

Question 1.

Write the derivation and draw the logic circuit diagram to realize all the gates (basic and derived) using NOR gate only.

Question 2.

An insurance company issues a policy to an applicant only when the applicant satisfies at least one of the following conditions:

- The applicant is a married male of age 25 years or above.
- The applicant is a female who never had a car accident.
- The applicant is a married female and has had a car accident.
- The applicant is a male below 25 years.
- The applicant is not below 25 years and has had a car accident.

The **inputs** are:

M → the applicant is married.

C → the applicant has had a car accident.

S → the applicant is a male.

Y → the applicant is below 25 years.

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

Output: I → denotes issue the policy [1 indicates policy is issued and 0 indicates it is not issued].

- (a) Draw the truth Table for the inputs and outputs given above and write the SOP expression for $I(M,C,S,Y)$.
- (b) Reduce $X(A,B,C,D)$ using the K-map. Draw the logic gate diagram for the reduced SOP expression. Assume that variables and their compliments are available as inputs.