We know, there are 100 Shares in total, where -

A has 40 shares,

B has 30 shares,

C has 20 shares,

D has 10 shares.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| A | B | C | D | LED |
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 1 | 0 | 0 |
| 0 | 0 | 1 | 1 | 0 |
| 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 | 0 |
| 1 | 0 | 1 | 0 | 0 |
| 1 | 0 | 1 | 1 | 1 |
| 1 | 1 | 0 | 0 | 1 |
| 1 | 1 | 0 | 1 | 1 |
| 1 | 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 | 1 |

Only if, the majority of the vote sums up to be more than ⅔ of the total vote (>=66.66 shares in total among the voting parties for the resolution)

So, the truth table can be formed from the given information, -

So, the SOP equation for this problem will be, -

And, in all 5 of these cases the LED will be on as the resolution will be passed.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| AB↓/CD→ | 00 | 01 | 11 | 10 |
| 00 |  |  |  |  |
| 01 |  |  |  |  |
| 11 | 1 | 1 | 1 | 1 |
| 10 |  |  | 1 |  |

Further simplifying the SOP with K-map, -

So, the simplified SOP of the problem is