

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:

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

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)

$$3. (X \Leftrightarrow Y) \Rightarrow ((!X \Rightarrow Z) \Rightarrow !Y) \equiv !(XY) + (!X!Y) + (!X+Z)+!Y \equiv !(XY)!(!X!Y) + (!X!Z) + !Y \equiv (!X+!Y)(X+Y) + (!X!Z) + !Y \equiv (!X+!Y)(X+Y) + (!X+!Y)(!X+!Z) \equiv !X+!Y$$

$$4. ((B!C) \Leftrightarrow A) \Rightarrow (A + !C) \equiv !(AB!C + !A!BC) + A + !C \equiv !A!BC * AB!C + A + !C \equiv A + !C - \text{ДНФ и КНФ}$$

СДНФ:  $A + !C \equiv AC + A!C + A!C + !A!C \equiv AC + A!C \equiv ABC + A!BC + AB!C + A!B!C \equiv AB!C + A!B!C$

СКНФ:  $A + !C \equiv (A + B + !C)(A + !B + !C)$

$$5. B) (P \Rightarrow Q)(Q \Rightarrow P)(P+Q) \equiv (!P+Q)(!Q+P)(P+Q) \equiv (!P + Q)P \equiv PQ$$

$$\Gamma) (P \Rightarrow Q)(Q \Rightarrow !P)(R \Rightarrow P) \equiv (!P+Q)(!Q+!P)(!R+P) \equiv !P(!R+P) \equiv !P!R$$