

Government College of Engineering, Aurangabad  
(An Autonomous Institute of Government of Maharashtra)

M.E (CSE) FT/PT OLD Examination  
End Semester Examination Nov - 2016  
CS 521: **ADVANCED ALGORITHMS**

Time: Three Hours

12.8 NOV 2016

Max. Marks: 60

"Verify the course code and check whether you have got the correct question paper"

N.B.:-

1. All questions are compulsory
2. Assume suitable data if necessary and state it clearly
3. Use of non-programmable calculator is allowed

**Q1: Solve any two of the following**

**12 M**

A] Write an iterative algorithm for binary search and apply the binary search for  $X = 59$  for the elements -4 -3 0 3 10 15 18 22 24 36 39 59 and find its average case.

B] What do mean by Algebraic transformation. Explain transformation techniques for polynomial products.

C] Find the frequency count for the following algorithm when

- 1)  $N = 0$  or  $1$
- 2)  $N > 1$

Algorithm Fib(N)

```
{
  If ( N <= 1 ) then
    Write (N);
  Else
  {
    FN2 = 0; FN1 = 1;
    For I = 2 to N do
    {
      FN = FN1 + FN2;
      FN2 = FN1; FN1 = FN;
    }
    Write (FN);
  }
}
```

**Q2: Solve any two of the following**

**12 M**

A] Solve the recurrence by master method  $T(n) = 4T(n/2) + n^2$

B] Solve the following recurrence by substitution method  $T(n) = T(n/2) + 1$

C] Solve the recurrence  $T(n) = 2T(\sqrt{n}) + 1$  by making a change of variables.

**Q3: Solve any two of the following**

**12 M**

A] 3 CNF Satisfiability of Boolean formulas is NP complete or NP Hard  
Justify your answer.

B] Prove the vertex cover problem is polynomially transformable to the feedback edge set problem. So feedback edge set problem is NP complete

C] Explain the complexity measure for parallel algorithms.

**Q4: Solve any two of the following**

**12 M**

A] Explain the zero one principle for sorting networks.

B] Explain the bitonic sorting network.

C] Write a short note on techniques for algebraic problems.

**Q5: Solve the following**

**12 M**

What do mean by approximation algorithms? Explain with algorithm and suitable example the vertex cover using approximation.