

Bago University

Department of Mathematics

Second Semester Examination, September 2019

Second Year (B.Sc)

Math-2110

(Mathematics Specialization)

Discrete Mathematics II

Answer All Questions.

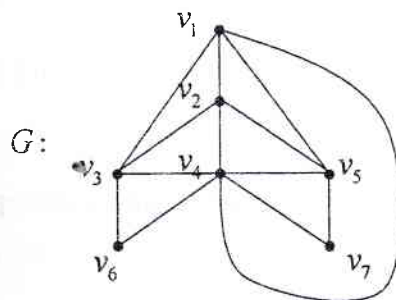
Time Allowed: (3) hours

1.(a) (i) Find a formula for the number of edges in K_n .

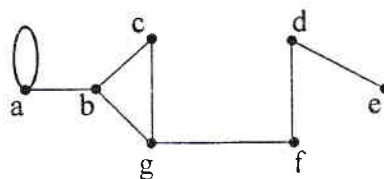
(ii) Draw K_3 , K_4 , and K_5 .

(b) (i) If a graph G has an Euler cycle, show that G is connected and every vertex has even degree.

(ii) Show that the given graph G has an Euler cycle.

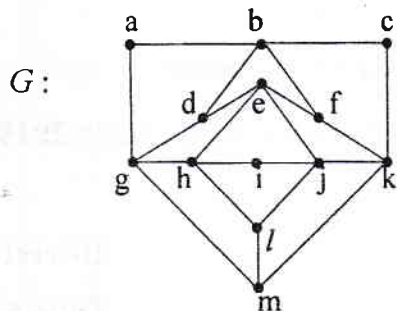


2.(a) Define a subgraph and find all connected subgraphs of the graph containing all the vertices of the original graph and having as few edges as possible.

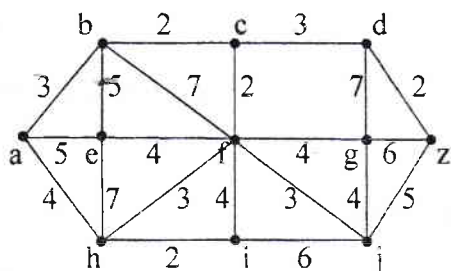


P.T.O.

(b) Show that the given graph G does not contain a Hamiltonian cycle.

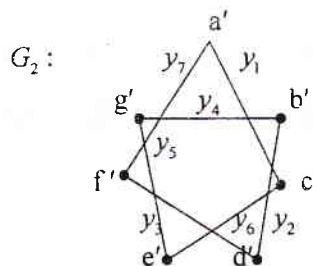
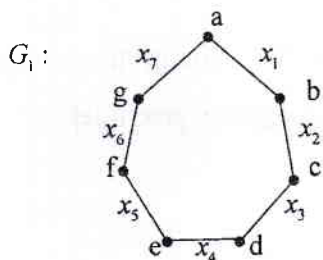


3.(a) Find a shortest path from a to z and its length for the graph of given figure.



(b) Define a complete bipartite graph and write the adjacency matrix of $K_{2,3}$.

4.(a) Determine whether the graphs G_1 and G_2 are isomorphic. If the graphs are isomorphic, find the functions.



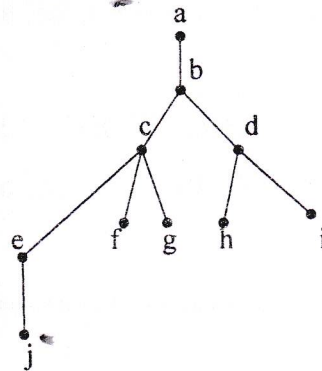
(b) Show that the graph $K_{3,3}$ is not a planar.

P.T.O.

5.(a) Construct an optimal Huffman code for the set of letters in the table.

| Character | Frequency |
|-----------|-----------|
| ! | 2 |
| @ | 3 |
| # | 7 |
| \$ | 8 |
| % | 12 |

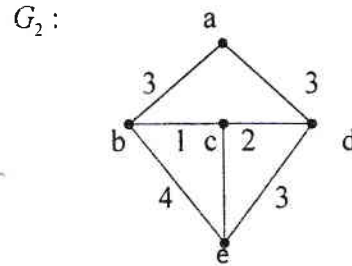
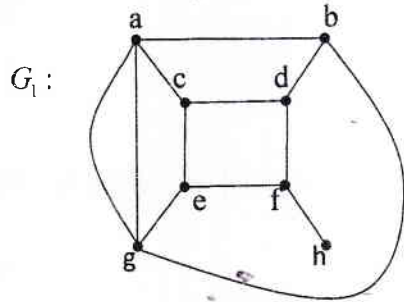
(b) Answer the questions for the given figure.



- (i) Find the parents of c and of h.
- (ii) Find the ancestors of c and of j.
- (iii) Find the children of d and of e.
- (iv) Find the descendants of c and of e.
- (v) Find the siblings of f and of h.
- (vi) Find the terminal vertices.
- (vii) Find the internal vertices.

P.T.O.

6.(a) Define a spanning tree and find the spanning tree of the graph G_1 and minimal spanning tree of the graph G_2 .



(b) Place the words WORD PROCESSING PRODUCES CLEAN MANUSCRIPTS BUT NOT NECESSARILY CLEAR PROSE, in the order in which they appear, in a binary search tree.
