

B.N. Bandodkar College of Science, Thane

S.Y.B.Sc. First Term End Examination Oct-2011

Sub: Mathematics-Paper III

DURATION: 2 hours

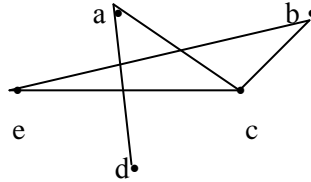
MARKS: 60

INSTRUCTIONS TO THE CANDIDATE:

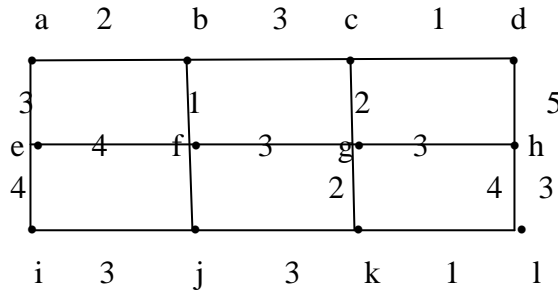
1 All questions are compulsory.

2. Figures to right indicate marks.

- Q.1 (a)** Write an algorithm which will find and display the maximum of the sequence of positive integers. **03**
- (b) Attempt any three of the following:**
- (i)** Write the adjacency matrix of the given graph. **04**



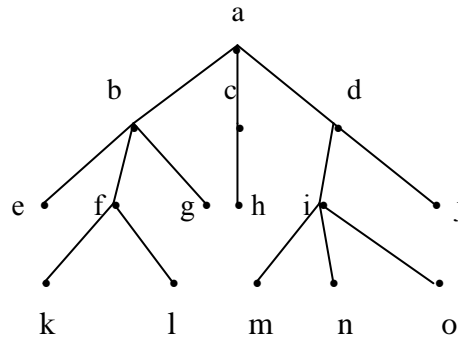
- (ii)** Write an algorithm which will find and display n^{th} term of the Fibonacci sequence. **04**
 Fibonacci sequence: $f_n = f_{n-1} + f_{n-2}$, $n \geq 2$. $f_0 = 0, f_1 = 1$.
- (iii)** Write an algorithm which will find and display the maximum of the sequence of positive integers. **04**
- (iv)** Find the minimum spanning tree of given simple graph using Prim's algorithm. **04**



P.T.O.

(v) Write the given tree in preorder and inorder.

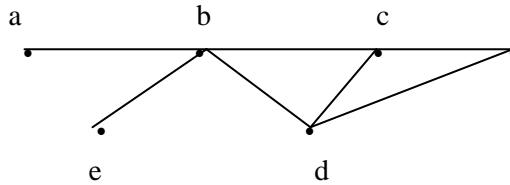
04



Q.2 (a)

Find degree of all the vertices. Which vertices are pendent?

03



(b)

Attempt any three of the following:

- (i) Write an algorithm which will find and display the area and circumference of a circle. 04
- (ii) Let $f(n) = 3n^2 + 4n$ and $g(n) = n^2$. Show that f and g are of same order. 04
- (iii) Give a big-oh estimate for the sum $1 + 2 + 3 + \dots + n$. 04
- (iv) Write an algorithm which will find and display the factorial of given inputted positive integer. 04
- (v) Convert the given binary number into decimal number. $(10110111)_2$ 04

Q.3 (a)

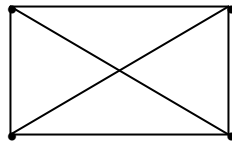
Define : Simple graph, Loop of a graph, Pseudograph.

03

(b)

Attempt any three of the following:

- (i) State Dirac's theorem and Ore's theorem. 04
- (ii) What is planar representation of graph. Draw the planar graph of given graph. 04

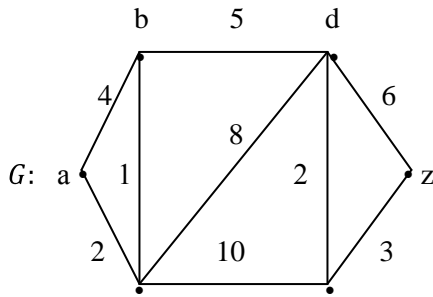


(iii) Define : Bipartite graph, Complete graph.

04

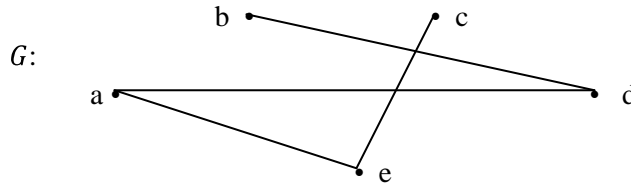
(iv) Find the shortest path from vertex a to z using Dijkstra's algorithm of weighted graph G .

04



(v) Define complementary graph. Draw complementary graph of G .

04



Q.4 (a) Define: Tree, Irreducible Tree and Spanning tree.

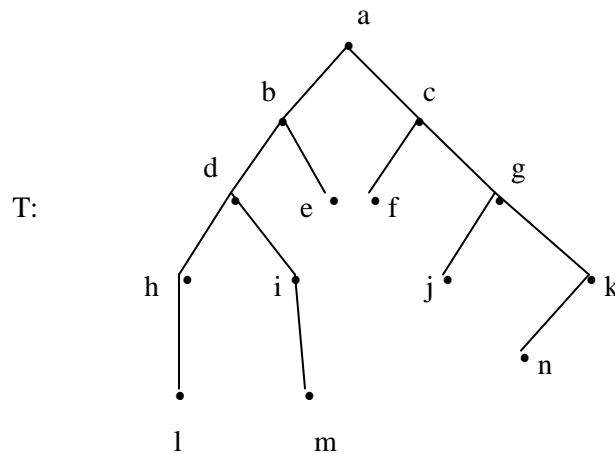
03

(b) Attempt any three of the following:

(i) For the given tree T , answer the following:

04

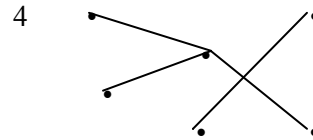
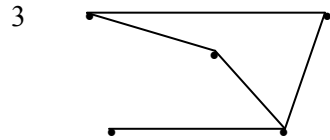
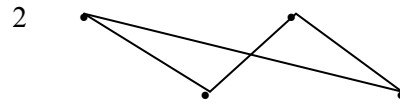
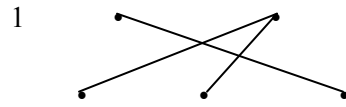
1. Which is a root of T ?
2. Write all the leaf vertices.
3. Which vertex is a parent of vertex e ?
4. Write the ancestors of vertex m .



P.T.O.

(ii) Which of the following are trees:

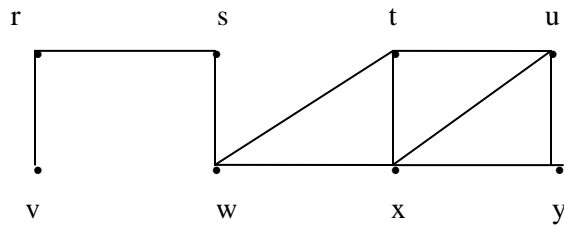
04



P.T.O

(iii) Find the spanning tree, of the given simple graph G , using BFS (Breadth First Search method).

04



(iv) Write any four properties of a tree.

04

(v) Draw a decision tree for sorting three distinct integers.

04
