Practice Quiz Chapters 6, 7   Math 203   Name:_____
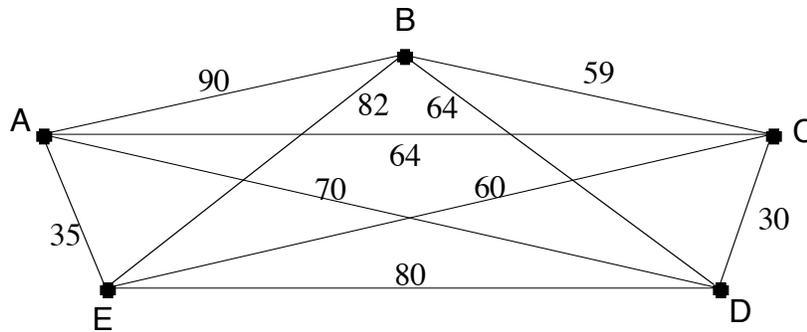
Quiz 2, Wednesday, February 14, will consist of 6 questions, based on various parts of the 6 questions below. Each question is 5 points (for a total of 30 points on Quiz 2).

Instructions: Answer each question, and when required explain your answer. Your explanation must be clear and complete.

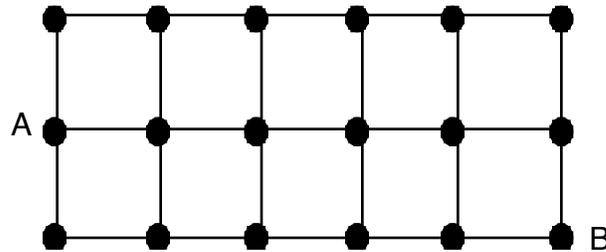1.   Consider the following weighted graph:

(a) Use the nearest neighbor algorithm to find a Hamiltonian circuit on this graph, starting at A. Indicate your answer by writing down each vertex in the order that you visit it, starting with A:

(b) Use the cheapest link algorithm to find a Hamiltonian circuit on this graph. Indicate your answer by writing down each edge in the order that you chose it:

2.   Use Kruskal's algorithm to find a minimum cost spanning tree for the following graph. Indicate your answer by drawing heavily over the edges in your tree:
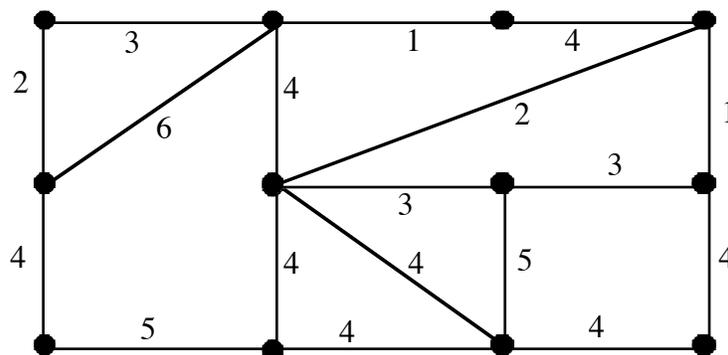
3.   (a) Find an Eulerization of the following graph suitable for finding an efficient route starting at A and ending at B, which includes each edge:

(b) Indicate an efficient route starting at A and ending at B using your Eulerization by numbering the edges in the order in which you would take them if you followed your route.

4.   Consider the following order requirement digraph:
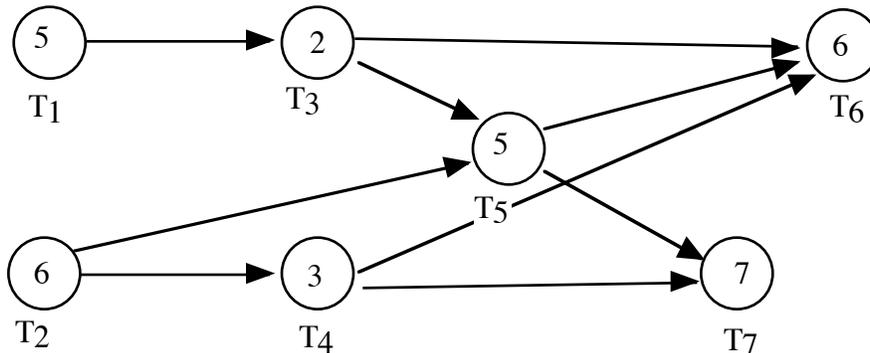
(a) For each vertex, list next to it its forward critical time. Now find all critical paths and their critical times (indicate each critical path by listing its tasks in order, and give its critical time):

(b) List the decreasing time priority list:
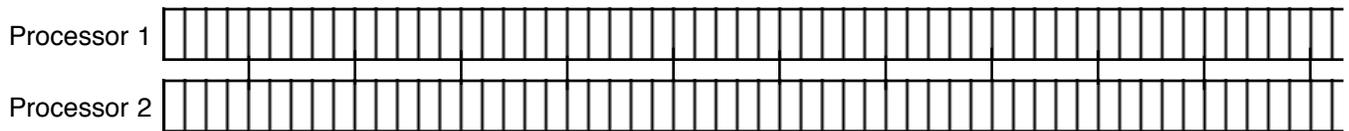
(c) List the increasing time priority list:

(d) List the critical-path priority list:

(e) Fill out the Gantt chart using the given priority list ad find the completion time:

Priority List: T_2 T_1 T_5 T_4 T_3 T_6 T_7

Ready List:

Completion time:

Processor 1

Processor 2

(f) Suppose the time of task 6 were reduced to 5 minutes. Would that reduce the completion time? Explain.

(g) What would the optimal completion time be if there were only one processor? Explain.

(h) What would the optimal completion time be if there were 7 processors? Explain.

(i) What would the optimal completion time be if there were 2 processors? Explain.

(5)   In each of the following situations, describe whether the situation calls for finding an Euler path, a minimal spanning tree or Hamiltonian path:

(a) You wish to find an efficient route for your meals on wheels business, which has clients at 17 locations around Lincoln:

(b) It's the 1930s and you wish to electrify 15 small towns in rural Nebraska that have never had electricity:

(c) You are the only snow plow operator in a small town and you want to come up with a route for plowing the streets in town:

(6)   Draw an example of a suitable graph in each of the following cases, and explain why your example satisfies the given requirements:

(a) A graph with an Euler path but no Euler circuit:

(b) A graph with an Euler circuit:

(c) A graph with no Euler path:

(d) A graph with no Hamiltonian path