

LAB PROJECT-1

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Section: 1

Truth Table:

| Input Reference | A | B | C | D | F | Min terms | Max term |
|-----------------|---|---|---|---|---|-----------|-----------|
| 0 | 0 | 0 | 0 | 0 | 0 | | $A+B+C+D$ |
| 1 | 0 | 0 | 0 | 1 | 1 | $A'B'C'D$ | |
| 2 | 0 | 0 | 1 | 0 | 1 | $A'B'CD'$ | |
| 3 | 0 | 0 | 1 | 1 | 1 | $A'B'CD$ | |
| 4 | 0 | 1 | 0 | 0 | 1 | $A'BC'D'$ | |
| 5 | 0 | 1 | 0 | 1 | 1 | $A'BC'D$ | |
| 6 | 0 | 1 | 1 | 0 | 1 | $A'BCD'$ | |
| 7 | 0 | 1 | 1 | 1 | 1 | $A'BCD$ | |
| 8 | 1 | 0 | 0 | 0 | 1 | $AB'C'D'$ | |
| 9 | 1 | 0 | 0 | 1 | 1 | $AB'C'D$ | |
| 10 | 1 | 0 | 1 | 0 | 1 | $AB'CD'$ | |
| 11 | 1 | 0 | 1 | 1 | 1 | $AB'CD$ | |
| 12 | 1 | 1 | 0 | 0 | 1 | $ABC'D'$ | |
| 13 | 1 | 1 | 0 | 1 | 1 | $ABC'D$ | |
| 14 | 1 | 1 | 1 | 0 | 1 | $ABCD'$ | |
| 15 | 1 | 1 | 1 | 1 | 1 | $ABCD$ | |

1st Canonical Form:

| Shorthand Notation | Function |
|---|--|
| $F = \sum(1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15)$ | $F = A'B'C'D + A'B'CD' + A'B'CD + A'BC'D' + A'BC'D + A'BCD' + A'BCD + ABC'D' + ABC'D + ABCD' + ABCD$ |

2nd Canonical Form:

| Shorthand Notation | Function |
|--------------------|-----------------|
| $F = \Pi(0)$ | $F = (A+B+C+D)$ |

Report:

We have developed a data logger system using a combinational circuit. This circuit can observe 4 different Gas sensors (A, B, C, D) and notify with an emergency alarm siren (F). We used binary logic 0, to determine that the individual gas sensor is in normal state and binary logic 1, to determine that the individual gas reaches above the threshold value. We implemented the circuit using the 1st canonical form and 2nd canonical form functions. We used 8 (4 Input AND gate IC), 4 (4 Input OR gate IC), 1 (Hex Inverters NOT gate IC) and 1 (2 Input OR gate) to develop this combinational circuit of the data logger system.