Question 1

```
R1= (D^{C})
R2=(B.C)
R3 = (A + R1)^{C}
 = (A+D^C)^C
 = (A^{C}.D)
                           De Morgan's law
R4 = (R1 + R2)
  = ((B.C) + (D^C))
R5 = (R1.R3)^{C}
 = ((A+D^{c})^{c}.(D^{c}))^{c}
  = ((A+D^{c})^{c} + (D^{c})^{c})
                                De Morgan's law
Double Negation Law
Excluded Middle Law
 = ((A+D^{c})+D)
  = (A+1)
  = 1
                                  Domination Law
X = (R4.R5)
= ((B.C) + (D^C)) . 1
 = (1.(B.C) + 1.D^{c}) Distributive Law
= ((B.C) + D^{C})
Y = (R3.R4)
 = ((A^{c}.D).((B.C)+(D^{c}))
= (A^{c}.D).(B.C) + (A^{c}.D).(D^{c}) Distributive Law

= (A^{c}.D.B.C) + (A^{c}.D.D^{c}) Associative Law
 = (A^{C}.D.B.C) + A^{C}.0
                                         Contradiction Law
= (A^{C}.D.B.C) + 0
                                         Domination Law
                                          Identity Law
 = (A<sup>C</sup>.D.B.C)
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_		T =	I _							
A	В	С	D	R1	R2	R3	R4	R5	X	Y
0	0	0	0	1	0	0	1	1	1	0
0	0	0	1	0	0	1	0	1	0	0
0	0	1	0	1	0	0	1	1	1	0
0	0	1	1	0	0	1	0	1	0	0
0	1	0	0	1	0	0	1	1	1	0
0	1	0	1	0	0	1	0	1	0	0
0	1	1	0	1	1	0	1	1	1	0
0	1	1	1	0	1	1	1	1	1	1
1	0	0	0	1	0	0	1	1	1	0
1	0	0	1	0	0	0	0	1	0	0
1	0	1	0	1	0	0	1	1	1	0
1	0	1	1	0	0	0	0	1	0	0
1	1	0	0	1	0	0	1	1	1	0
1	1	0	1	0	0	0	0	1	0	0
1	1	1	0	1	1	0	1	1	1	0
1	1	1	1	0	1	0	1	1	1	0

Question 2

```
R1= (C+D)
R2 = B^{C}
R3=(C.D)
R4=(R1)^{C}
 = (C+D)^{C}
 = (C^{C}.D^{C})
                          De Morgan's Law
R5 = (B.R4)
 = (B.((C+D)^{c}))
 = (B.(C^{C}.D^{C}))
                             De Morgan's Law
                            Associative Law
 = (B.C^{C}.D^{C})
R6 = (R1.R2)
 = ((C+D).(B^{C}))
 = (B^{C}.C) + (B^{C}.D)
                     Distributive Law
R7 = (B.R1)
 = (B.(C+D))
 = ((B.C) + (B.D))
W = (A + R7)
= (A+(B.(C+D)))
= (A+(B.C)+(B.D)) Distributive Law
X = (R5 + R6)
= (((C+D).(B^{C})) + (B.((C+D)^{C})))
 = (((C+D).(B^{c})) + (B.(C^{c}.D^{c})))
                                         De Morgan's Law
= (((C+D).(B^{C})) + (B.C^{C}.D^{C}))
= ((B^{c}.C) + (B^{c}.D) + (B.C^{c}.D^{c}))
                                Distributive Law
Y = (R3 + R4)
= ((C.D) + ((C+D)^{c}))
= ((C.D) + (C^{C}.D^{C}))
                                         De Morgan's Law
Z = D^{C}
```

A	В	С	D	R1	R2	R3	R4	R5	R6	R7	W	Х	Y	Z
0	0	0	0	0	1	0	1	0	0	0	0	0	1	1
0	0	0	1	1	1	0	0	0	1	0	0	1	0	0
0	0	1	0	1	1	0	0	0	1	0	0	1	0	1
0	0	1	1	1	1	1	0	0	1	0	0	1	1	0
0	1	0	0	0	0	0	1	1	0	0	0	1	1	1
0	1	0	1	1	0	0	0	0	0	1	1	0	0	0
0	1	1	0	1	0	0	0	0	0	1	1	0	0	1
0	1	1	1	1	0	1	0	0	0	1	1	0	1	0
1	0	0	0	0	1	0	1	0	0	0	1	0	1	1
1	0	0	1	1	1	0	0	0	1	0	1	1	0	0
1	0	1	0	1	1	0	0	0	1	0	1	1	0	1
1	0	1	1	1	1	1	0	0	1	0	1	1	1	0
1	1	0	0	0	0	0	1	1	0	0	1	1	1	1
1	1	0	1	1	0	0	0	0	0	1	1	0	0	0
1	1	1	0	1	0	0	0	0	0	1	1	0	0	1
1	1	1	1	1	0	1	0	0	0	1	1	0	1	0

Question 3

```
R1=A^{C}
R2 = C^{C}
R3 = D^{C}
R4=E^{C}
R5=F^{C}
R6=(A.R2.E)
 = (A.C^{C}.E)
R7 = (A.R2.F)
 = (A.C^{C}.F)
R8= (A.R3.E)
  = (A.D^{C}.E)
R9 = (A.R3.F)
  = (A.D^{C}.F)
R10 = (B.C.D.R4.R5)
   = (B.C.D.E<sup>C</sup>.F<sup>C</sup>)
R11= (R1.B.C.D)
    = (A^{C}.B.C.D)
R12= (A.B.E)
R13 = (A.B.F)
R14 = (B.C.E)
R15=(B.C.F)
G = (R6 + R7 + R8 + R9 + R10)
= ((A.C^{c}.E) + (A.C^{c}.F) + (A.D^{c}.E) + (A.D^{c}.F) + (B.C.D.E^{c}.F^{c}))
H= (R11+R12+R13+R14+R15)
 = ((A^{C}.B.C.D) + (A.B.E) + (A.B.F) + (B.C.E) + (B.C.F))
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