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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT  
T1 EXAMINATION- FEB 2019

COURSE NAME: ADVANCED ALGORITHM  
COURSE CODE: 10M11CI211  
COURSE CREDITS: 3

MAX. MARKS: 15

MAX. TIME: 1.0 Hr

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*Note: All questions are compulsory. Carrying of a mobile phone during examinations will be treated as a case of unfair means.*

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**Question 1:** Let  $f(n)$  and  $g(n)$  be positive functions, Prove that if  $f(n)$  is  $O(g(n))$  then  $g(n)$  is  $\Omega(f(n))$ .

[3 Marks]

**Question 2:** What is the recurrence relation of merge sort, write its complexity using back substitution, Recurrence Tree Method and Master Method:

[1+3 Marks]

**Question 3:** What is difference between 0/1 and fraction knapsack problem. Use greedy approach to solve the

| Item | Weight | Value |
|------|--------|-------|
| 1    | 5      | 30    |
| 2    | 10     | 40    |
| 3    | 15     | 45    |
| 4    | 22     | 77    |
| 5    | 25     | 90    |

[1+3 Marks]

**Question 4:** What is optimization problem? How greedy is different from dynamic programming? Write factorial program using dynamic programming approach?

[1+1+2 Marks]