

Amaliy matematika va informatika Diskret matematika va matematik mantiq fanidan
imtihon savollari

1. Diskret matematika va matematik mantiqiyot faniga kirish
2. Ko'pliklar nazariyasining asosiy tushunchasi
3. Ko'pliklar ustida amallar
4. Ko'pliklarning aksiomatiklik nazariyasi haqida tushunchalar
5. Ko'pliklar nazariyasining asosiy qonunlari
6. Binar va ekvivalenlik daxllar
7. Funkciya tushunchasi va funkciyalarning superpozitsiyasi
8. Aytimlar va ular ustida amallar
9. Aytimlar olgebrasining formulasi va teng qudratlilik tushunchasi
10. Tavtalogiya, mushtarakiga muvofiq va o'rinlanuvchi formulalar
11. Aytimlar olgebrasidagi asosiy teng qudratliliklar
12. Unsurar konyunktsiya va unsurar diziyunktziya tushunchasi
13. Formulalarning normal shakllari (DNF va KNF)
14. Formulalarning takomillashgan normal shakli (MKNF va MDNF)
15. Chinlik tablicasi asosida formulalarni tiklash
16. Formulalarning chinlik ko'pligi tushunchasi
17. Chinlik ko'pligi tushunchasining tatbiqlari
18. Aytimlar olgebrasida funksiya tushunchasi
19. Mantiqlik olgebradagi qo'shlarlik qonun
20. Mantiqlik olgebradagi arifmetiklik amallar. Jerga ko'paytirish
21. Aytimlar hisobining formulasi
22. Aytimlar hisobida keltirib chiqarish qoidalar
23. Bitta vaqtda o'rniga qo'yish, sillogizm, kontrpozitsiya va qo'shlar bekorlanishi olib tashlash qoidalar
24. Aytimlar hisobida formulani keltirib chiqarish qoidasi
25. Aytimlar hisobida formulani keltirib chiqarishning asosiy qoidalar
26. Matematik nazariyalar
27. Birinchi tartibli til. Term va formulalar
28. Matematik nazariyada mantiqlik va maxsus aksiomalar. Keltirib chiqarish qoidasi
29. Funktsional unsurlar va ularan sxemalar yasash
30. Rele kontaktli sxemalar
31. To'plamlar va ular ustida amallar. To'plamlar, birlashma, kesishma, universal to'plam, tartiblangan juftlik, dekart ko'paytma.
32. Munosabatlar.
33. Relyatsion algebra.
34. Binar munosabatlarning ko'paytmasi.
35. Funksiya. Munosabat, binar munosabat, munosabatlar ustida amallar, relyatsion algebra.
36. Maxsus binar munosabatlar.

37. Ekvivalentlik munosabati. Qisman tartiblangan to'plamlar.
38. Refleksivlik, simmetriklik, tranzitivlik, ekvivalentlik, qisman tartib, panjara.
39. Mantiqiy bog'lovchilar. Muloxazalar algebrasi.
40. CHinlilik jadvali. Formula, qism formula.
41. Mulohaza, mantiqiy amallar, formula, qism formula, CHinlilik jadvali.
42. Formulalarning teng kuchliligi.
43. Mulohazalar algebrasining asosiy tengkuchliliklari.
44. Teng kuchlilik, teng kuchli almashtirishlar, tautologiya
45. Keltirilgan formulalar.
46. Mantiqiy amallarning to'liq sistemalari.
47. Keltirilgan formulalar, mantiqiy amallar, to'liq sistema
48. Normal formalar. Mukammal diz'yunktiv va konyunktiv normal formalar.
Diz'yunkti normal formalar, kon'yunktiv normal formalar, mukammal normal formalar.
49. Mulohazalar algebrasi formulalarining tatbiqlari.
50. Rele-kontakt sxemalari.
51. Mulohazalar algebrasi tatbiqlari, rele-kontakt sxemalari
52. Formal aksiomatik nazariya.
53. Mulohazalar hisobi.
54. Aksiomatik nazariya, aksioma, keltirib chiqarish, isbot, teorema, mulohazalar hisobi.
55. Mulohazalar hisobining aksiomalari.
56. Dedukciya teoremasi. L nazariya, L nazariya aksiomalari, dedukciya teoremasi.
57. To'liqlik xaqida Gëdel teoremasi. Ziddiyatsizligi.
58. Nazariya, nazariyaning to'liqligi, zidiyatlilik, ziddiyatsizlik.
59. Elementar Bul funkciyalari.
60. Ularning berilish usullari.
61. Muxim va sohta o'zgaruvchilar.
62. Bul funkciyalari, elementar bul funkciyalari, jalval usuli, bul funkciyalar soni.
63. Formula tushunchasi.
64. Ekvivalent formulalar. Dual funkciyalar. Duallik principi.
65. Bul funkciyalar sistemasi ustida formula tushunc
66. hasi, funkciyalar realizatsiyasi, teng kuchli formulalar, dual formulalar, duallik principi.
67. Normal formalar.
68. Funkciyani o'zgaruvchilar bo'yicha ëyish.
69. Normal formalar, o'zgaruvchilar bo'yicha ëyish teoremasi.
70. To'liq sistemalar.
71. Bul funkciyasini
72. Jegalkin ko'pxadiga yoish.
73. To'liq sistemalar, Jegalkin ko'phadi
74. Jegalkin teoremasi.
75. Muxim ëpiq sinflar. O'z-o'ziga dual bo'lmagan funkciya xaqida lemma. Nolni saqllovchi funkciyalar, birni saqllovchi funkciyalar, o'z-o'ziga dual funkciyalar
76. Monoton bo'lmagan va chiziqli bo'lmagan funkciyalar xaqidagi lemmalar. Post teoremasi va uning natijalari. Monoton funkciyalar, chiziqli funkciyalar, to'liqlik kriteriyasi

