7 The truth table for a logic circuit is shown.

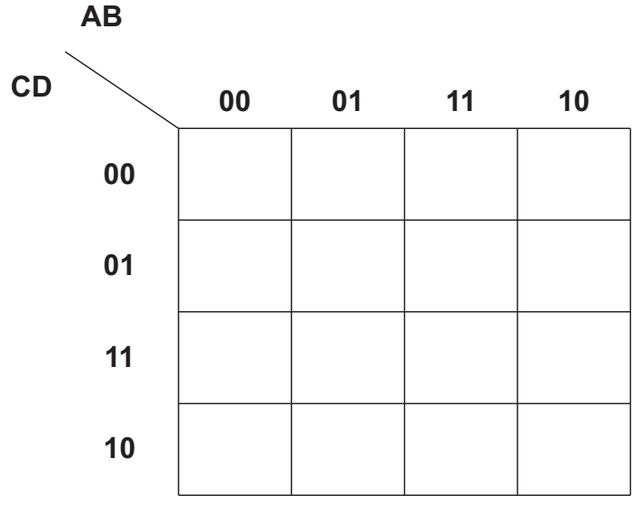
INPUT				OUTPUT
A	**B**	**C**	**D**	**T**
0	0	0	0	0
0	0	0	1	1
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	0
0	1	1	0	0
0	1	1	1	0
1	0	0	0	0
1	0	0	1	1
1	0	1	0	0
1	0	1	1	1
1	1	0	0	0
1	1	0	1	1
1	1	1	0	0
1	1	1	1	1

(a) Write the Boolean logic expression that corresponds to the given truth table as the sum-of-products.

T = ...

..... [3]

(b) Complete the Karnaugh map (K-map) for the given truth table.



[2]

(c) Draw loop(s) around appropriate group(s) in the K-map to produce an optimal sum-of-products. [2]

(d) **(i)** Write the Boolean logic expression from your answer to part **(c)** as the simplified sum-of-products.

T = ...

..... [2]

(ii) Use Boolean algebra to write your answer to part **(d)(i)** in its simplest form.

T = ... [1]