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SVIS 327 A-16
B.Sc. VIth Semester Degree Examination
Mathematics
(Graph Theory)
Paper : BSM 6.3 (d)

Time : 3 Hours Maximum Marks : 80

Instructions to Candidates:

Answer all sections.

Section - A

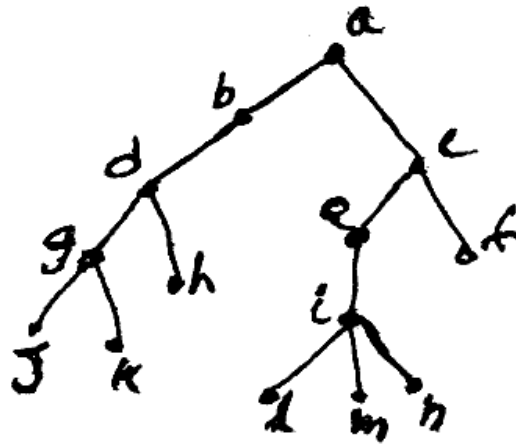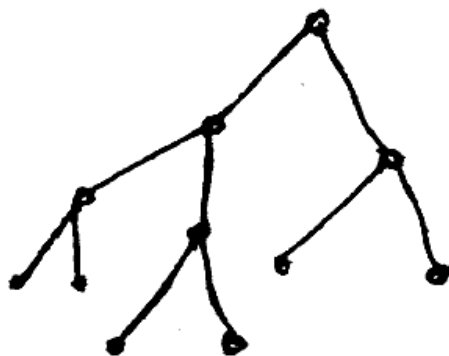Answer any ten of the following : (10×2=20)

1. Is V is a cut vertex of connected graph G. Then draw the graph G - V is disconnected at least two components.

2. Give an Example of tree with six vertices and $\Delta(T) \geq 4$

3. Define the terms (i) Bridge (ii) Block.

4. Define spanning tree and draw spanning tree of K_5.

5. Define rooted tree. Give an Example with five vertices

6. Draw two different binary trees with 13 vertices.

7. Find the connectivity of a complete graph Kp with $p \geq 2$

8. Define Eulerian trail. And Eulerian cycle.

9. Show that Every simple K - regular graph with 2K-1 vertices is Hamiltonian.

10. Give an Example of an Eulerian graph with six vertices which is also a bipartite graph.

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11. In a given tree then identify

    i)   Vertices which are leaves.

    ii)   Vertices having the level number 4

12. Find the sum of the path length of given binary tree.

Section - B

Answer any **Five** of the following :   (5×6=30)

1. Every Non - trivial connected graph has at least two vertices which are not cut vertices.

2. If G is tree, then every two distinct vertices of G are joined by unique path of G.

3. A tree has 2n vertices of degreel, 3n vertices degree 2 n vertices of degreee 3, then find the number of vertices and edge in a tree.

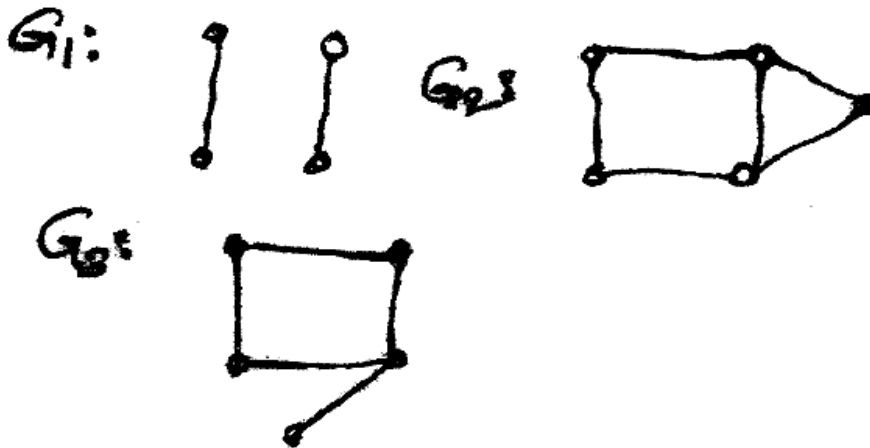4. Show that of a (p, q) Graph G, is a forest with k components. then q = p - k.

5. Draw all binary tree with 5 - End vertices. Find the path length of each.

6. Construct a graph G satisfying $K(G) = 1$, $\lambda(G) = 3$, $\delta(G) = 4$.

7. Explain the Konigsberg bridge problem.

Section - C

Answer any **Five** of the following : (5×6=30)

1. Which of the following 1 - edge connected.

2. Show that every edge cut set in a non - separable graph with $p \geq 3$ vertices contains at least two edges.

3. Prove that there is one and only one path between every pair of vertices in a tree.

4. In a Binary tree T. on n - vertices then show that the Number of pendant vertices is $\left(\dfrac{n+1}{2}\right)$.
   Is it possible to draw a tree with 5 vertices having a degree 1, 1, 2, 2, 4

5. Prove that if Every block of connected graph G is Eulerian then G is Eulerian

6. A Graph is Hamiltonian if and only if its closure is Hamiltonian

7. In tree T be complete m - ary tree of order n with p leaves and q internal vertices then prove that $q = \dfrac{n-1}{m}$