Tribhuvan University
Institute of Science and Technology
2067

Bachelor Level/ Third Year/ Fifth Semester/ Science — Full Marks: 80
Computer Science and Information Technology (CSc. 303) — Pass Marks: 32
(Design and Analysis of Algorithm) — Time: 3 hours

Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.

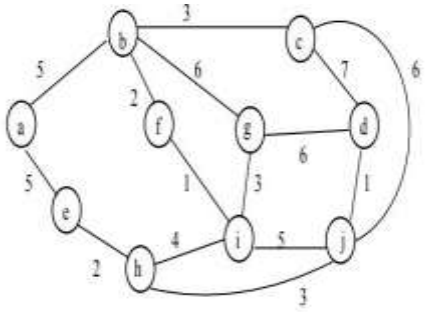
Attempt all the questions.

1. Explain Worst case, best case and average case of algorithm analysis with an example. (8)
2. What is recurrence relation? Find big-O of following recurrence using recurrence tree method.
$T(n) = T(n/2) + 1$ $n > 1$
$= 1$ $n = 1$ (2+6)
3. Make a tight big-O analysis of following code.

```
void main()
{
int m, n, i, j, a[ ], b[ ], c[ ];
printf("Enter value of m and n");
scanf("%d %d",&m, &n);
for (i = 0; i< n; i++)
{
a[i] = i;
b[i] = i*i;
c[i]= -i;
}
for (j = 0; j < m; j++)
{
printf("%d\t %d\t %d\n", a(j), b(j), c(j);
}
}
```

(8)
4. What is order statistics? How can you devise an algorithm that guarantee the section of ith order statistics in linear time? Write the algorithm of it and analyze it. (1+3+4)
5. What is the main idea of randomized algorithm? Write an algorithm quick sort and analyze it. (2+6)
6. Define greedy paradigm. How can you define Huffman algorithm is greedy algorithm? Explain. (2+6)

7. What is minimum spanning tree? Write the execution trace of the following graph to construct minimum spanning tree by prime algorithm.



8. Explain Graham's Scan algorithm to compute convex hull. (8)
9. Define the terms "Class P", "Class NP" and "NP - Completeness". (8)
10. What is the concept of dynamic programming? Find the longest common subsequence (LCS) between "XMJYAUZ" and "MZJAWXU". (2+6)