Institute of Business & Information Technology

University of the Punjab

Quaid-e-Azam Campus, Lahore

Sheet No. ____________

Assignment 01

Fall Term 2021

Code	IT-466	**Degree**	BBIT
Title	Analysis of Algorithm	**Batch**	F18-IT Specialization
Due Date:	Nov 25, 2021 before 0945hr	**Marks**	70

Instructions:

1. Do not forget to pray before starting to attempt the paper. Trust me it helps. Remember! SOMEONE is always with you (Be Relaxed), and HE is also watching you (Be Honest)
2. **Question Paper is SELF EXPLANATORY. Understanding the Question Paper is part of Solution.**
3. Nothing Beyond the Finish Line will be Evaluated. Back Side of Pages is Beyond Finish Line.
4. For Calculations etc. Use the back side of the pages.
5. Error in Question will be advantageous to Student.
6. Read the Questions carefully before attempting.
7. Solve your paper using Black/Blue Pen only.
8. Attempt All Questions in a Precise Fashion.
9. Switch Off your Cellular Phones.
10. Manage Your Time.

GOOD LUCK

Reg. No: ____________ **Name:** ____________

Class: IT Major **Date:** Friday, Nov 19, 2021

Section: ____________ **Signature:** ____________

Q 01.	Q 02.	Q 03.	Q 04.	Q 05.	Q 06.	Q 07.	Q 08.	Q 09.	Q 10.	Total
25	25	20								70

Assistant's Signature

Examiner's Signature

Do Not Open until YOU are Advised by the Invigilator.

Question No 01. 25

Find the Time Complexity of the Following Iterative Algorithms, Show Working.

4

```
int x=1, y=0;
while ( y <= n ){
    y = x * x * x;
    Print(y);
    x++;
}
```

4

```
for(i=1; i <= $\frac{n}{2}$; i++)
    for(int j=1; j <= $i^3$; j++)
        for(int k=1; k <= n; k=k * 5)
            Print("IBIT-PU");
```

4

```
for (i = 1; i <= n; i += c)
    for (j = i+1; j <= n; j *= c)
        Print("IBIT");
```

```
for(j=n; j >= 1; j-=2)                                  4
   for(i=1; $i^3$ <= j;i++)
      for(k=1; k <= $\frac{n}{2}$;k+=2)
         print("IBIT");
```

```
for (i = $\frac{n}{2}$; i > 0; i -= c)                  4
   for (j = i+1; j <=n; j += c)
      Print("IBIT");
```

```
for(int i=1;i <= n; i=i*2)                              5
   for(int j=1; j <= 2*(i-1); j++)
      Print("IBIT-PU")
   for(int k=i; k <=10*i; k++)
      Print("AoA")
```

Question No 02. 20

Find the Time Complexity of the Following Recursive Algorithms, Show Working.

5

```
void Func(int n){
    if (n==1)
        return;
    for (i=1;i <= n; i=i*2)
        Print("IBIT-PU");
    Func(n-1);
}
```

4

```
int findMin(int[] X, int NoE){
    int Min;
    if(NoE == 1){
        return X[0];
    }else{
        Max = findMin(X, NoE - 1);
        if(Min < X[NoE - 1])
            return Min;
        else
            return X[NoE - 1];
    }
}
```

$\boldsymbol{T(n) = 3T(n-2) + n^3}$ **7**

$\boldsymbol{T(n) = 2T\left(\frac{n}{3}\right) + n^2}$ **9**

Question No 03. **20**

Write down the Formal Statement of Master Theorem 5

Find the Time Complexity of the Following Recursive Algorithms using Recursion Tree, Show Working.

$\boldsymbol{T(n) = 4T\left(\frac{n}{2}\right) + n^2\sqrt{n}}$ 3

$\boldsymbol{T(n) = 2T\left(\frac{n}{2} + 17\right) + n}$ 3

$\boldsymbol{T(n) = 7T\left(\frac{n}{5}\right) + \Theta\left(n^2\, log^3\, n\right)}$ 3

$\mathbf{T(n) = 2T\left(\frac{n}{3}\right) + n^{-2}lgn}$ 3

$\boldsymbol{T(n) = 9T\left(\frac{n}{3}\right) + \ n^2 lg^{-3} n}$ 3

Finish Line

Nothing beyond this line will be evaluated