77. Predikat tushunchasi. Predikatlar ustida mantiqiy amallar. Predikat, ular ustida amallar, misollar, predikatlar algebrasi
78. Umumiylik va mavjudlik kvantorlari.
79. Cheklangan kvantorlar.
80. Mantiqiy kvadrat.
81. Kvantorlar, umumiylik va mavjudlik
82. Predikatlar algebrasining formulalari.
83. Bajariluvchi, rad etiluvchi formulalar. Aynan rost, aynan ʻolgʻon formulalar.
84. Predikatlar algebrasida formulalarning teng kuchliligi. Teng kuchli formulalar, asosiy teng kuchliliklar
85. Formulalarning normal kanonik formolari.
86. Normal kanonik formalar, unga keltirish usullari, asosiy teoremlar
87. Kombinatorikaning asosiy elementlari.
88. Asosiy kombinatsiyalar. Asosiy kombinatsiyalar, kombinatorikaning klassik masalalari, asosiy printsiplari
89. Kiritish chiqarish qoidasi.
90. To'plam elementlari sonini aniqlash, kiritish chiqarish qoidalari
91. Rekkurent munosabatlar metodi. Fibonachchi sonlari Rekkurentlik, rekkurent munosabatlar metodi,
92. Fibonachchi sonlari
93. Xosil qiluvchi funktsiyalar.
94. Xosil qiluvchi funktsiyalar, ular yordamida rekurrent munosabatlarni aniqlash
95. Graflar va ularning berilish usullari.
96. Graflarning turlari. Graf, graf uchlari, graf qirralari, ilmoq, kushnilik matricasi, incidentlik matricasi
97. Graflarning bog'liqligi. Marshrut, zanjir, sikl. Graf metrikasi. Eyler va Gamilton graflari. Bog'liqlik, marshrut, zanjir, sikl, graf metrikasi.
98. Orientirlangan graflar. Tranzitiv graflar. Graflarning bikomponentalari.
99. Graflarda orientir, izomorflik, tranzitivlik, bikomponenta
100. Graflarni buyash. Xromatik sonlar. Graflarni bo'yash algoritmlari, xromatik sonni aniqlash

1. Teng kuchlilikni isbotlang $x \vee (y \wedge z) = (x \vee y) \wedge (x \vee z)$
2. Ikki tomonlama funktsiyani toping $f = (\bar{x} \vee \bar{z}) \wedge (\bar{y} \rightarrow (z \wedge x)) \vee t$, $f^* = ?$
3. Ikki tomonlama funktsiyani toping $f = (\bar{x} \vee z) \wedge (y \rightarrow (u \rightarrow x))$, $f^* = ?$
4. Ikki tomonlama funktsiyani toping $f = (x \vee \bar{y} \rightarrow x \wedge z) \rightarrow (\overline{x \rightarrow \bar{z}}) \vee y \wedge \bar{z}$
5. Ikki tomonlama funktsiyani toping $F = (x \rightarrow y) \wedge (y \rightarrow z) \rightarrow (z \rightarrow x)$, $F^* = ?$
6. Ikki tomonlama funktsiyani toping $f = (\bar{x} \rightarrow z) \vee (y \wedge (z \rightarrow x) \rightarrow z)$, $f^* = ?$
7. Ikki tomonlama funktsiyani toping $(x \rightarrow (y \rightarrow z)) \rightarrow (y \rightarrow x)$
8. Jegalkin lo'pxadi shaklida yozing $((x \rightarrow y) \wedge (y \rightarrow z) \rightarrow \overline{x \rightarrow \bar{z}}) \vee y \wedge \bar{z}$
9. Jegalkin ko'pxadin tuzing $(x \vee \bar{y} \rightarrow x \wedge z) \rightarrow (\overline{x \rightarrow \bar{x}}) \vee y \wedge \bar{z}$
10. Jegalkin ko'pxadin tuzing $(\bar{x} \vee z) \wedge (y \rightarrow (u \rightarrow x))$
11. Jegalkin ko'pxadi shaklida yozing $(x \rightarrow y) \wedge (y \rightarrow z) \rightarrow (x \rightarrow z)$
12. Jegalkin ko'pxadi shaklida yozing $(x \rightarrow y) \leftrightarrow (z \rightarrow (x \leftrightarrow \bar{z}))$
13. Soddalashtiring $(x \vee y) \rightarrow (x \wedge \bar{y} \vee \bar{x} \rightarrow \bar{y})$

