

2.1

- (a) $\bar{A}\bar{B} + A\bar{B} + AB$
- (b) $\bar{A}\bar{B}\bar{C} + ABC$
- (c) $\bar{A}\bar{B}\bar{C} + \bar{A}\bar{B}\bar{C} + A\bar{B}\bar{C} + A\bar{B}C + ABC$
- (d) $\bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}C\bar{D} + \bar{A}\bar{B}CD + A\bar{B}\bar{C}\bar{D} + A\bar{B}C\bar{D} + ABC\bar{D}$
- (e) $\bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}CD + \bar{A}\bar{B}\bar{C}D + \bar{A}\bar{B}CD + A\bar{B}\bar{C}D + A\bar{B}CD + ABC\bar{D} + ABCD$

2.2

- (a) $(A + \bar{B})$
- (b) $(A + B + \bar{C})(A + \bar{B} + C)(A + \bar{B} + \bar{C})(\bar{A} + B + C)(\bar{A} + B + \bar{C})(\bar{A} + \bar{B} + C)$
- (c) $(A + B + \bar{C})(A + \bar{B} + \bar{C})(\bar{A} + \bar{B} + C)$
- (d) $(A + \bar{B} + C + D)(A + \bar{B} + C + \bar{D})(A + \bar{B} + \bar{C} + D)(A + \bar{B} + \bar{C} + \bar{D})(\bar{A} + B + C + \bar{D})(\bar{A} + B + C + D)(\bar{A} + B + \bar{C} + \bar{D})(\bar{A} + \bar{B} + C + D)(\bar{A} + \bar{B} + \bar{C} + \bar{D})$
- (e) $(A + B + C + \bar{D})(A + B + \bar{C} + D)(A + \bar{B} + C + D)(A + \bar{B} + \bar{C} + \bar{D})(\bar{A} + B + C + D)(\bar{A} + B + \bar{C} + D)(\bar{A} + B + C + \bar{D})(\bar{A} + B + \bar{C} + \bar{D})$

2.3

- (a) $A + \bar{B}$
- (b) $\bar{A}\bar{B}\bar{C} + ABC$
- (c) $\bar{A}\bar{C} + AC + A\bar{B}$
- (d) $\bar{B}\bar{D} + \bar{A}\bar{B} + AC\bar{D}$
- (e) $\bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}CD + \bar{A}B\bar{C}D + \bar{A}BC\bar{D} + A\bar{B}\bar{C}\bar{D} + A\bar{B}C\bar{D} + ABC\bar{D} + ABCD$

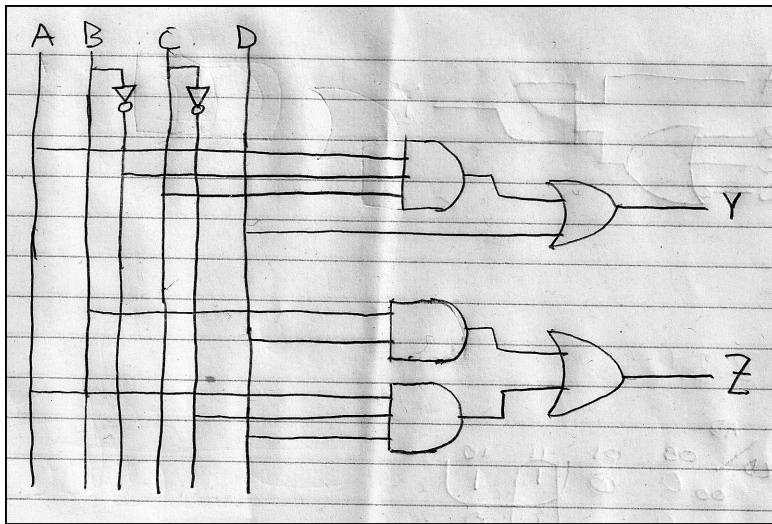
2.12

Alyssa is wrong. A counterexample is the function $\bar{A}\bar{B} + B\bar{C}$, which has the prime implicant $\bar{A}\bar{C}$, which is not part of the minimal form.

