Introduction to Logic

Practice Exam Answers for Unit 3 (Exams 3 and 5):

Note: All logically equivalent translations are acceptable. I've tried to list the most obvious translations, but there are always other logically equivalent answers.

1. ~In & ~Ij
2. ~Gn & ~Gm —OR—
   ~(Gn v Gm)
3. Nnu
4. ~Ocn → Ocj
5. ∀x(Sx → ~Ix) —OR—
   ~∃x(Sx & Ix)
6. ∃x(Px & ~Ix) —OR—
   ~∀x(Px → Ix)
7. ∀x[(Gx & Px) → Rx]
8. ~∀xIx —OR—
   ∃x~Ix
9. ∃x(Rx & Gx)
10. ∀x[(Gx & Px) → (Rx v Dx)]
11. ∀xGx → ∀x~Px —OR—
    ~∀x~Px → ~∀xGx —OR—
    ∃xPx → ~∀xGx —OR—
    ∀xGx → ~∃xPx
12. ∀x[(Px v Sx) → (Ix v Gx)] —OR—
    ∀x[Px → (Ix v Gx)] & ∀x[Sx → (Ix v Gx)]
13. (Among everything, only inhabitable planets rotate.)
    ∀x[~(Ix & Px) → ~Rx] —OR—
    ∀x[Rx → (Ix & Px)]
14. (Among planets, only the inhabitable ones rotate.)
    ∀x[~(Ix & Px) → ~(Rx & Px)] —OR—
    ∀x[(Rx & Px) → (Ix & Px)] —OR—
    ∀x[(Rx & Px) → Ix] —OR—
    ∀x[Px → (Rx → Ix)] —OR—
    ∀x[Px → (~Ix → ~Rx)]
    etc...
15. ∀x[(~Gx & Px) → Rx] —OR—
    ∀x[~Rx → ~(~Gx & Px)]
16. ∀x(Px → Ix) → ∃x[(Gx & Px) & Ix]
17. ~Ij → ∀x[(Ix & Px) → ~Gx] —OR—
    ~Ij → ~∃x[(Ix & Px) & Gx] —OR—
    ~∃x[(Ix & Px) & Gx] v Ij —OR—
    ∀x[(Ix & Px) → ~Gx] v Ij
    etc...
18. ∃xOxj
19. ∃x~Oxj —OR—
    ~∀xOxj
20. ∀x∃yOyx
21. ∃x∀y~Oxy —OR—
    ∃x~∃yOxy
22. ∀x(Oxj → Ljx)
23. ∃x(Lxm & Oxj)
24. ∀x(Lxj → ~Lxn) —OR—
    ~∃x(Lxj & Lxn)
25. ∀x[Px → ~∀y(Sy → Lxy)] —OR—
    ~∃x[Px & ∀y(Sy → Lxy)] —OR—
    ∀x[Px → ∃y(Sy & ~Lxy)] —OR—
    ~∃x[Px & ~∃y(Sy & ~Lxy)]
    etc...
26. ∃x{[Px & ∀y(Ay → Lxy)] & Ix} —OR—
    ∃x{[Px & ~∃y(Ay & ~Lxy)] & Ix}
    etc...
27. ∀x{[Sx & ∀y(Py → Lxy)] → ∀y(Ay → Lxy)} —OR—
    ∀x{Sx → [∀y(Py → Lxy) → ∀y(Ay → Lxy)]}
    etc.
28. ∀x[∀y(Sy → Lxy) → ~∃y(Py & Oxy)] —OR—
    ∀x[∀y(Sy → Lxy) → ∀y(Py → ~Oxy)] —OR—
    ~∃x[∀y(Sy → Lxy) & ∃y(Py & Oxy)]
    etc...