

1. (15 points) Problem 2.8 in Required Textbook.
2. (15 points) Problem 2.10 in Required Textbook. You may use either definition of NP.
3. (20 points) Problem 2.15 in Required Textbook.
4. (20 points) A subset of the nodes of a graph  $G$  is a *dominating set* if every other node of  $G$  is adjacent to some node in the subset. Let

$$DOMINATING - SET = \{\langle G, k \rangle \mid G \text{ has a dominating set with } k \text{ nodes}\}.$$

Show that it is NP-complete by giving a reduction from *VERTEX - COVER*.

5. (10 points) Problem 2.23 in Required Textbook.