

國立高雄應用科技大學
106 學年度研究所碩士班招生考試
電機工程系碩士班
資料結構(丙組)

試題 共 2 頁，第 1 頁

注意：a. 本試題共 5 題，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

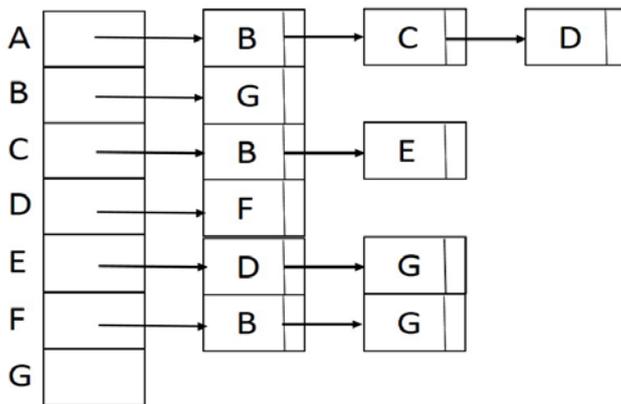
d. 第 2 和第 5 題作答時，必須書寫解題過程或敘明理由。若過程或理由不正確，則該題不予計分。

1. Construct a binary search tree by inserting a sequence of items, i.e., 36, 19, 23, 61, 56, 28, 6, 88, 12, 47 into an empty tree. (20%)
2. (a) Convert the postfix expression “ABCDE*-F*-/” to its infix expression. (10%)

(b) Convert the prefix expression “+/-CDE*A-B*FH” to its infix expression. (10%)
3. Write a recursive function, i.e., listPointer delete(listPointer **list**, int **k**) to delete the first node with the data that is equal to **k** from the singly-linked **list**, and return the resulting list. (20%)

```
typedef struct listNode *listPointer;  
typedef struct listNode{  
    int data;  
    listPointer link;  
};
```

4. Here is an adjacency list representation of a directed graph where there is no weight assigned to the edges.



(a) Draw a picture of the directed graph that has the above adjacency list representation. (14%)

(b) Run depth-first search on the directed graph of the 4.(a) question from vertex A, and list the order of visited vertices. Assume the adjacency sets are in sorted order, e.g., when exploring vertex A, the algorithm considers the edge $\langle A, B \rangle$ before $\langle A, C \rangle$ and $\langle A, D \rangle$. (6%)

5. Represent the time complexity of each of the following two nested loops by using big O notation. (20%)

(a)

```
for(int i=0; i < n; i+=2)
    for(int j=1; j < n ; j++)
        {statements;}
```

(b)

```
for(int j=1; j < n ; j *=2)
    for (int i = 1; i < n ; i++)
        {statements;}
```