Answer on Question #43374 – Math - Discrete Mathematics

Expand the following Boolean functions into their canonical form:
i.f(X,Y,Z)=XY+YZ+X'Z+X'Y'
ii. f(X,Y,Z)=XY+X'Y'+X'YZ

Solution.
We will express each function as sum of minterms.

i. $f(X,Y,Z) = XY + YZ + X'Z + X'Y' = XY(Z + Z') + (X + X')YZ + X'(Y + Y')Z + X'Y'(Z + Z') = XYZ + XYZ' + XYZ + X'YZ + X'YZ + X'Y'Z + X'Y'Z + X'Y'Z' = XYZ + XYZ' + X'YZ + X'Y'Z + X'Y'Z'.$

ii. $f(X,Y,Z) = XY + X'Y' + X'YZ = XY(Z + Z') + X'Y'(Z + Z') + X'YZ = XYZ + XYZ' + X'Y'Z + X'Y'Z' + X'YZ.$

Answer: i. $f(X,Y,Z) = XYZ + XYZ' + X'YZ + X'Y'Z + X'Y'Z'$,
ii. $f(X,Y,Z) = XYZ + XYZ' + X'Y'Z + X'Y'Z' + X'YZ.$