14. Soddalashtiring: $(x \vee \bar{y} \rightarrow (z \rightarrow y \vee \bar{y} \vee x)) \wedge (x \vee x \rightarrow (x \rightarrow y)) \rightarrow z$
15. Soddalashtiring $(x_1 \vee x_2 \bar{x}_3 x_4)((\bar{x}_2 \vee x_4) \rightarrow x_1 \bar{x}_3 x_1) \vee x_2 x_3 \vee \bar{x}_1 \vee x_4$
16. Soddalashtiring: $(x \vee \bar{y} \rightarrow (z \rightarrow y \vee \bar{y} \vee x)) \wedge (x \vee x \rightarrow (x \rightarrow y)) \rightarrow x \vee z$
17. $f = (x \rightarrow y) \vee ((x \rightarrow z)y)$, $g = x\bar{y}(\bar{y} \rightarrow x\bar{z})$ teng kuchli ekanligini isbotlang
18. MDNSh tuzing $(x \leftrightarrow y) \wedge (x\bar{y} \vee \bar{x}y)$
19. MDNSh tuzing $(x \rightarrow y) \wedge (y \rightarrow z) \rightarrow (z \rightarrow x)$
20. MDNSh tuzing $(x(y \vee z \rightarrow y \vee z)) \vee (y \wedge x \wedge \bar{y}) \vee x \vee (y \wedge x \wedge \bar{x})$
 $(x \vee \bar{y} \rightarrow x \wedge z) \rightarrow (\overline{x \rightarrow z}) \vee y \wedge \bar{z}$
21. MKNSh tuzing
22. MKNSh tuzing $(ab \rightarrow bc) \rightarrow ((a \rightarrow b) \rightarrow (c \rightarrow b))$
23. MKNSh tuzing $(y \rightarrow x) \leftrightarrow (y \vee x \rightarrow (z \leftrightarrow \bar{x}))$
24. Agarda $U = \{1, 2, 3, 4\}$, $A = \{1, 3, 4\}$, $B = \{2, 3\}$, $C = \{1, 4\}$ bo'lsa, $(B \setminus A) \cup C$ xisoblang.
25. Agarda $A = \{1, 2, 3, 4, 5, 6, 7\}$, $B = \{4, 5, 6, 7, 8, 9, 10\}$, $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ bo'lsa, $A \cap B'$ toping
26. Agarda $A = \{a, b, c\}$, $B = \{f, e, c, a\}$, $C = \{d, e, f\}$ $U = \{a, b, c, d, e, f\}$ bo'lsa, $(A \cup C) - \bar{B}$ xisoblang
27. Chinlik jadvali bilan berilgan $\Phi(x, y, z)$ funktsiyasi sodda shaklini toping
- | x | y | z | $\Phi(x, y, z)$ |
|-----|-----|-----|-----------------|
| 1 | 1 | 1 | 1 |
| 1 | 1 | 0 | 0 |
| 1 | 0 | 1 | 0 |
| 1 | 0 | 0 | 0 |
| 0 | 1 | 1 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 1 |
28. Chinlik jadvalini tuzing va soddalashtiring $\overline{p \rightarrow (q \wedge p)} \rightarrow p \vee r \rightarrow r$
29. Chinlik jadvali bilan berilgan $F_1(x, y, z)$ funktsiyasini toimng va soddalashtiring
- | x | y | z | $F_1(x, y, z)$ |
|-----|-----|-----|----------------|
| 1 | 1 | 1 | 0 |
| 1 | 1 | 0 | 1 |
| 1 | 0 | 1 | 1 |
| 1 | 0 | 0 | 1 |
| 0 | 1 | 1 | 0 |
| 0 | 1 | 0 | 0 |
| 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 0 |
30. Chinlik jadvali bilan berilgan $F(x_1, x_2, x_3)$ funktsiyaning sodda shaklini toping

x_1	x_2	x_3	$F(x_1, x_2, x_3)$
1	1	1	0
1	1	0	1
1	0	1	1
1	0	0	0
0	1	1	0
0	1	0	1
0	0	1	0
0	0	0	1

