

Reg. No. :

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**Question Paper Code : 60757**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Third Semester

Information Technology

IT 2201/IT 33/10144 IT 304/080250005 — DATA STRUCTURES AND  
ALGORITHMS

(Regulations 2008/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is abstract data types? Give example.
2. What are the applications of stack and queue?
3. What are general trees? Give an example.
4. State the properties of a binary heap.
5. What is meant by collision in hashing?
6. What is the use of extendible hashing?
7. What is meant by indegree and outdegree of a Vertex?
8. What is meant by articulation points?
9. Enumerate the problems in implementing divide and conquer algorithm.
10. Consider the following C++ program fragment. Give the Big Oh expression for the worst-case running time of the function f.

```
unsigned int f(unsigned int n)
{
    unsigned int sum = 0;
    for(unsigned int I = 0; I ≤ n; I++)
        sum = sum + I;
    return sum;
}
```

PART B — (5 × 16 = 80 marks)

11. (a) Implement circular linked list for the operations of insert, delete and display. (16)

Or

- (b) Implement stack operations to check whether the given string is palindrome or Not. (16)
12. (a) (i) Construct an expression tree for the expression  $ab + cde + **$ . (10)
- (ii) Give a precise expression for the minimum number of nodes in an AVL tree of height  $h$  and what is the minimum number of nodes in an AVL tree of height 15? (6)

Or

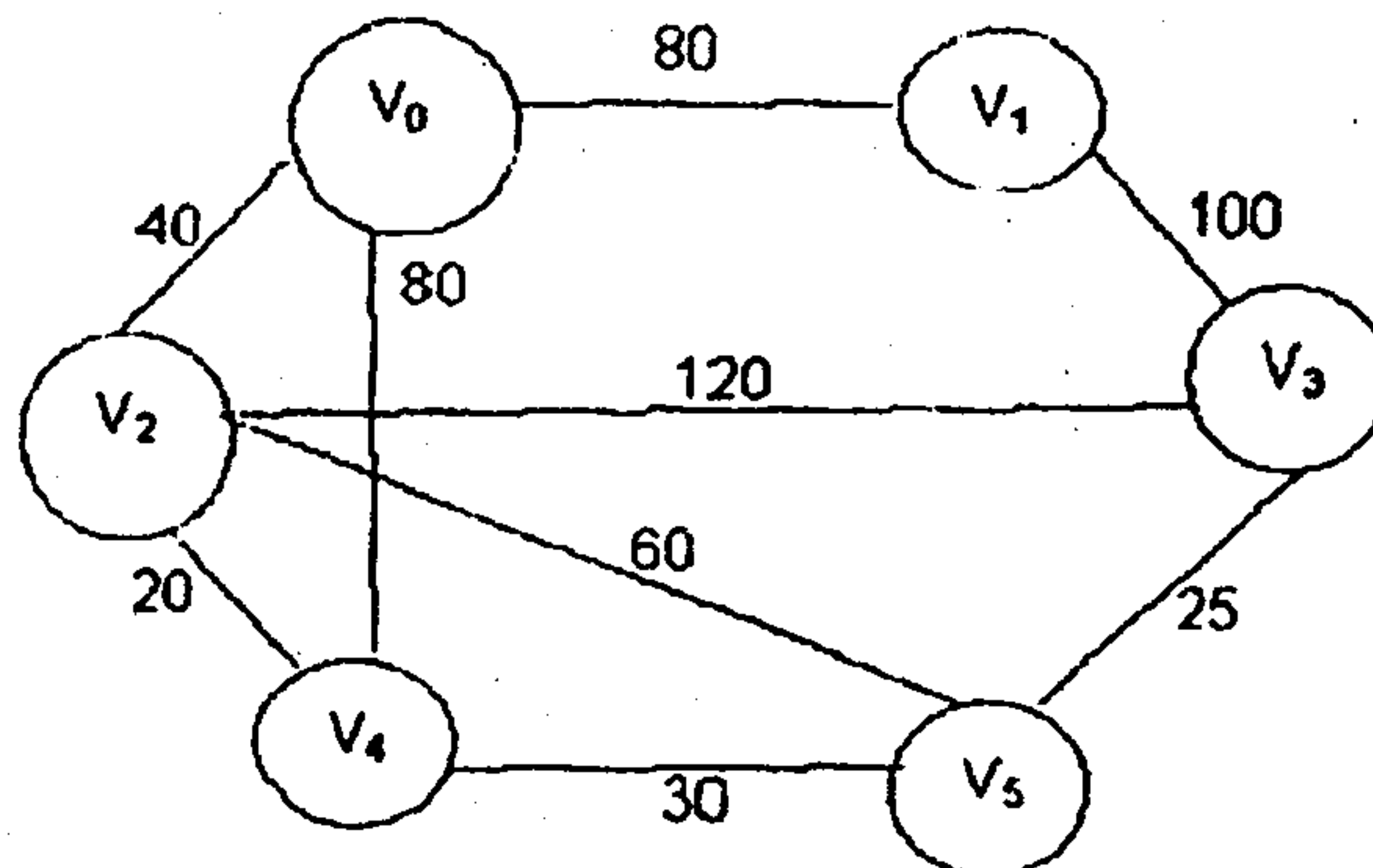
- (b) (i) Write function to perform delete-min operation in a binary heap. (8)
- (ii) Show the result of inserting 3; 1; 4; 6; 9; 2; 5; 7 into an initially empty binary search tree. (8)
13. (a) (i) The following values are to be stored in a hash table  
25, 12, 96, 101, 102, 162, 197
- Describe how the values are hashed by using division method of hashing with a table size of 7. Use chaining as the method of collision resolution. (8)
- (ii) What are the types of Collision Resolution techniques and the methods used in each of the type? Explain the different types of collision Resolution techniques. (8)

Or

- (b) Explain with code, the union operations that are performed : (4 × 4 = 16)
- (i) Arbitrarily
- (ii) Union by size
- (iii) Union by height
- (iv) Find with path compression.
14. (a) (i) Write Kruskal algorithm to find a minimum spanning tree of a Graph. (10)
- (ii) What is linked representation of a graph? What are its advantages over other representations of graph? (6)

Or

- (b) Write Dijkstra's algorithm and find shortest path taking 'V<sub>0</sub>' as starting node in the Graph. (16)



15. (a) (i) Show that greedy algorithm aids in minimizing mean completion time for multiprocessor job scheduling works. (8)  
(ii) Devise a search algorithm which supports find operation in  $O(\log N)$  and all other operations in  $O(N)$ . (8)

Or

- (b) Write short notes on :
- (i) Dynamic programming
  - (ii) Backtracking
  - (iii) Analysis of recurrence relations
  - (iv) Randomized algorithms. (4 × 4 = 16)