

Samarqand davlat universitetning Kattaqo'rg'on filiali Aniq va tabiiy fanlar fakulteti bahorgi semestr Matematika va informatika ta'lim yo'nalishi: 2-kurs talabalariga « Diskret matematika va mantiq » fanidan yakuniy nazorat savollari

Imtihon shakli amaliy

Savolning tartib raqami	Savolning qiyinlik darajasi	Savolning qanday mashg'ulotga tegishliligi	Mavzu nomeri	Savol matni
1.	1	A	1	Formulani kon'yunktiv normal shaklga keltiring va izohlang: $(x \vee y) \rightarrow z$;
2.	1	A	1	Formulani kon'yunktiv normal shaklga keltiring va izohlang: $(x \rightarrow y) \otimes (x yz)$;
3.	1	A	1	Formulani kon'yunktiv normal shaklga keltiring va izohlang: $(x \rightarrow yzt)(z \rightarrow x\bar{y})$;
4.	1	A	1	Formulani diz'yunktiv normal shaklga keltiring va izohlang: $((x y) \downarrow z) (y \downarrow t)$;
5.	1	A	1	Formulani diz'yunktiv normal shaklga keltiring va izohlang: $x \rightarrow ((yz \rightarrow t) \rightarrow \bar{y})$;
6.	2	A	1	Formulani diz'yunktiv normal shaklga keltiring va izohlang: $(x \oplus y)(z \rightarrow \bar{y}t)$;

7.	2	A	2	Formulani mukammal kon'yunktiv normal shaklga keltiring va izohlang: $(\bar{x}y \oplus z)(xz \rightarrow y)$;
8.	2	A	2	Formulani mukammal kon'yunktiv normal shaklga keltiring va izohlang: $(x \sim y) \vee (xz \oplus (y \rightarrow z))$;
9.	2	A	2	Formulani mukammal kon'yunktiv normal shaklga keltiring va izohlang: $(x \downarrow yz) \downarrow ((\bar{x} y) \downarrow z)$;
10.	2	A	2	Formulani mukammal diz'yunktiv normal shaklga keltiring va izohlang: $(x \sim (y \rightarrow z)) \vee (y \rightarrow xz)$;
11.	3	A	2	Formulani mukammal diz'yunktiv normal shaklga keltiring va izohlang: $(\bar{x} \rightarrow (y \rightarrow z)) \oplus x\bar{y}z$;
12.	3	A	2	Formulani mukammal diz'yunktiv normal shaklga keltiring va izohlang: $\overline{xy} \vee (x \downarrow (y \vee (\bar{x} \rightarrow y)))$;
13.	3	A	3	Bleyk usuli bilan minimal DNSh ko'rinishiga keltiring: $(x \oplus y)(z \rightarrow \bar{y}t)$;
14.	3	A	3	Bleyk usuli bilan minimal DNSh ko'rinishiga keltiring: $(\bar{x}y \oplus z)(xz \rightarrow y)$;
15.	3	A	3	Bleyk usuli bilan minimal DNSh ko'rinishiga keltiring: $\overline{\bar{x}\bar{y} \vee z} \sim (x \rightarrow y\bar{z})$;
16.	3	A	3	Mak-Klaski usuli bilan minimal DNSh ko'rinishiga keltiring: $A(x, y, z, u) = (0011101110001101)$

17.	3	A	3	Mak-Klaski usuli bilan minimal DNSh ko'rinishiga keltiring: $A(x, y, z) = (01110110)$
18.	3	A	3	Mak-Klaski usuli bilan minimal DNSh ko'rinishiga keltiring: $A(x, y, z) = (01101010)$
19.	3	A	3	Nelson usuli bilan qisqartirilgan DNSh ko'rinishiga keltiring: $x \rightarrow (y \rightarrow z) \oplus (x (y \oplus z))$;
20.	3	A	3	Nelson usuli bilan qisqartirilgan DNSh ko'rinishiga keltiring: $xy \vee (x \downarrow (y \vee (\bar{x} \rightarrow y)))$;
21.	3	A	3	Nelson usuli bilan qisqartirilgan DNSh ko'rinishiga keltiring: $\bar{x}\bar{y} \vee \bar{y}z \vee (x \rightarrow yz)$;
22.	3	A	3	Karno-Karta usuli bilan qisqartirilgan DNSh ko'rinishiga keltiring: $((x \& y) \sim (x \& z)) \sim x$;
23.	2	A	3	Karno-Karta usuli bilan qisqartirilgan DNSh ko'rinishiga keltiring: $((x \downarrow y) z) x \downarrow y$
24.	2	A	3	Karno-Karta usuli bilan qisqartirilgan DNSh ko'rinishiga keltiring: $(\bar{x}_1 \cdot x_2 \rightarrow (\bar{x}_1 \sim \bar{x}_2)) \rightarrow x_1 \cdot \bar{x}_2$
25.	2	A	4	Quyidagi formulaning chinlik to'plamini tuzing: $A(x) \wedge B(x) \rightarrow C(x)$ $A(x): 3 + 4x \geq 5$; $B(x): 0,25^x \geq 0,5^{4x-8}$; $C(x): \sin^2 x + \cos^2 x = 1$;
26.	2	A	4	Quyidagi formulaning chinlik to'plamini tuzing: $A(x) \wedge B(x) \rightarrow C(x)$