31. Chinlik jadvali bilan berilgan $F(x_1, x_2, x_3)$ funktsiyaning sodda shaklini toping

x_1	x_2	x_3	$F(x_1, x_2, x_3)$
1	1	1	1
1	1	0	0
1	0	1	0
1	0	0	1
0	1	1	1
0	1	0	0
0	0	1	0
0	0	0	1

32. Chinlik jadvali bilan berilgan $F(x_1, x_2, x_3)$ funktsiyaning sodda shaklini toping

x_1	x_2	x_3	$F(x_1, x_2, x_3)$
1	1	1	1
1	1	0	0
1	0	1	1
1	0	0	0
0	1	1	0
0	1	0	0
0	0	1	0
0	0	0	1

33. Chinlik jadvalini tuzing va qanday formula ekanligini aniklang
 $(x \vee \bar{y} \rightarrow (z \rightarrow y \vee \bar{y} \vee x)) \wedge (x \vee x \rightarrow (x \rightarrow x)) \rightarrow y$

34. Chinlik jadvalini tuzing va qanday formula ekanligini aniklang
 $(x \wedge z) \vee (x \wedge \bar{z}) \vee (y \wedge z) \vee (\bar{x} \wedge y \wedge z)$

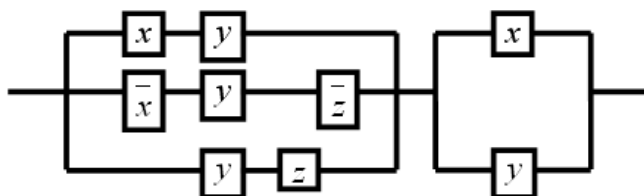
35. Soddalashtiring: $x \vee \bar{y} \rightarrow (z \rightarrow y \vee \bar{z} \vee x) \wedge (x \vee \bar{y}) \leftrightarrow z \vee y$

36. Soddalashtiring: $x \rightarrow y \vee \bar{x} \vee z \wedge (x \vee \bar{y}) \leftrightarrow x \vee y$

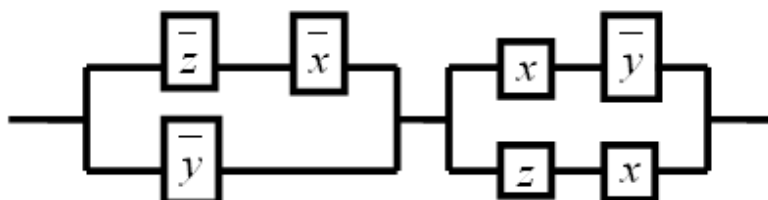
37. Soddalashtiring: $x \wedge \bar{z} \vee z \rightarrow y \vee \bar{x} \wedge (x \vee \bar{y}) \vee z$

