C’ (blue)

5.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 00 | 01 | 11 | 10 |
| 00 | 1 | 1 | 1 | 1 |
| 01 | 1 |  |  | 1 |
| 11 | 1 |  |  | 1 |
| 10 | 1 | 1 | 1 | 1 |

F = B’D’(blue) + B’D(green) + BD’(yellow)

6.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 00 | 01 | 11 | 10 |
| 00 |  |  | 1 | 1 |
| 01 |  | 1 |  |  |
| 11 | 1 |  |  | 1 |
| 10 | 1 |  | 1 | 1 |

F = B’C (yellow) + AD’ (blue) + A’BC’D (green)

7. Use a K-Map to find a simplified Boolean function for the D output of the 7-segment display. The truth table is in the book.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 00 | 01 | 11 | 10 |
| 00 | 1 |  | x | 1 |
| 01 |  | 1 | x |  |
| 11 | 1 |  | x | x |
| 10 | **1** | **1** | **x** | **x** |

F = CD’ (red) + B’C (green border) + B’D’ (green background) + BC’D (yellow)