				1. $A(x): 2x - 3(x - 1) > -1$; $B(x): 2^{\sqrt{x}-1}(4x^2 - 4x + 1) > 0$; $C(x): \sin^2 x - \frac{5}{2}\sin x + 1 < 1$;
27.	2	A	4	Quyidagi formulaning chinlik to'plamini tuzing: $A(x) \wedge B(x) \rightarrow C(x)$ $A(x): (x + 1)^2 > (x + 2)^2$; $B(x): (\sqrt{6})^x \leq \frac{1}{36}$; $C(x): 2\sin 2x \geq \operatorname{ctg} \frac{\pi}{4}$;
28.	2	A	6	$M = \{1, 2, 3, \dots, 20\}$ to'plamda quyidagi predikatlar berilgan: $A(x): \langle x \text{ son } 5\text{ga qoldiqsiz bo'linmaydi} \rangle$; $B(x): \langle x - \text{juft son} \rangle$; $C(x): \langle x - \text{tub son} \rangle$; $D(x): \langle x \text{ son } 3\text{ga karrali} \rangle$. Quyidagi predikatlarning har biri uchun chinlik to'plamni aniqlang: $(A(x) \wedge C(x)) \rightarrow \overline{D(x)}$
29.	2	A	6	$M = \{1, 2, 3, \dots, 20\}$ to'plamda quyidagi predikatlar berilgan: $A(x): \langle x \text{ son } 5\text{ga qoldiqsiz bo'linmaydi} \rangle$; $B(x): \langle x - \text{juft son} \rangle$; $C(x): \langle x - \text{tub son} \rangle$; $D(x): \langle x \text{ son } 3\text{ga karrali} \rangle$. Quyidagi predikatlarning har biri uchun chinlik to'plamni aniqlang: $(A(x) \wedge D(x)) \rightarrow \overline{C(x)}$
30.	2	A	6	$M = \{3, 4, 5, 6, 7, 8\}$ to'plamda ikkita $A(x): \langle x - \text{tub son} \rangle$ va $B(x): \langle x - \text{toq son} \rangle$ predikatlar berilgan. Bu predikatlarning chinlik to'plamini tuzing.
31.	2	A	5	Quyidagi formulalarni deyarli normal shaklga keltiring: $\forall x(A(x) \rightarrow B(y)) \rightarrow \exists y(B(y) \rightarrow A(x))$
32.	2	A	5	Quyidagi formulalarni deyarli normal shaklga keltiring: $\forall x(A(x) \rightarrow \exists x(C(x))) \rightarrow \forall x((C(x) \rightarrow A(x)))$

33.	2	A	5	Quyidagi formulalarni deyarli normal shaklga keltiring: $\forall x(A(x) \rightarrow \exists x(B(y))) \rightarrow \exists x(A(x) \rightarrow B(y))$
34.	2	A	5	Berilgan predikatning aynan chin bo'lishini qanday aniqlash mumkin tahlil qilib bering: $\exists x Q(x)$
35.	2	A	5	Berilgan predikatning aynan chin bo'lishini qanday aniqlash mumkin tahlil qilib bering: $\exists x P(x)$
36.	3	A	5	1. R to'plamda $P(x)$: « $x^2 + x + 1 > 0$ » va $Q(x)$: « $x^2 - 4x + 3 = 0$ » predikatlar berilgan bo'lsin. Quyidagi mulohazalarning qaysilari chin, qaysilari esa yolg'on ekanligini aniqlang: $\forall x P(x)$
37.	3	A	5	Quyidagi formulani umumqiymatlilikga tekshiring: $(\exists x(A(x)) \rightarrow \forall x(B(x))) \rightarrow (\forall x(B(x)) \vee A(x))$
38.	3	A	7	Quyida berilgan variantlardagi formulani soddalashtiring va $\varphi_1 = \bar{a}$, $\varphi_2 = a \vee b$, $\varphi_3 = a \wedge b$ larga mos funksional sxema tuzing. $(x \sim y) \vee (xz \oplus (y \rightarrow z))$;
39.	2	A	7	Quyida berilgan variantlardagi formulani soddalashtiring va $\varphi_1 = \bar{a}$, $\varphi_2 = a \vee b$, $\varphi_3 = a \wedge b$ larga mos funksional sxema tuzing. $\overline{x \rightarrow (y \rightarrow z)} \oplus (x (y \oplus z))$;
40.	2	A	7	Quyida berilgan variantlardagi formulani soddalashtiring va $\varphi_1 = \bar{a}$, $\varphi_2 = a \vee b$, $\varphi_3 = a \wedge b$ larga mos funksional sxema tuzing. $\overline{xy \vee z} \sim (x \rightarrow y\bar{z})$;
41.	2	A	8	Quyida berilgan variantlardagi formulani soddalashtiring va $\varphi_1 = \bar{a}$, $\varphi_2 = a \vee b$, $\varphi_3 = a \wedge b$ larga mos funksional sxema tuzing.