38. Soddalashtiring: $x \vee \bar{z} \rightarrow x \vee y \leftrightarrow z \wedge x \vee \bar{z}$

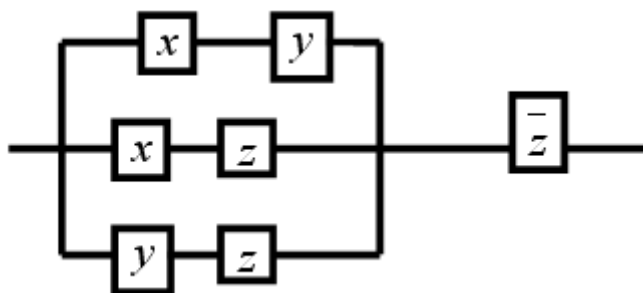
39. Sxemanı soddalashtiring



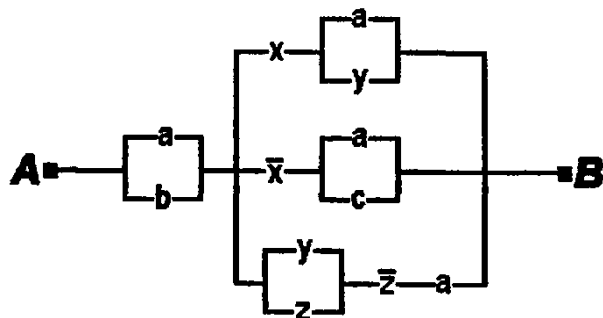
40. Sxemanı soddalashtiring



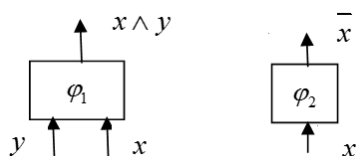
41. Sxemanı soddalashtiring



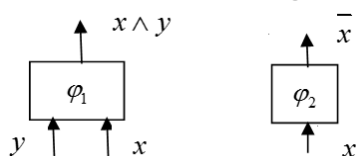
42. Sxemani soddalashtiring



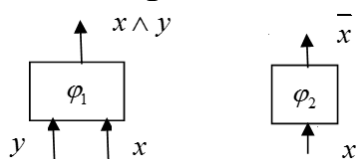
43. $\Phi = \{\varphi_1, \varphi_2\}$ sistemasidagi funktsiyalarni realizatsiya etuvchi funktsional elementlar sistemasi quydagicha berilgan bolsa, uning yordamida $(x \rightarrow y) \leftrightarrow (z \rightarrow (x \leftrightarrow \bar{z}) \vee x)$ formulasini realizatsiya etuvchi funktsional sxemani tuzing



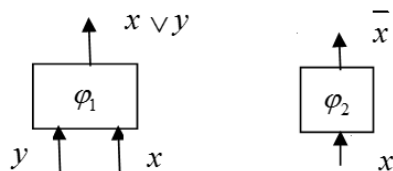
44. $\Phi = \{\varphi_1, \varphi_2\}$ sistemasidagi funktsiyalarni realizatsiya etuvchi funktsional elementlar sistemasi quydagicha berilgan bolsa, uning ja'rdeminde $(x \rightarrow z) \rightarrow ((y \rightarrow z) \rightarrow ((x \vee y) \rightarrow z))$ formulasini realizatsiya etuvchi funktsional sxemani tuzing



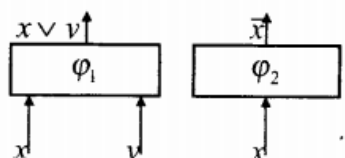
45. $\Phi = \{\varphi_1, \varphi_2\}$ sistemasidagi funktsiyalarni realizatsiya etuvchi funktsional elementlar sistemasi quydagicha berilgan bolsa, uning yordamida $(x \rightarrow y) \leftrightarrow (z \rightarrow (x \leftrightarrow \bar{z}))$ formulasini realizatsiya etuvchi funktsional sxemani tuzing



46. $\Phi = \{\varphi_1, \varphi_2\}$ sistemasidagi funktsiyalarni realizatsiya etuvchi funktsional elementlar sistemasi quydagicha berilgan bolsa, uning yordamida $(x \rightarrow y) \wedge (y \vee \bar{z})$ formulasini realizatsiya etuvchi funktsional sxemani tuzing



47. $F_2 = \{x \vee y, \bar{x}\}$ sistemasidagi funktsiyalarni realizatsiya etuvchi $\Phi = \{\varphi_1, \varphi_2\}$ funktsional elementlar sistemasi quydagicha berilgan bolsa, uning yordamida $((x \rightarrow y) \wedge (y \rightarrow z)) \rightarrow (x \rightarrow z)$ formulasini realizatsiya etuvchi funktsional sxemani tuzing



48. Berilgan formulaning bekorlanishini toping
 $\forall x(A(x) \rightarrow B(x)) \wedge \exists x(S(x) \wedge \bar{R}(x))$
49. Absolyut normal formaga keltiring $\exists x(P(x) \rightarrow Q(x)) \rightarrow (\exists x(P(x) \rightarrow \exists xQ(x)))$
50. Umumiy qiymatli ekanini keltiring
 $A = \forall x(P(x) \rightarrow \bar{Q}(x)) \rightarrow \bar{\exists xP(x) \wedge \forall xQ(x)}$
51. Teng kuchllilikni isbotlang $x \vee (y \wedge z) = (x \vee y) \wedge (x \vee z)$
52. ikkilik funkciyani toping $f = (\bar{x} \vee \bar{z}) \wedge (\bar{y} \rightarrow (z \wedge x)) \vee t$, $f^* = ?$
53. Jegalkin ko'phadini tuzin' $(x \vee \bar{y} \rightarrow x \wedge z) \rightarrow (\bar{x} \rightarrow \bar{x}) \vee y \wedge \bar{z}$
54. Soddalashtirin' $(x \vee y) \rightarrow (x \wedge \bar{y} \vee \bar{x} \rightarrow \bar{y})$
55. $f = \overline{(x \rightarrow y) \vee ((x \rightarrow z)y)}$, $g = x\bar{y}(\bar{y} \rightarrow x\bar{z})$ Teng kuchllilikni isbotlang
56. MDNF ga keltiring $(x \leftrightarrow y) \wedge (x\bar{y} \vee \bar{x}y)$
57. Jegalkin ko'phad ko'rinishin yozing $(\bar{x} \vee z) \wedge (y \rightarrow (u \rightarrow x))$
58. Agar $U = \{1, 2, 3, 4\}$, $A = \{1, 3, 4\}$, $B = \{2, 3\}$, $C = \{1, 4\}$ bo'lsa, unda $(B \setminus A) \cup C$ toping.
59. SHinliq tablitsasi quyidagicha berilgan funktsiyasini ápiwayi shaklin toping

