B.Tech. DEGREE EXAMINATION, NOVEMBER 2019
Third Semester

CS0203 – DESIGN AND ANALYSIS OF ALGORITHMS
(For the candidates admitted from the academic year 2007-2008 to 2012-2013)

Time: Three hours   Max. Marks: 100

Answer **ALL** Questions
PART – A (10 × 2 = 20 Marks)

1. Express using asymptotic notation: $6 * 2^n + n^2$
2. Solve $\sum_{i=1}^{n} i = \frac{n(n+1)}{2}$ using mathematical induction.
3. Write the general steps involved in divide and conquer method.
4. Write an algorithm to search a number using binary search.
5. What is dynamic programming?
6. Give an example for bi-connected component.
7. How back tracking is used to implement graph coloring?
8. Define Knapsack problem.
9. What is polynomial problem?
10. Distinguish NP and NP-complete.

PART – B (5 × 16 = 80 Marks)

11. a. Explain the asymptotic notations Big-oh (O), Big-omega (Ω), and theta (θ) with example.
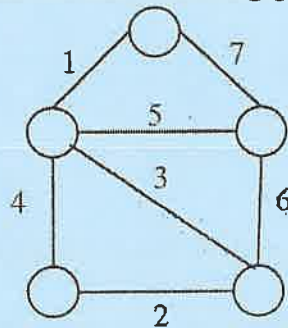
(OR)

b. Solve T(n) using recurrence relation, where

$$T(n) = \begin{cases} a, & \text{if } n=1 \ \& \ 'a' \text{ is constant} \\ 2T(n/2) + cn, & \text{if } n>1 \ \&'c' \text{ is constant} \end{cases}$$

12. a. Explain merge sort algorithm with example.

(OR)

b. Draw minimum cost spanning tree using Prim's and Kruskal's algorithms for the following graph

13. a. Illustrate traveling sales person algorithm with example.

(OR)

b. Describe graph traversal algorithm with example.

14. a. Design an algorithm to find out Hamiltonian cycle in a graph. Explain with example.

(OR)

b. Explain 8-queen's algorithm with example.

15. a. Explain NP problems with example. Justify why the problems are considered as NP-problems.

(OR)

b. Write short notes on
   (i)   P
   (ii)   NP-hard
   (iii)   NP-complete
   (iv)   Reducibility

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