MAT 118      FALL 2015      MIDTERM II

NAME :               ID :

RECITATION : (M, W or Th)

THERE ARE 4 PROBLEMS, 16 POINTS EACH
AND 4 MULTIPLE CHOICE QUESTION, 9 POINTS EACH
SHOW YOUR WORK
DO NOT TEAR-OFF ANY PAGE
NO NOTES       NO CELLS ETC.

ON YOUR DESK: ONLY test, pen, pencil, calculator, eraser and student ID

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1
1. Eulerize the following graph and find an optimal circuit covering each edge of the initial graph at least once.
2. Distances between 5 villages (A, B, C, D and E) are given in a table. Find an effective route visiting all the villages and coming back to the initial city using the Nearest Neighbor Algorithm starting at A. Find the total length of this route.

<table>
<thead>
<tr>
<th></th>
<th>A</th>
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3. Consider a population of rabbits in a forest that grows according to a linear growth model. If there were 400 rabbits in the beginning of 2000 and 500 rabbits in the beginning of 2004 how many rabbits were there in the beginning of 2015?
4. Suppose you purchase a 5 year U.S. savings bond with an APR of 5%. The face value of the bond is $6,000. Find the purchase price of the bond.
5. In each of the following multiple choice questions circle the correct answer.

1) Semi-eulerization is:
   a) the process of adding additional vertices to the graph so that all the edges except two are even;
   b) finding the shortest route visiting at least half of all edges;
   c) the process of adding additional edges to the graph so that all the vertices except two are even;
   d) a method of solving the Traveler Salesman Problem.

2) Which of the following is FALSE about Hamilton paths and circuits:
   a) any Hamilton circuit is a Hamilton path;
   b) a complete graph with \( N \) vertices has \( N! \) Hamilton paths;
   c) disconnected graphs do not have Hamilton paths;
   d) any Hamilton path is a Hamilton circuit.
3) Which of the following is TRUE about population growth models:
   a) in the logistic growth model animal population may alternate cyclically between two different levels of population;
   b) in the exponential growth model the population is always growing;
   c) in the linear growth model the population is always decreasing;
   d) in the logistic growth model the growth rate is constant (does not depend on the generation).

4) Among the following statements choose the one which describes simple interest most accurately:
   a) the interest rate is applied both to the principal value $P$ and to the previously accumulated interest;
   b) it is always applied once per year;
   c) this is the only type of interest used in savings accounts;
   d) the interest rate is applied only to the principal value $P$. 