

II B.Tech I Semester Supplementary Examinations, November 2005
APPLIED SYSTEMS ENGINEERING
(Computer Science & Systems Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
 All Questions carry equal marks

1. (a) Compare and contrast the differences between finite and infinite graphs.
 (b) What are isolated vertex and pendant vertices? Describe them with suitable illustrations. [8+8]
2. (a) Prove that the two graphs in the following are isomorphic. shown in figure.1

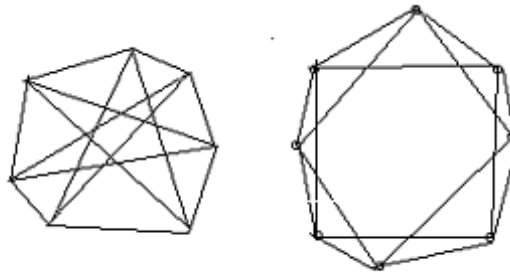


Figure 1:

- (b) Draw a graph in which an Euler line is also a hamiltonian circuit. Write your comments on such graphs. [8+8]
3. (a) What are trees? Describe the basic terminology of trees. Also describe the properties of trees.
 (b) Prove that every connected graph with three or more vertices has at least two vertices which are not cut-vertices. [8+8]
4. (a) Determine the number of crossings and the thickness of the following graphs. shown in figure.2
 (b) Write down the addition and multiplication tables for each of modulo 4,5,6 and 7 arithmetics. [8+8]
5. (a) What is an incidence matrix? Write the incidence matrix for the following graph. Shown in figure.3
 (b) Prove that every Euler diagram (without isolated vertices) is strongly connected. Also show, by constructing a counter example, that the converse is not true. [6+10]

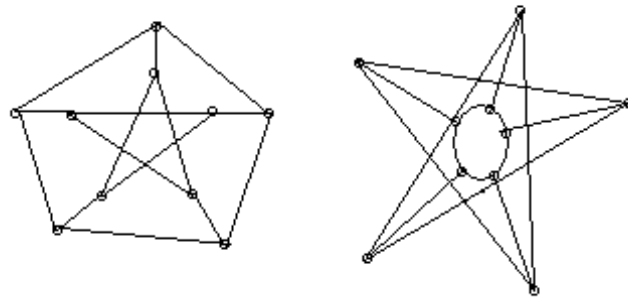


Figure 2:

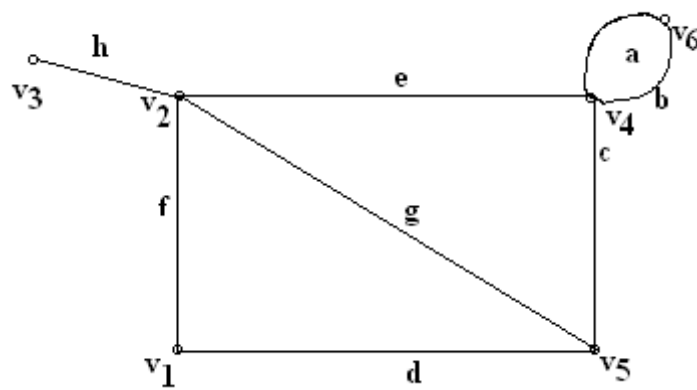


Figure 3:

6. (a) What are various types of digraphs? Describe them with necessary illustrations.
- (b) What are acyclic digraphs? Describe their properties. [8+8]
7. (a) Describe the systems concepts. Also explain the need and significance of system modelling.
- (b) Describe the topological models of systems with necessary illustrations. [8+8]
8. (a) For the following network containing resistors and voltage drivers,
 - i. Draw the system graph and pick a formulation tree which includes the elements corresponding to voltage drivers.
 - ii. Formulate the tree-branch equations for the network.
 - iii. Formulate the chord equations for the network shown in figure.4

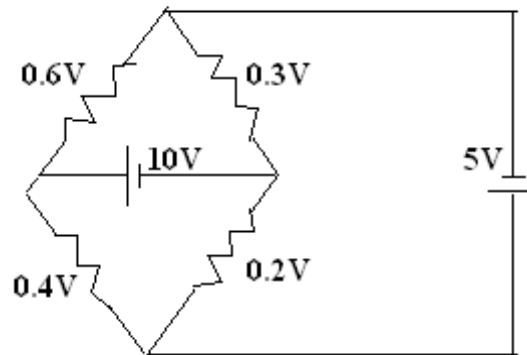


Figure 4:

- (b) Write a brief note on parameter time-invariant systems. Give necessary illustrations. [8+8]
