Derivation Questions for Unit 6 using only UI, EG and EI

The first set of questions can be done with only UI and EG:

6.001 $\forall x(Fx \rightarrow Gx).\ \forall y(Hy \rightarrow \sim Gy).\ Fc.\ \therefore \exists x \sim Hx$

6.002 $\forall x(Bx \rightarrow Cx).\ \forall y(Ay \vee By).\ \therefore \sim Cb \rightarrow \exists x Ax$

6.003 $\forall x(Dx \leftrightarrow \sim Cx).\ \forall x(Cx \vee \sim Dx).\ \therefore \sim \exists y Dy$ (Hint… do this as an ID!)

6.004 $\therefore \forall x(Fx \wedge Gx \wedge Hx) \rightarrow \exists x Fx \wedge \exists y(Gy \wedge Hy) \wedge \exists z(Hz \vee Bz)$

6.005 $\forall x(\sim Bx \rightarrow Dx).\ \forall x(Cx \wedge Fx \rightarrow \sim Dx).\ Fa.\ \forall y(Cy \vee \sim(Fy \wedge By)).\ \therefore \exists x(Cx \leftrightarrow Bx)$

6.006 $\forall x(Fx \vee Gx) \wedge \forall y(Gy \rightarrow Hy).\ \sim Ha \vee \sim Hb.\ \therefore \exists y Fy$

6.007 $\exists x(\sim Fx \vee Gx) \rightarrow \forall y(Ay \rightarrow Hy).\ \therefore \sim(Fb \vee \sim Ab) \rightarrow \exists w Hw$

6.008 $\forall x(Ax \leftrightarrow Bx \vee Cx).\ \forall x(\sim Cx \rightarrow (Fx \vee Gx)).\ \sim Ga(b).\ \therefore \exists x(\sim Fx \rightarrow Ax)$

6.009 $\forall x Gb(cx) \therefore \exists y Gb(yy) \wedge \exists z Gz$

6.0010 $\forall x G(xx).\ \forall x(\exists y G(xy) \rightarrow \sim Cx \wedge Ax).\ \forall x(Cx \leftrightarrow Bx).\ \therefore \sim \forall x(Ax \rightarrow Bx)$

6.0011 $\sim \exists x \exists y B(xy).\ \forall x \forall y(C(yx) \rightarrow B(yx)).\ \therefore C(aa) \rightarrow \exists x \sim C(xx)$

6.0012 $\forall x(Fx \rightarrow \forall y(Gy \rightarrow \sim L(xy))).\ \exists x(Fx \vee \sim Fx) \rightarrow \forall z(Fz \leftrightarrow Gz).\ Ga.$
$\therefore \sim \forall x \forall y(Fx \wedge Fy \rightarrow L(xy))$

6.0013 $\forall x(A(bx) \rightarrow B(ax)).\ \exists x \exists y A(xy) \rightarrow \forall w \forall z(B(wz) \vee B(bb) \rightarrow C(zw)).\ \therefore A(bb) \rightarrow \exists x \exists y C(xy)$

For these you will need UI, EG and EI.

6.0014 $\forall x(Fx \rightarrow \sim Gx).\ \forall y(Hy \vee Gy)\ \exists x Fx.\ \therefore \exists x Hx$

6.0015 $\exists x(Ax \wedge \sim Bx).\ \forall z(Cz \vee Bz).\ \forall x(Ax \leftrightarrow Mx).\ \forall x(Cx \vee Fx \rightarrow Gx).\ \therefore \exists y(Gy \wedge My)$

6.0016 $\forall x(Ax \rightarrow Bx).\ \exists x(Cx \wedge \sim Dx).\ \forall x \sim(Bx \leftrightarrow Cx).\ \therefore \forall y(Dy \vee Fy) \rightarrow \exists x(Fx \wedge \sim Ax)$

6.0017 $\forall x(Fx \leftrightarrow Bx).\ \forall x \sim(Cx \rightarrow Dx).\ \forall y(By \wedge \sim Dy \rightarrow \sim Cy).\ \sim \exists y Gy.\ \therefore \sim \exists x(Fx \vee Gx)$

6.0018 $\therefore \exists x L(xa) \wedge \forall x \forall y(L(xy) \leftrightarrow L(yx)) \rightarrow \exists y L(ay)$

6.0019 $\exists x(Fx \wedge Gx).\ \exists y(Fy \wedge \sim Gy).\ \therefore \forall x(Hx \leftrightarrow Gx) \rightarrow (\exists y Hy \wedge \exists y \sim Hy)$

6.0020 $\forall x(Fx \vee Hx \rightarrow \forall y L(xy)).\ \sim \exists x(Gx \wedge L(xx)).\ \therefore \sim \exists x(Fx \wedge Gx)$

6.0021 $\exists y \forall x F(b(y)x)\ \therefore \exists x F(xx)$

6.0022 $\therefore \forall x(Ax \rightarrow \forall y(By \rightarrow \sim C(xy))) \rightarrow \sim \exists w \exists z(Az \wedge Bw \wedge C(zw))$

6.0023 $\forall x \forall y(B(xxy) \rightarrow L(yx)).\ \therefore \exists x \forall y \exists z\ B(xyz) \rightarrow \exists x \exists y L(xy)$

6.0024 $\forall x \exists y \sim(Ax \rightarrow \sim By).\ \therefore \exists x(Ax \wedge Bx)$