2-2

1. А) 4
   Б) 5
   В)1,2,4,7
   Г)3,5,6
2. А) f(A,B,C,D) = (A+B+C)D;

A	B	C	D	A+B+C	(A+B+C)D	ЭК	ЭД
0	0	0	0	0	0	-	A+B+C+D
0	0	0	1	0	0	-	A+B+C+!D
0	0	1	0	1	0	-	A+B+!C+D
0	0	1	1	1	1	!A!BCD	-
0	1	0	0	1	0	-	A+!B+C+D
0	1	0	1	1	1	!AB!CD	-
0	1	1	0	1	0	-	A+!B+!C+D
0	1	1	1	1	1	!ABCD	-
1	0	0	0	1	0	-	!A+B+C+D
1	0	0	1	1	1	A!B!CD	-
1	0	1	0	1	0	-	!A+B+!C+D
1	0	1	1	1	1	A!BCD	-
1	1	0	0	1	0	-	!A+!B+C+D
1	1	0	1	1	1	AB!CD	-
1	1	1	0	1	0	-	!A+!B+!C+D
1	1	1	1	1	1	ABCD	-

СДНФ: !A!BCD + !AB!CD + !ABCD + A!B!CD + A!BCD + AB!CD + ABCD

СКНФ:

(A+B+C+D)(A+B+C+!D)(A+B+!C+D)(A+!B+C+D)(A+!B+!C+D)(!A+B+C+D)(!A+B+!C+D)(!A+!B+C+D)(!A+!B+!C+D)

Б) f(A,B,C,D) = A +BCD +!B!C;

A	B	C	D	!B	!C	BCD	!B!C	A +BCD +!B!C	ЭК	ЭД
0	0	0	0	1	1	0	1	1	!A!B!C!D	-
0	0	0	1	1	1	0	1	1	!A!B!CD	-
0	0	1	0	1	0	0	0	0	-	A+B+!C+D
0	0	1	1	1	0	0	0	0	-	A+B+!C+!D
0	1	0	0	0	1	0	0	0	-	A+!B+C+D
0	1	0	1	0	1	0	0	0	-	A+!B+C+!D
0	1	1	0	0	0	0	0	0	-	A+!B+!C+D
0	1	1	1	0	0	1	0	1	!ABCD	-
1	0	0	0	1	1	0	1	1	A!B!C!D	-
1	0	0	1	1	1	0	1	1	A!B!CD	-
1	0	1	0	1	0	0	0	1	A!BC!D	-

1	0	1	1	1	0	0	0	1	A!BCD	-
1	1	0	0	0	1	0	0	1	AB!C!D	-
1	1	0	1	0	1	0	0	1	AB!CD	-
1	1	1	0	0	0	0	0	1	ABC!D	-
1	1	1	1	0	0	1	0	1	ABCD	-

СДНФ: !A!B!C!D + !A!B!CD + !ABCD + A!B!C!D + A!B!CD + A!BC!D + A!BCD + AB!C!D

СКНФ: (A+B+!C+D)(A+B+!C+!D)(A+!B+C+D)(A+!B+C+!D)(A+!B+!C+D)

В)f(A,B,C,D) = AB(C+D);

A	B	C	D	C + D	AB	AB(C+D)	ЭК	ЭД
0	0	0	0	0	0	0	-	A+B+C+D
0	0	0	1	1	0	0	-	A+B+C+!D
0	0	1	0	1	0	0	-	A+B+!C+D
0	0	1	1	1	0	0	-	A+B+!C+!D
0	1	0	0	0	0	0	-	A+!B+C+D
0	1	0	1	1	0	0	-	A+!B+C+D
0	1	1	0	1	0	0	-	A+!B+!C+D
0	1	1	1	1	0	0	-	A+!B+!C+!D
1	0	0	0	0	0	0	-	!A+B+C+D
1	0	0	1	1	0	0	-	!A+B+C+!D
1	0	1	0	1	0	0	-	!A+B+!C+D
1	0	1	1	1	0	0	-	!A+B+!C+!D
1	1	0	0	0	1	0	-	!A+!B+C+D
1	1	0	1	1	1	1	AB!CD	-
1	1	1	0	1	1	1	ABC!D	-
1	1	1	1	1	1	1	ABCD	-

СДНФ: AB!CD + ABC!D + ABCD;

СКНФ:

(A+B+C+D)(A+B+C+!D)(A+B+!C+D)(A+B+!C+!D)(A+!B+C+D)(A+!B+C+D)(A+!B+!C+D)(A+!B+!C+!D)(A+!B+!C+!D)(!A+B+C+D)(!A+B+C+!D)(!A+B+!C+D)(!A+B+!C+!D)(!A+!B+C+D)

Г)f(A,B) = !AB + A!B;

A	B	!A	!B	!AB	A!B	!AB+A!B	ЭК	ЭД
0	0	1	1	0	0	0	-	A+B
0	1	1	0	1	0	1	!AB	-
1	0	0	1	0	1	1	A!B	-
1	1	0	0	0	0	0	-	!A+!B

СДНФ: !AB+A!B

СКНФ: (A+B)(!A+!B)

Д)f(A,B,C) = A!B + A!C + !BC

A	B	C	!B	!C	A!B	A!C	!BC	A!B + A!C + !BC	ЭК	ЭД
0	0	0	1	1	0	0	0	0	-	A+B+C
0	0	1	1	0	0	0	1	1	!A!BC	-
0	1	0	0	1	0	0	0	0	-	A+!B+C
0	1	1	0	0	0	0	0	0	-	A+!B+!C
1	0	0	1	1	1	1	0	1	A!B!C	-
1	0	1	1	0	1	0	1	1	A!BC	-
1	1	0	0	1	0	1	0	1	AB!C	-
1	1	1	0	0	0	0	0	0	-	!A+!B+!C

СДНФ: !A!BC + A!B!C + A!BC + AB!C;

СКНФ: (A+B+C)(A+!B+C)(A+!B+!C)(!A+!B+!C)

3. (X⇔Y)=>((!X=>Z)=>!Y) ≡ !((XY)+(!X!Y)) + (!(X+Z)+!Y) ≡ (!(XY)!(!X!Y)) + (!X!Z) + !Y ≡ (!X+!Y)(X+Y) + (!X!Z) + !Y ≡ (!X+!Y)(X+Y) + (!X+!Y)(!X+!Z) ≡ !X+!Y

4. ((B!C) ⇔ A)=>(A + !C) ≡ !(AB!C + !A!BC) + A + !C ≡ !A!BC * AB!C + A + !C ≡ A + !C – ДНФ И КНФ

   СДНФ: A + !C ≡ AC+A!C+A!C+!A!C ≡ AC + A!C + !A!C ≡ ABC + A!BC + AB!C + A!B!C + !AB!C + !A!B!C - 6 переменных в сднф

   СКНФ: A + !C ≡ (A + B + !C)(A + !B + !C) – 2 переменные в скнф

5. В) (P => Q)(Q => P)(P+Q) ≡ (!P+Q)(!Q+P)(P+Q) ≡ (!P + Q)P ≡ PQ

   Г) (P => Q)(Q => !P)(R => P) ≡ (!P+Q)(!Q+!P)(!R+P) ≡ !P(!R+P) ≡ !P!R