x	y	z	$\Phi(x, y, z)$
1	1	1	1
1	1	0	0
1	0	1	0
1	0	0	0
0	1	1	1
0	1	0	1
0	0	1	1
0	0	0	1

59. MDNF keltiring $(x \rightarrow y) \wedge (y \rightarrow z) \rightarrow (z \rightarrow x)$

60. Berilgan funkciyada ikkilangan funkciyani toping

$$f = (x \vee \bar{y} \rightarrow x \wedge z) \rightarrow (\bar{x} \rightarrow \bar{z}) \vee y \wedge \bar{z}$$

61. Chinlik jadvalini tuzing va soddalashtirin' $\overline{p \rightarrow (q \wedge p)} \rightarrow p \vee r \rightarrow r$

62.Chinlik jadvalida kuydagi berilgan $F_1(x, y, z)$ funktsiyasini toping va soddalashtiring

x	y	z	$F_1(x, y, z)$
1	1	1	0
1	1	0	1
1	0	1	1
1	0	0	1
0	1	1	0
0	1	0	0
0	0	1	1
0	0	0	0

63.Kuydagi formulani MKNF ko'rinishga keltiring

$$(x \vee \bar{y} \rightarrow x \wedge z) \rightarrow (\overline{x \rightarrow z}) \vee y \wedge \bar{z}$$

64.Jegalkin ko'phad ko'rinishda yozing $((x \rightarrow y) \wedge (y \rightarrow z) \rightarrow \overline{(x \rightarrow z)}) \vee y \wedge \bar{z}$

65. $A = \{1, 2, 3, 4, 5, 6, 7\}$, $B = \{4, 5, 6, 7, 8, 9, 10\}$, $U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ bo'lsa $A' \cap B'$ toping

66. Soddalashtiring: $(x \vee \bar{y} \rightarrow (z \rightarrow y \vee \bar{y} \vee x)) \wedge (x \vee \bar{x} \rightarrow \overline{(x \rightarrow y)}) \rightarrow z$

67.Kuydagi formulalarni MDNF ko'rinishga keltiring

$$(x(y \vee z \rightarrow y \vee z)) \vee (y \wedge x \wedge \bar{y}) \vee x \vee (y \wedge x \wedge \bar{x})$$

68. $A = \{a, b, c\}$, $B = \{f, e, c, a\}$, $C = \{d, e, f\}$ $U = \{a, b, c, d, e, f\}$ bo'lsa $(A \cup C) - \bar{B}$ hisoblang

69.Soddalashtiring $(x_1 \vee x_2 \bar{x}_3 x_4)((\bar{x}_2 \vee x_4) \rightarrow x_1 \bar{x}_3 \bar{x}_1) \vee x_2 x_3 \vee \bar{x}_1 \vee x_4$

70.Jegalkin ko'phadga keltiring $(x \rightarrow y) \leftrightarrow (z \rightarrow (x \leftrightarrow \bar{z}))$

71.Soddalashtiring $(x \vee \bar{y} \rightarrow (z \rightarrow y \vee \bar{y} \vee x)) \wedge (x \vee \bar{x} \rightarrow \overline{(x \rightarrow y)}) \rightarrow x \vee z$

72.SHınlıq tablitsası to'mendegishe berilgen $F(x_1, x_2, x_3)$ funkciyasini soddalashtirish formulasini toping

x_1	x_2	x_3	$F(x_1, x_2, x_3)$
1	1	1	0
1	1	0	1
1	0	1	1
1	0	0	0
0	1	1	0
0	1	0	1
0	0	1	0
0	0	0	1

73.Ikkilik funkciyani toping $f = (\bar{x} \vee z) \wedge (y \rightarrow (u \rightarrow x))$, $f^* = ?$

74.Ko'ydagi formulalarni JKNF ko'rinishga keltiring

$$(ab \rightarrow bc) \rightarrow ((a \rightarrow b) \rightarrow (c \rightarrow b))$$

75.Chinlik jadval tuzing va qanday formula ekanini toping

$$(x \vee \bar{y} \rightarrow (z \rightarrow y \vee \bar{y} \vee x)) \wedge (x \vee x \rightarrow (x \rightarrow x)) \rightarrow y$$

