

Question 1.

A Government institution intends to award a medal to a person who qualifies any of the following criteria:

→ The person should be an Indian citizen and had lost his/her life in a war but had completed 25 years of service. OR

→ The person must be an Indian citizen and had served the nation for a continuous period of 25 years or more but has not lost his/her life in a war. OR

→ The person is not an Indian citizen but has taken active part in activities for the upliftment of the nation.

The **inputs** are:

A → the person is /was a Indian citizen.

B → has a continuous service of more than 25 years.

C → lost his/her life in a war.

D → taken part in the activities for the upliftment of the nation.

[1 indicates YES and 0 indicates NO in all the above cases]

Output: X → denotes eligible for medal [1 indicates Yes and 0 indicates No in all the cases]

(a) Draw the truth Table for the inputs and outputs given above and write the POS expression for $X(A,B,C,D)$.

Reduce $X(A,B,C,D)$ using the K-map. Draw the logic gate diagram for the reduced POS expression. Assume that variables and their compliments are available as inputs.