

**Exam 2**

**Graph Theory**

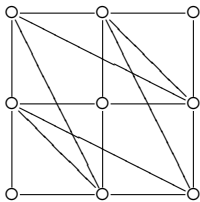
**01–05–2019**

Section A. (1 point each) Short Answer.

1. Given the incidence matrix  $Z = \begin{bmatrix} 1 & 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 0 & 0 \\ 1 & 0 & 1 & 0 & 0 \end{bmatrix}$  find the distance matrix.

2. Determine  $d(C_{17})$ .

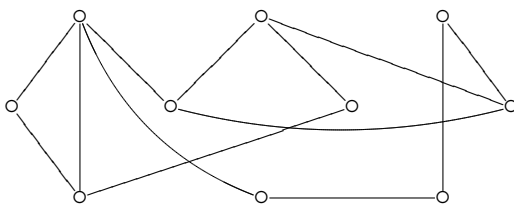
3. Determine if this graph has Euler walk, or Euler circuit, or neither.



4. Give one example of a complete bipartite graph  $K_{m,n}$  that has an Euler walk but not Euler circuit.

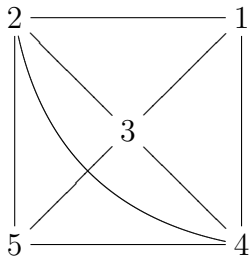
5. Give one example of a complete bipartite graph  $K_{m,n}$  which has a Hamilton cycle.

6. Draw a Hamilton cycle from this graph.

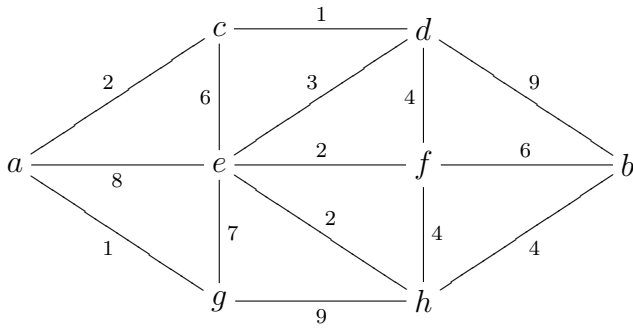


Section B. (3.5 points each) You must write complete solution.

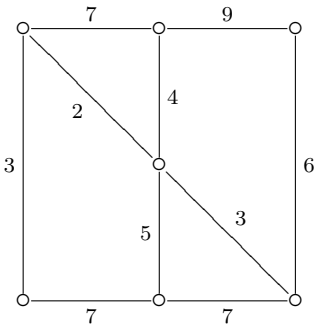
7. Use adjacency matrix to determine the number of triangles in this graph.



8. Use Dijkstra's algorithm to compute  $d(a, b)$ .



9. Solve the Chinese Postman problem.



10. Solve the Traveling Salesman problem by drawing all possible Hamilton cycles.

