Name: _____

The final will be COMPREHENSIVE. This review is for chapters 6 on (check midterm materials for chapters 1-5).

- For chapter 6 focus on sections: 6.1,6.2,6.4,6.8
- For ch 7, focus on 7.1,7.2,7.4,7.8 and read the applications sections.
- For ch 8 and 9, make sure you understand the whole chapter. 8.10 gives a good summary of ch 8.
- For chapter 10, focus on 10.1,10.2
- For chapter 11, can skip 10.7
- For chapter 12, make sure to study 10.1, 10.2, and read the rest (can skip 12.6)
- For chapter 13, feel free to only skim 13.7 to 13.11

1. (10 points) Describe the Dynamic programming approach, and describe an algorithm that uses it
2. (10 points) Given the following intervals, with weights, find the scheduling which will provide maximum weight. Hint: The Dynamic Programming algorithm uses the equation: OPT(j)=MAX(v_j+OPT(p(j)), OPT(p(j-1))) . Intervals are open, so a job that starts at exactly the same time as the other one ends is allowed in the solution

Start	End	Weight
1	5	10
1	3	11
4	8	5
7	10	7
8	12	5

3. (10 points) What is a flow network ?
4. (10 points) What is the Ford-Fulkerson algorithm and how is it used ?
5. (10 points) Explain how do we apply the maximum flow algorithm to the bipartite matching problem
6. (5 points) P $\subset$ NP - True / False / Unknown
7. (5 points) P $\subseteq$ NP - True / False / Unknown
8. (5 points) NP-Complete $\subset$ NP - True / False / Unknown
9. (5 points) Co-NP$\subset$ NP - True / False / Unknown

10. (5 points) Every NP-Hard problem is also NP-Complete - True / False / Unknown
11. (20 points) List and describe 3 NP-Complete problems
12. (20 points) For one NP-Complete problem of your choice, show how we know it is NP-Complete by reducing it to another know NP-Complete problem
13. (10 points) Describe the PSPACE kind of problems
14. (5 points) PSPACE $\subset$ NP - True / False / Unknown
15. (5 points) NP $\subseteq$ PSPACE - True / False / Unknown
16. (10 points) Describe one problem that is in PSPACE but not known to be in NP
17. (10 points) What are the 3 relaxations we can make to solve NP-Complete problems in practice
18. (10 points) Describe one of the algorithms that work in special cases for otherwise NP-Complete problems
19. (10 points) Describe one of the approximation algorithms that approximate optimal solutons for an NP-Complete problem
20. (10 points) Briefly describe the simmulated annealing algorithm
21. (10 points) Describe one of the randomized algorithms we studied
22. (10 points) What is the difference between Montecarlo and Las Vegas algorithms Total questions: 22 Total points: 205