

7) Which graph has no Euler path and no Euler circuit?

- a) K_5 b) $K_{2,5}$ c) $K_{3,4}$ d) $K_{4,2}$

8) Convert the incidence matrix $\begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 \\ 1 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \end{bmatrix}$ to adjacency matrix.

- a) $\begin{bmatrix} 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 1 \\ 1 & 1 & 0 & 1 \\ 0 & 1 & 1 & 0 \end{bmatrix}$ b) $\begin{bmatrix} 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 1 \\ 1 & 1 & 0 & 0 \\ 1 & 1 & 0 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 1 & 1 \\ 1 & 1 & 0 & 0 \\ 0 & 1 & 0 & 0 \end{bmatrix}$ d) $\begin{bmatrix} 0 & 1 & 1 & 0 \\ 1 & 0 & 0 & 1 \\ 1 & 0 & 0 & 1 \\ 0 & 1 & 1 & 0 \end{bmatrix}$

PART (II) Each problem is worth 4 points. Write complete solutions.

9) Evaluate GCD (3102, 2013).

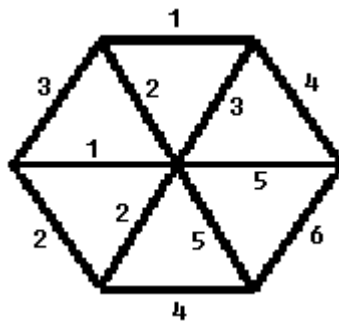
10) Find the function for the sequence $S(0) = 3, S(1) = 3, S(n) = S(n-1) + 2 S(n-2)$.

11) Use induction to prove that $3^n < n!$ for all integer $n \geq 7$.

12) Let $A = \{1, 2, 3, 4\}$. Find one example of a relation for (a) and one for (b).

- a) Reflexive (F); Symmetric (F); Anti-symmetric (F); Transitive (F)
 b) Reflexive (F); Symmetric (T); Anti-symmetric (F); Transitive (T)

13) Find the minimal spanning tree (MST) for the following graph.



14) Solve the Chinese postman problem (CPP) for the graph below.

