|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Roll No** |  |  |  |  |  |  |  |  |  |

|  |  |
| --- | --- |
|  | **राष्ट्रीय प्रौधोगिकी संस्थान गोवा**  NATIONAL INSTITUTE OF TECHNOLOGY GOA  Farmagudi, Ponda, Goa, 403401  Programme Name: B.Tech.  Minor-II Examinations, December-2021 |

Course Name: Data Structures Course Code: CS201

Date: 1/12/2021 Time: 3:00 PM-4:00 PM

Duration: 1 Hour Max. Marks: 25

ANSWER ALL QUESTIONS

1. Provide a valid algorithm and prove that space complexity of heapsort is O(1). (7 Marks)
2. If all input elements are equal then what is the time complexity of quicksort algorithm?.(Consider last element as pivot element) (6 Marks)
3. What will be the time and space complexity of mergesort if largest element of one sorted subarray is smaller than the first element of other subarray. Justify with valid proof. (6 Marks)
4. Find the time complexity and space complexity of following code segment. Justify with valid proof. (6 Marks)

A(n)

{

if(n>=1)

{ A(n-1);

print(“Nitgoa”);

A(n-1);

}

}