1. **Построив резолютивный вывод, доказать противоречивость множества дизъюнктов ( a, b, c – константы; f, g – функторы; x, y, z, v, u - переменные):**

**S = {M(a, g(c), f(b)); P(a); M(x, x, f(x)); ¬ M(x, y, z) ∨ M(y, x, z); ¬ M(x, y, z) ∨ D(x, z); ¬ P(x) ∨ ¬ M(y, z, u) ∨ ¬ D(x, u) ∨ D(x, y) ∨ D(x, z); ¬ D(a, b)}**

**C1: M(a, g(c), f(b));**

**C2: P(a);**

**C3: M(x, x, f(x));**

**C4: ¬ M(x, y, z) ∨ M(y, x, z);**

**C5: ¬ M(x, y, z) ∨ D(x, z);**

**C6: ¬ P(x) ∨ ¬ M(y, z, u) ∨ ¬ D(x, u) ∨ D(x, y) ∨ D(x, z);**

**C7: ¬ D(a, b)}**

**C8 (C3, C5) {x / y, f(x) / z}: D(x, f(x))**

**C9(C6’, C8) {f(x) / u}: ~P(x) V ~M(y, y, f(x)) V D(x, y)**

**C10(C9, C2) {a / x}: ~M(y, y, f(a)) V D(a, y)**

**C11(C10, C11) {b / y}: ~M(b, b, f(a))**

**C12(C11, C3) {b / x, a / x}:[]**

**2. Доказать две теоремы методом резолюций:**

**а)  ∃x (A(x) ∧ ∃x (B(x) → ¬ A(x)) → ¬ ∀x B(x))**

**~(∃x (~(A(x) ∧ ∃x (~B(x) → ¬ A(x))) → ¬ ∀x B(x)))**

**∀x ((A(x) ^ ∃t (~B(t) V ~A(t))) ^ ∀y(B(y)))**

**∀x∃t∀y((A(x) ^ (~B(t) V ~A(t))) ^ (B(y)))**

**∀x∀y(A(x) ^ (~B(f(x)) V ~A(f(x))) V (B(y)))**

**C1: A(x)**

**C2: ~B(f(x)) V ~A(f(x))**

**C3: B(y)**

**C4(C2, C3){a/x, f(a)/y}: ~A(f(a))**

**C5(C1, C4){f(a)/x}: []**

**б) F1: ∀y ∀x ∀z (B(z, x) → ∃ v (C(y, x) ∧ E(y, z, v)))**

**∀y ∀x ∀z (~(B(z, x)) V (∃v (C(y, x) ∧ E(y, z, v))))**

**∀y ∀x ∀z ∃v (~B(z, x) V ((C(y, x) ^ E(y, z, v))))**

**∀y ∀x ∀z ((~B(z, x) V C(y, x)) ^ (~B(z, x) v E(y, z, f(y, x, z)))**

**F2: ∀y ∀x ∀z ∀v (A(y, x) ↔ B(z, x) ∧ S(v, x) ∧ E(y, z, v))**

**∀y ∀x ∀z ∀v ((~A(y, x) V (B(z, x)) ^ S(v, x) ^ E(y, z, v))) ^ ((~B(z, x) v ~S(v, x) V ~E(y, z, v) V A(y, x))**

**∀y ∀x ∀z ∀v ((~A(y, x) V B(z, x)) ^ (~A(y, x) v S(v, x)) ^ (~A(y, x) V E(y, z, v))) ^ ((~B(z, x) V ~S(v, x) V ~E(y, z, v) V A(y, x))**

**F3: ∀y ∀x A(y, x)**

**G: ∀y ∀x C(y, x)**

**C1: ~B(z, x) V C(y, x)**

**C2: ~B(z, x) V E(y, z, f(y, x, z)))**

**C3: ~A(y, x) V B(z, x)**

**C4: ~A(y, x) V S(v, x)**

**C5: ~A(y, x) V E(y, z, v)**

**C6: ~B(z, x) V ~S(v, x) ~E(y, z, v) V A(y, x)**

**C7: A(y, x)**

**C8: ~C(y, x)**

**C9(C1, C8): ~B(z, x)**

**C10(C3, C9): ~A(y, x)**

**C11(C7, C10): []**