76.Ko'ydagi formulalarni JDNF ko'rinishine keltirin' $(a \rightarrow \bar{b}) \wedge (\bar{a} \rightarrow c) \rightarrow a \wedge (b \vee c)$

77.Ikkilik funkciyani toping $F = (x \rightarrow y) \wedge (y \rightarrow z) \rightarrow (z \rightarrow x)$, $F^* =$

78.Jegalkin ko'pag'zalisina keltirin' $(x \rightarrow y) \wedge (y \rightarrow z) \rightarrow (x \rightarrow z)$

79.Ikkilik funkciyani toping $f = (\bar{x} \rightarrow z) \vee (y \wedge (z \rightarrow x) \rightarrow z)$, $f^* = ?$

80.Ko'ydagi formulalarni MKNF ko'rinishiga keltiring

$$(y \rightarrow x) \leftrightarrow (y \vee x \rightarrow (z \leftrightarrow \bar{x}))$$

81.Chinlik jadval tuzing va qanday formula ekanini toping

$$(x \wedge z) \vee (x \wedge \bar{z}) \vee (y \wedge z) \vee (\bar{x} \wedge y \wedge z)$$

82.Chinlik jadvali ko'ydagisha berilgan $F(x_1, x_2, x_3)$ funkciyasini soddalashtirish formulasini toping

x_1	x_2	x_3	$F(x_1, x_2, x_3)$
1	1	1	1
1	1	0	0
1	0	1	1
1	0	0	0
0	1	1	0
0	1	0	0
0	0	1	0
0	0	0	1

83.Soddalashtiring: $x \vee \bar{y} \rightarrow (z \rightarrow y \vee \bar{z} \vee x) \wedge (x \vee \bar{y}) \leftrightarrow z \vee y$

84.Ikkilik funkciyani toping $(x \rightarrow (y \rightarrow z)) \rightarrow (y \rightarrow x)$

85.Soddalashtiring: $x \rightarrow y \vee \bar{x} \vee z \wedge (x \vee \bar{y}) \leftrightarrow x \vee y$

86.Ko'ydagi formulalarni MKNF ko'rinishiga keltiring

$$(ab \rightarrow bc) \rightarrow ((a \rightarrow b) \rightarrow (c \rightarrow b))$$

87.Soddalashtiring: $x \wedge \bar{z} \vee z \rightarrow y \vee \bar{x} \wedge (x \vee \bar{y}) \vee z$

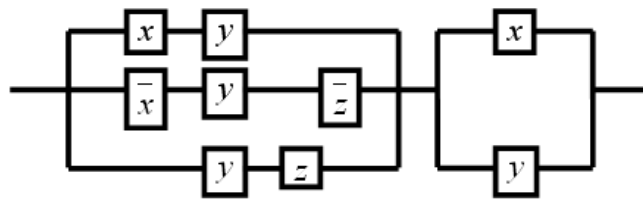
88.Chinlik jadval ko'ydagisha berilgan $F(x_1, x_2, x_3)$ funkciyasini soddalashtirish formulasini toping

x_1	x_2	x_3	$F(x_1, x_2, x_3)$
1	1	1	1
1	1	0	0
1	0	1	0
1	0	0	1
0	1	1	1
0	1	0	0
0	0	1	0
0	0	0	1

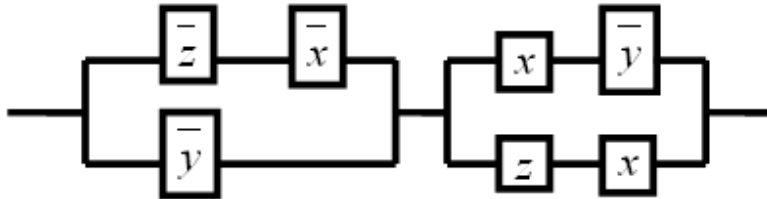
89. Soddalashtiring: $x \vee \bar{z} \rightarrow x \vee y \leftrightarrow z \wedge x \vee \bar{z}$