				$(x \downarrow y)((y z) \vee x \bar{t})(x \downarrow (z t));$
42.	2	A	8	Quyida berilgan variantlardagi formulani soddalashtiring va $\varphi_1 = \bar{a}$, $\varphi_2 = a \vee b$, $\varphi_3 = a \wedge b$ larga mos funksional sxema tuzing. $(x \rightarrow y)(y \rightarrow \bar{z})(z \rightarrow x \bar{t});$
43.	2	A	8	Quyida berilgan variantlardagi formulani soddalashtiring va $\varphi_1 = \bar{a}$, $\varphi_2 = a \vee b$, $\varphi_3 = a \wedge b$ larga mos funksional sxema tuzing. $(x \vee y \bar{z} \bar{t})((\bar{x} \vee t) \oplus yz) \vee \bar{y}(z \vee x \bar{t});$
44.	2	A	9	Sonlar o'qida A, B, C nuqtalar berilgan. C nuqta A va B nuqtalar orasida joylashgan. AC va BC kesmalar uzunligining ko'paytmasini topish algoritmini tuzing.(Blok sxema shaklida)
45.	3	A	9	To'g'ri uchburchakning katetlari a va b berilgan. Uning gipotenuzasi c va perimetri P aniqlash algoritmini tuzing.(Blok sxema shaklida)
46.	3	A	9	Nolga teng bo'lmagan ikkita son berilgan. Ularning yig'indisini, ko'paytmasini va har birining kvadrati aniqlash algoritmini tuzing.(Blok sxema shaklida)
47.			9	Tekislikdagi berilgan ikki nuqta (x_1, y_1) va (x_2, y_2) orasidagi masofa topish algoritmini tuzing.(Blok sxema shaklida)
48.			9	Butun son berilgan. Ushbu sonning oxirgi raqami juftligini tekshirish algoritmini tuzing.(Blok sxema shaklida)
49.			9	Butun son berilgan. Ushbu sonning oxirgi raqami toqligini tekshirish algoritmini tuzing.(Blok sxema shaklida)
50.			10	Berilgan

				$P: \begin{cases} q_1 0 q_1 1 R \\ q_1 1 q_2 0 R \\ q_2 0 q_1 1 R \\ q_2 1 q_3 1 L \\ q_3 0 q_1 1 L \end{cases}$ programma bo'yicha Tyuring mashinasini P so'ziga qo'llash mumkinmi? Bunda, q_1-boshlang'ich holat, q_0-tugallangan holat. $P=1^5[01]^2$;
51.			10	Berilgan $P: \begin{cases} q_1 0 q_1 1 R \\ q_1 1 q_2 0 R \\ q_2 0 q_1 1 R \\ q_2 1 q_3 1 L \\ q_3 0 q_1 1 L \end{cases}$ programma bo'yicha Tyuring mashinasini P so'ziga qo'llash mumkinmi? Bunda, q_1-boshlang'ich holat, q_0-tugallangan holat. $P=1^3 0^3 [01]^2$;
52.			10	Berilgan $P: \begin{cases} q_1 0 q_1 1 R \\ q_1 1 q_2 0 R \\ q_2 0 q_1 1 R \\ q_2 1 q_3 1 L \\ q_3 0 q_1 1 L \end{cases}$ programma bo'yicha Tyuring mashinasini P so'ziga qo'llash mumkinmi? Bunda, q_1-boshlang'ich holat, q_0-tugallangan holat. $P=[101]^2 0011$;
53.			10	Berilgan

				$P: \begin{cases} q_1 0 q_1 1 R \\ q_1 1 q_2 0 R \\ q_2 0 q_1 1 R \\ q_2 1 q_3 1 L \\ q_3 0 q_1 1 L \end{cases}$ programma bo'yicha Tyuring mashinasini P so'ziga qo'llash mumkinmi? Bunda, q_1-boshlang'ich holat, q_0-tugallangan holat. $P=[10]^2 0011$;
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