2.15

$$Y = \bar{A}D + A\bar{C}D + A\bar{B}C + ABCD$$

$$Z = BD + A\bar{C}D$$



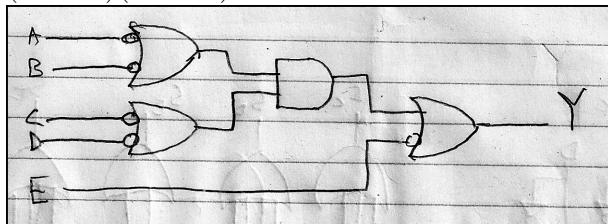
2.16

$$Y = A\bar{B}C + D$$

$$Z = BD + A\bar{C}D$$

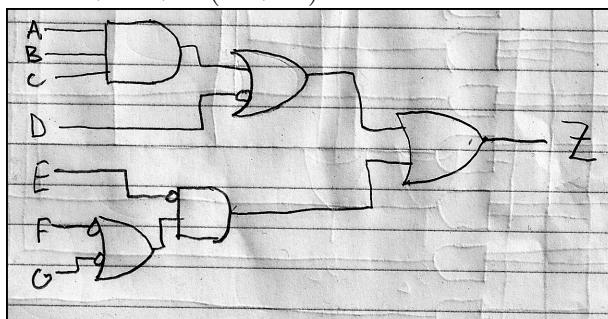
2.17

$$(\bar{A} + \bar{B})(\bar{C} + \bar{D}) + \bar{E}$$



2.18

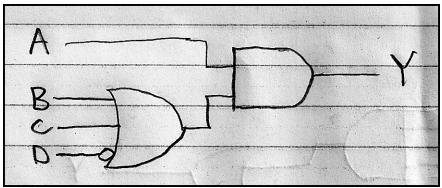
$$ABC + \bar{D} + \bar{E}(\bar{F} + \bar{G})$$



2.19

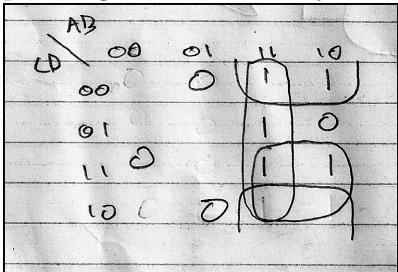
$$Y = AB + AC + A\bar{D}$$

2.20



2.21

No, because there are no uncovered borders between implicants in the K-map. **Note:** Depending on the circuit you chose for **2.19** your answer may be different.



2.22

$$E = \bar{A} + H + AL$$

2.23

(a)

$$S_c = \bar{A}D + \bar{A}B + \bar{B}\bar{C}$$

$$S_d = \bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}C + \bar{A}C\bar{D} + \bar{A}B\bar{C}D$$

$$S_e = \bar{B}\bar{C}\bar{D} + \bar{A}C\bar{D}$$

$$S_f = \bar{A}\bar{C}\bar{D} + \bar{A}B\bar{D} + \bar{A}B\bar{C} + A\bar{B}\bar{C}$$

$$S_g = \bar{A}B\bar{C} + A\bar{B}\bar{C} + \bar{A}\bar{B}C + \bar{A}C\bar{D}$$

(b)

$$S_c = B + \bar{C} + D$$

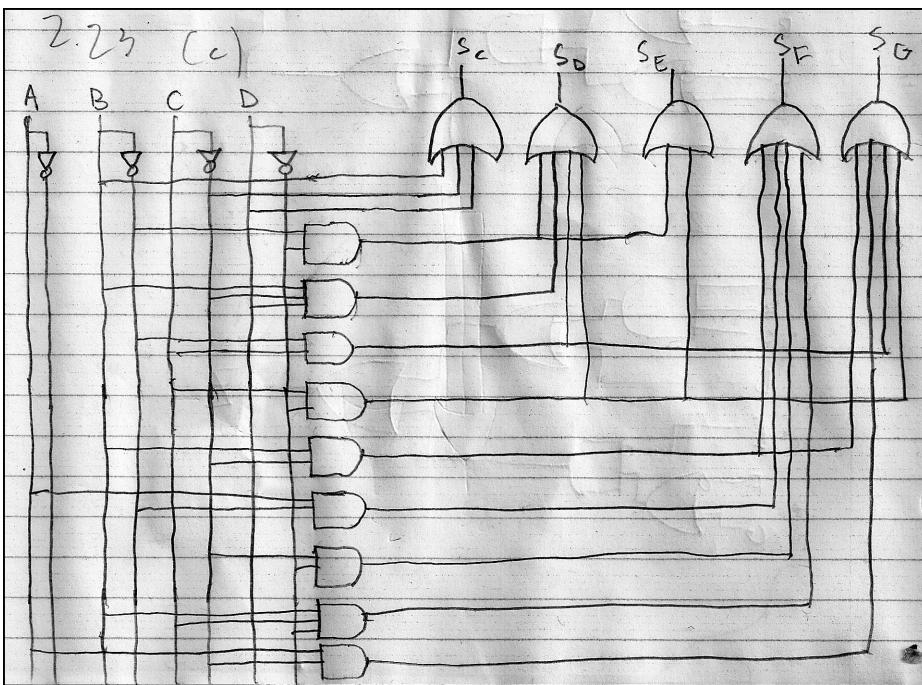
$$S_d = \bar{B}\bar{D} + B\bar{C}D + \bar{B}C + C\bar{D}$$

$$S_e = \bar{B}\bar{D} + C\bar{D}$$

$$S_f = B\bar{C} + A\bar{B} + \bar{C}\bar{D} + BC\bar{D}$$

$$S_g = B\bar{C} + A\bar{C} + \bar{B}C + C\bar{D}$$

(c)



2.24

$$P = B\bar{C}D + \bar{A}BD + \bar{A}\bar{B}\bar{C} + \bar{B}CD$$

$$D = \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}CD + \bar{A}BC\bar{D} + ABC\bar{D} + ABCD + A\bar{B}\bar{C}D$$