

國立高雄科技大學 113 學年度碩士班招生考試 試題紙

系所別：資訊工程系碩士班

組別：不分組

考科代碼：3021

考科：資料結構

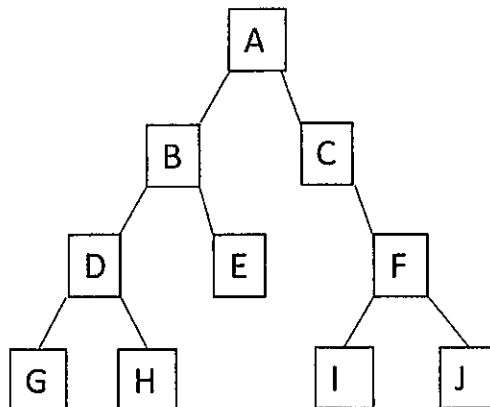
注意事項：

- 1、筆試可使用電子計算器之科目，由本校提供，考生不得使用自備計算器，違者該科不予計分。
- 2、請於答案卷上規定之範圍作答，違者該題不予計分。

1. (20%) Given the following keys: 23, 44, 12, 15, 56, 17, 66, 31. Answer the following questions.

- (a) (10%) Perform a bubble sort (show each step).
- (b) (10%) Perform a merge sort (show each step).

2. (20%) The diagram below represents a binary tree with 10 nodes. Please describe the node order for each of the following traversals.



- (a) (5%) Preorder traversal.
- (b) (5%) Inorder traversal.
- (c) (5%) Postorder traversal.
- (d) (5%) Level-order traversal.

3. (10%) Answer the following questions.

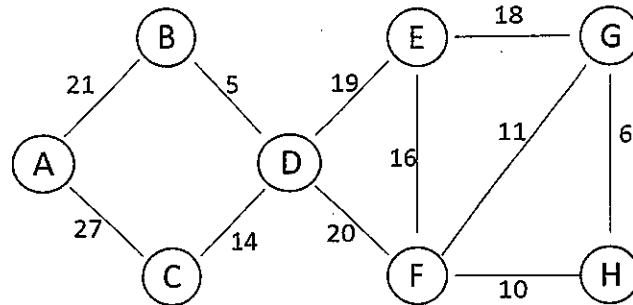
- (a) (5%) Please provide a detailed description of Abstract Data Type (ADT).
- (b) (5%) List two common abstract data types and explain each in detail.

4. (10%) Convert the expression $((a + b) - c * (d + e) + f) / (g + h * i)$ into the following expressions.

- (a) (5%) Prefix expression.

(b) (5%) Postfix expression.

5. (20%) The following figure is a weighted graph. Answer the following questions.



(a) (10%) Write down Kruskal's algorithm

(b) (10%) Apply the algorithm you write above to find the minimum cost spanning tree using the given figure (show each step).

6. (20%) Answer the following questions.

(a) (5%) Build a binary search tree for the sequence of numbers (12 4 7 6 9 13 14).

(b) (10%) Construct an AVL-tree for the sequence in (a) again.

(c) (5%) Explain the differences between the trees constructed by the two methods mentioned above when the input sequence has been sorted.