

國立高雄應用科技大學
九十七學年度碩士班招生考試
電機工程系（丙組）

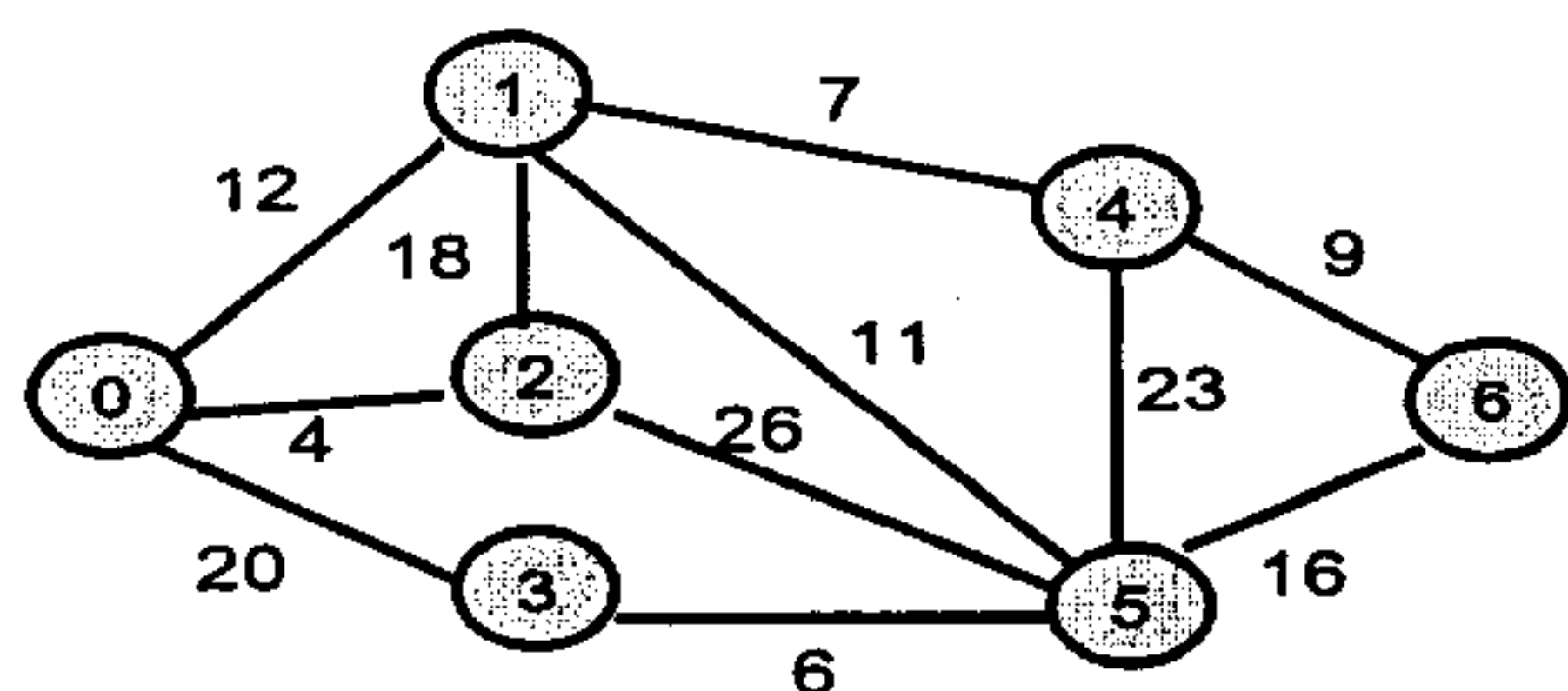
准考證號碼 （考生必須填寫）

資料結構

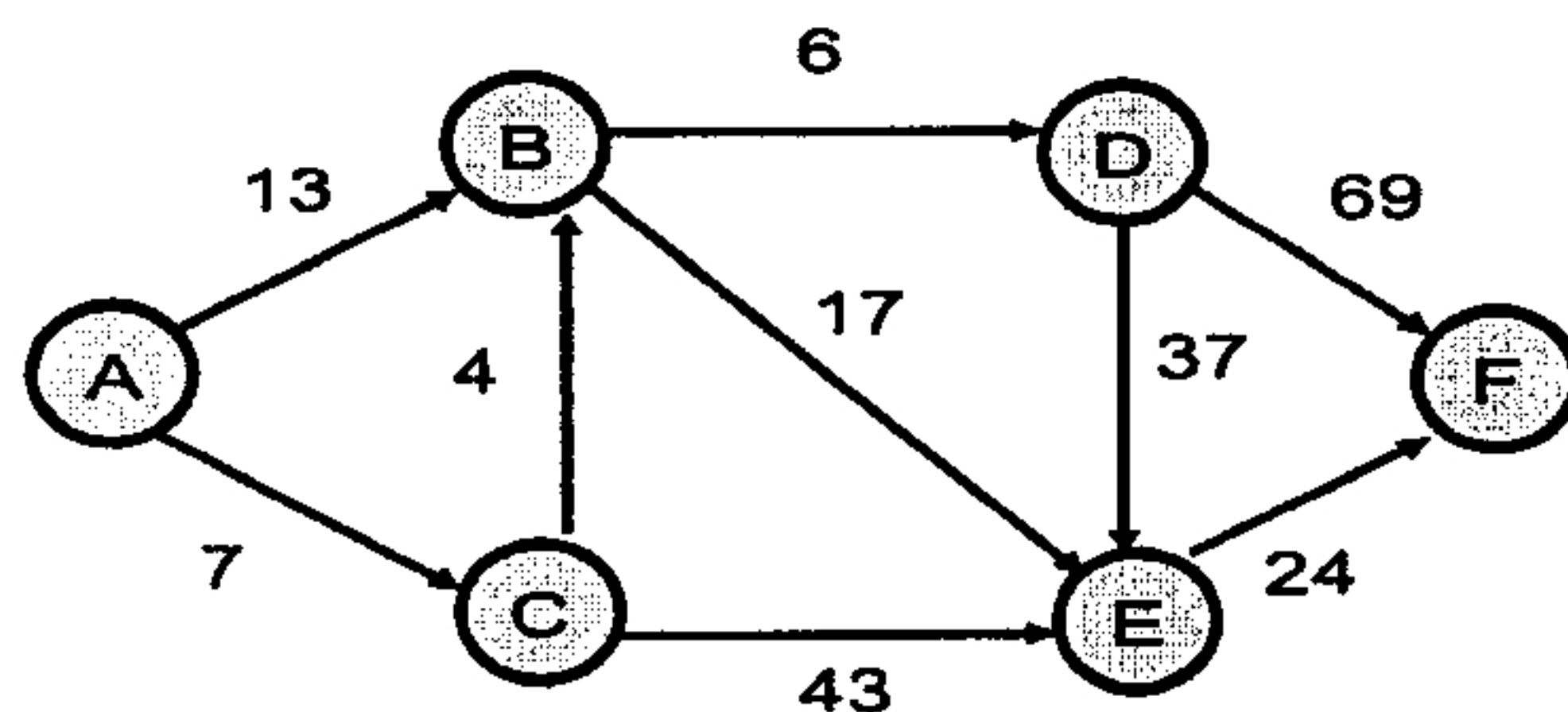
試題 共 2 頁，第 1 頁

- 注意：a. 本試題共 5 題，每題 20 分，共 100 分。
b. 作答時不必抄題。
c. 考生作答前請詳閱答案卷之考生注意事項。

1. a. Find a minimum cost spanning tree of the following weighted undirected graph by Kruskal's algorithm. Show the edge selected in each step of constructing the minimum cost spanning tree. (10%)
b. Replace Kruskal's algorithm with Prim's algorithm, and then do Question 1.a again. Let the starting node be vertex 0. (10%)



