

Dr. M. Singh

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-1 EXAMINATION- February, 2020

B. Tech IV Semester

COURSE CODE: 18B11CI412

MAX. MARKS: 15

COURSE NAME: DESIGN AND ANALYSIS OF ALGORITHMS

COURSE CREDITS: 3

MAX. TIME: One Hour

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

1. Find out the time complexity of the given codes. 3 CO-1
 - a.

```
Test() {  
    i= 1, s=1;  
    while (s<=n){  
        i++;  
        s+=i;  
        print("Sum of series");  
    }  
}
```
 - b.

```
for(i=n/2; i<=n; i++){  
    for(j=1; j<=n; j+=i){  
        print("Hello");  
    }  
}
```
2. Solve the given recurrence relation using substitution method. 2 CO-1
 - a. $T(n) = 2T(n/2) + n \log_2 n$, if $n > 1$
 $= 1$ otherwise
 - b. $T(n) = 2T(\sqrt{n}) + \log_2 n$ if $n > 1$
 $= 1$ otherwise
3. Solve the given recurrence relation using recurrence tree: $T(n) = 3T(n/4) + cn^2$. 2 CO-1
4. Solve the given recurrence relation using Master Theorem. 2 CO-1
 - a. $T(n) = 6T(n/3) + n^2 \log_2 n$
 - a. $T(n) = 0.5T(n/2) + 1/n$
5. Write the merge sort algorithm and find out the recurrence equation and worst case running time. CO-3
3
6. Write the pseudo code for the procedure MAX-HEAPIFY (A, i) and illustrate the operation of MAX-HEAPIFY(A, 3) on the array A = [27, 17, 3, 16, 13, 10, 1, 5, 7, 12, 4, 8, 9, 10]. CO-3
3