90. Ikkilik funkciyani toping $(x \rightarrow y) \rightarrow (\bar{x} \wedge (y \vee z))$

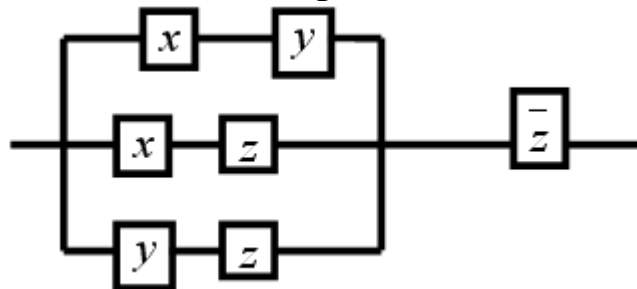
91. Sxemani soddalashtiring



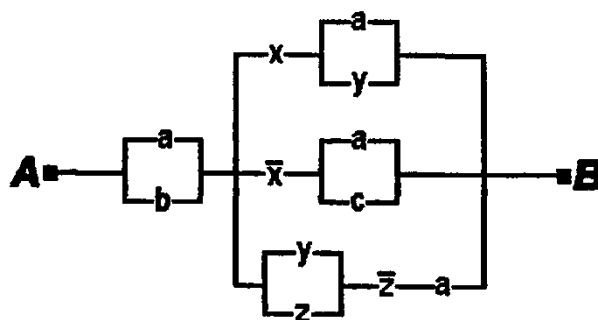
92. Sxemani soddalashtiring



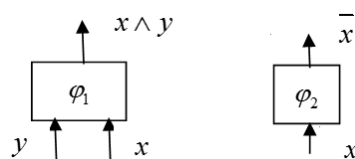
93. Sxemani soddalashtiring



94. Sxemani soddalashtiring



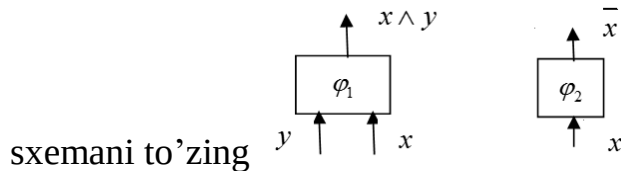
95. $\Phi = \{\varphi_1, \varphi_2\}$ Tizimidagi funktsiyalarni realizatsiya etuvchi funktsional unsurlar tizimsi quyidagicha berilgan bo'lsa, u yerda uning yordamida $(x \rightarrow y) \leftrightarrow (z \rightarrow (x \leftrightarrow \bar{z}) \vee x)$ formulasini Realizatsiya etuvchi funktsional



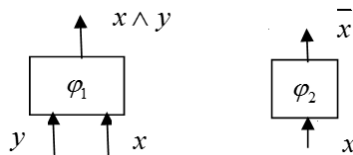
sxemani to'zing

96. $\Phi = \{\varphi_1, \varphi_2\}$ Tizimidagi funktsiyalarni realizatsiya etuvchi funktsional unsurlar tizimsi quyidagicha berilgan bo'lsa, u yerda uning yordamida

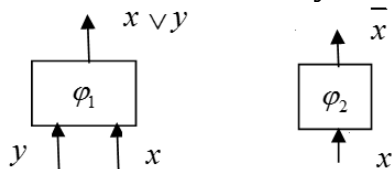
$(x \rightarrow z) \rightarrow ((y \rightarrow z) \rightarrow ((x \vee y) \rightarrow z))$ Formulasin realizatsiya etuvchi funktsional



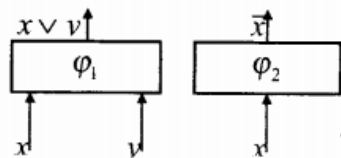
97. $\Phi = \{\varphi_1, \varphi_2\}$ Tizimidagi funktsiyalarni realizatsiya etuvchi funktsional unsurlar tizimsi quyidagicha berilgan bo'lsa, u yerda uning yordamida $(x \rightarrow y) \leftrightarrow (z \rightarrow (x \leftrightarrow \bar{z}))$ Formulasin realizatsiya etuvchi sxemasini to'zing



98. $\Phi = \{\varphi_1, \varphi_2\}$ Tizimidagi funktsiyalarni realizatsiya etuvchi funktsional unsurlar tizimsi quyidagicha berilgan bo'lsa, u yerda uning yordamida $(x \rightarrow y) \wedge (y \vee \bar{z})$ Formulasin realizatsiya etuvchi sxemasini to'zing



99. $F_2 = \{x \vee y, \bar{x}\}$ Tizimidagi funktsiyalarni realizatsiya etuvchi $\Phi = \{\varphi_1, \varphi_2\}$ funktsional unsurlar tizimsi quyidagicha berilgan bo'lsa, u yerda uning yordamida $((x \rightarrow y) \wedge (y \rightarrow z)) \rightarrow (x \rightarrow z)$ Formulasin realizatsiya etuvchi



sxemasini to'zing

100. $\Phi = \{\varphi_1, \varphi_2\}$ Tizimidagi funktsiyalarni realizatsiya etuvchi funktsional unsurlar tizimsi quyidagicha berilgan bo'lsa, u yerda uning yordamida $(x \rightarrow z) \rightarrow ((y \rightarrow z) \rightarrow ((x \vee y) \rightarrow z))$ Formulasin realizatsiya etuvchi funktsional

