Unit 1

Practice I

Introduction to logics

1. Mark the link terms (if any) in the following propositions. Find how many atomic propositions are found in each molecular proposition. Recall that << if ..., then >> is a single link term.
2. This is not my happy day.
3. Winter has come and days are shorter. >> (Winter has come) AND (days are shorter)
4. Many germs are not bacteria.
5. If there are flaws in large rock masses, then earthquakes may occur. >> IF (there are flaws in large rock masses) THEN (earthquakes may occur)
6. If it is a positive number then it is greater than zero. >> IF (it is a positive number) THEN (it is greater than zero)
7. If (x > 0) then (y = 2)
8. If (x + y = 2) then (z > 0)
9. (x = 0) or (y = 1)
10. If (x = 1) o (z = 2) then (y > 1)
11. If (z > 10) then (“x + z > 10”) and (“y + z > 10”).
12. (x + y = y + x)
13. Recognize the propositional structure of each sentence below, to do so underline the atomic propositions, mark the link terms and group them into molecules.
14. The meal will be today at three o'clock.
15. The big black bear walked lazily down the road.
16. (The music is very soft) or (the door is closed).
17. This big dog likes to hunt cats.
18. (He asks for his pipe) and (He asks for his bowl).
19. If (John is a good player), then (he will participate in the school team).
20. (Older students are not on the list before young people).
21. x + y > 2
22. (x = 1) or (y + z = 2)
23. y = 2 and z = 10
24. A better world has no pollution
25. Democracy only exists if and only if there are elections
26. To defeat Voldemort, Harry needs to destroy the Horcruxes.
27. To defeat Voldemort, Harry destroyed the Horcruxes.
28. If (I collect wood) then ( (I can build a ship) and (thus sail across the Atlantic).)
29. ( (Since[IF] I collect wood) then (I can build a boat) ) and, ( if (I build a boat) then (I sail to the other side of the Atlantic) )
30. Idem previous exercise, only use parentheses to show the structure of the following molecular propositions.
31. John is here and Mary has left.
32. If x + 1 = 10 then x = 9.
33. Mary is not here or John has left.
34. If (x = 1 or y = 2) then z = 3.
35. If (Peter is at home or John is in the courtyard,) then Joseph is innocent.
36. y = 0 and x = 0
37. Doesn’t happen that 6 = 7
38. Doesn’t happen that if x + 0 = 10 then x = 5.
39. Let p, q, r, s, t, m, n and v be atomic propositions, to which I assign the following sentences.

p: John traveled in the 8 A.M plane.

     q: Peter arrived on time to the airport.

     r: The project was presented to the board of directors.

     s: The flight was delayed

     t: Peter travels on the plane

m: “x + y = 0”; n: “x = 2”; v: “y = -2”

Interpret the molecular propositions formed. That is, express in natural language the following propositions. Group by using parentheses to better recognize the precedence of operators and form a sentence.

1. q -> ~p

If Peter arrived on time to the airport. Then John NOT traveled in the 8 A.M plane

1. (p ^ s) 🡪 t

John traveled in the 8 A.M plane. AND The flight was delayed

1. ~q 🡪 (~r ^ ~p )
2. (n ^ ñ) 🡪 n