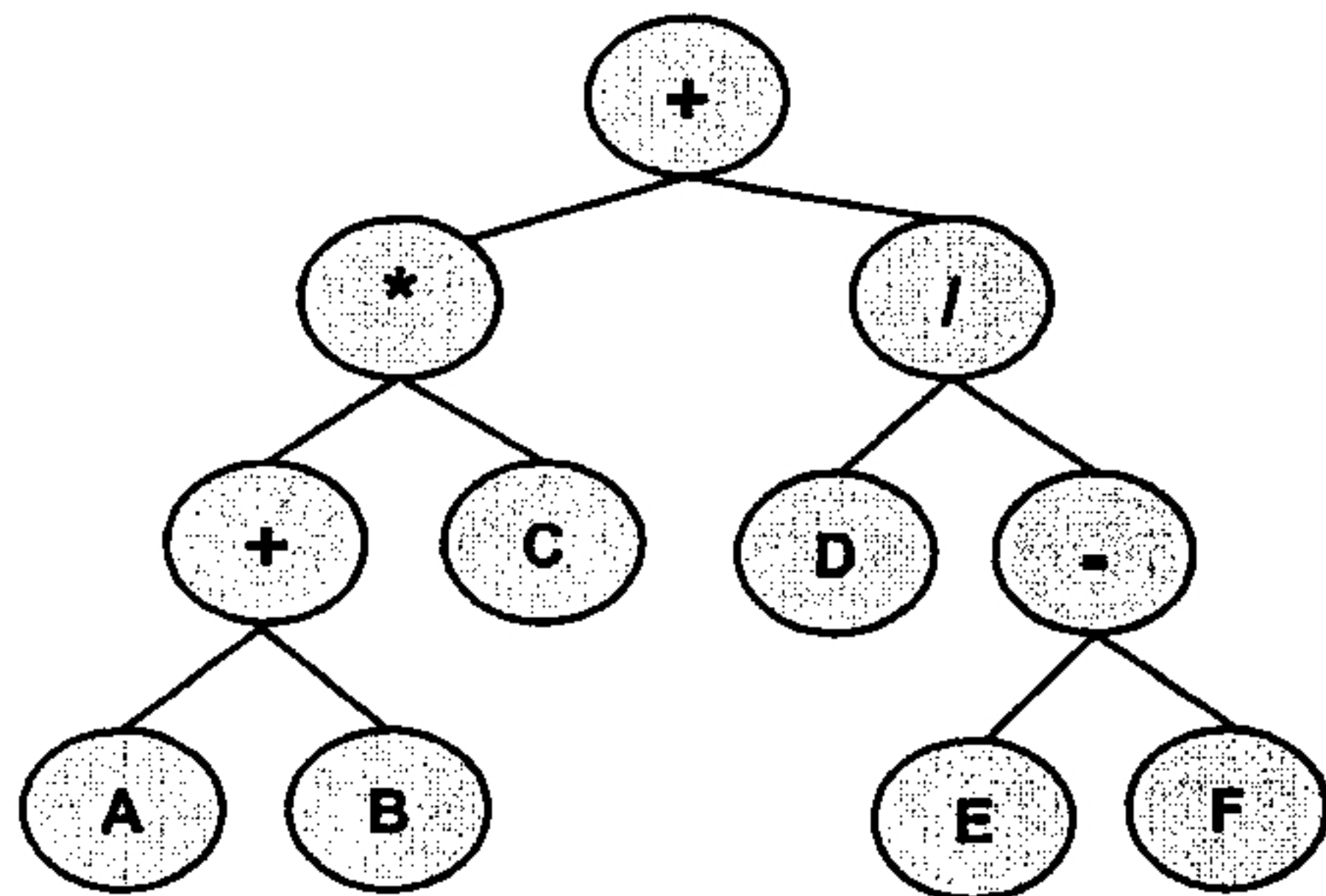
2. a. Show the cost adjacency matrix of the following weighted directed graph. (6%)
b. Find the shortest path from vertex A to each one of the other vertexes by using Dijkstra's algorithm. Show each step in the process of finding the shortest paths by Dijkstra's algorithm. (14%)



3. a. A binary tree has 10 nodes. The preorder and inorder traversal of the binary tree are shown as follows. Please draw the binary tree. (10%)

Preorder: EDCABFIJKL, Inorder: ACBDEIFKJL

- b. Show the postorder and preorder traversal of the following binary tree. (10%)



4. a. Sort the following number list in an ascendant order by *merge sort*: (5%)

26, 5, 77, 1, 61, 11, 59, 15

- b. Assume the function of Merge() is used to merge two sorted number lists into one sorted number list in a descendant order. Please write the code of this function by C language. This function is declared as follows. (15%)

```
void Merge(int* A, int* B, int* C, int m, int n);
```

/* This function is used to merge two sorted arrays, i.e., A and B, into one sorted array C in a descendant order. The parameter m is the number of elements in array A, and the parameter n is the number of elements in array B*/

5. a. Assume a hash table has seven slots and a list consists of seven numbers (23, 18, 20, 4, 26, 13, 19). Map the number list to the hash table by the following hash function, and using *linear probing* to resolve the problem of collisions. (7%)

Key = $x \% 7$, where x is an element in the number list and Key is the hash address of mapping x to the hash table.

- b. Let the number list and the hash table be represented as array A and array B, respectively. Please write a program to implement Question 5.a by C language. (13%)