

Reg. No.:

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Term End Examinations (TEE) – January 2021

Programme	: B.Tech – Computer Science and Engineering	Semester	: Interim 2020-2021
Course	: Design and Analysis of Algorithm	Code	: CSE3004
Faculty	: Mr. Muneeswaran V	Slot/Class No.	: D11 / 1046
Time	: 1½ hours	Max. Marks	: 50

Answer all the Questions

Q. No.	Question Description	Marks
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PART – A (3 x 10 = 30 Marks)

1 (a)	Show that the clique problem is NP-complete	10
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(OR)

1 (b)	i. Find the time efficiency of the following recursive algorithm	
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```
/*
N = Number of disks
Beg, Aux, End are the pegs
*/
T(N, Beg, Aux, End)
Begin
    if N = 1 then
        Print: Beg --> End;
    else
        Call T(N-1, Beg, End, Aux);
        Call T(1, Beg, Aux, End);
        Call T(N-1, Aux, Beg, End);
    endif
End
```

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ii.	Find the time efficiency (closest formula) of the following algorithm in dynamic programming technique:	
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MATRIX-CHAIN-ORDER(p)

```
1  n ← length[p] - 1
2  for i ← 1 to n
3      do m[i, i] ← 0
4  for l ← 2 to n      ▷ l is the chain length.
5      do for i ← 1 to n - l + 1
6          do j ← i + l - 1
7              m[i, j] ← ∞
8              for k ← i to j - 1
9                  do q ← m[i, k] + m[k + 1, j] + pi-1 pk pj
10                 if q < m[i, j]
11                     then m[i, j] ← q
12                     s[i, j] ← k
13  return m and s
```

5

- 2 (a) Explain how to determine the occurrences of pattern **P** – “**Z Y Z Z**” in the text **T** – “**Z Y X Z Y Z Z Y X Z Y Z X Z Y Z Z**” using KMP algorithm. Write the relevant pseudo code with their comparisons step by step results. **10**

(OR)

- 2 (b) Given a set of 5 line segments in the plane, find all intersection points efficiently check the following line segments intersects each other with the pseudocode. The Line segments are: **10**
L1: 1, 10 – 5, 10, L2: 2, 11 – 12, 2, L3: 3, 3 – 12, 5, L4: 7, 8 – 11, 8, L5: 8, 5 – 12, 12.

- 3 (a) Whether the following points are formed a convex hell using Jarvis March Algorithm. Need step by step results write the pseudocode. The points are : (1, 10), (5, 10), (2, 11), (12, 2), (3, 3), (12, 5), (7, 8), (11, 8), (8, 5), (12, 12). 10

(OR)

- 3 (b) Suppose $S1 = \{A, B, C, D\}$, $S2 = \{B, E, F\}$, $S3 = \{C, G, H\}$, $S4 = \{A, I, O\}$, $S5 = \{E, I, J\}$, $S6 = \{F, G, K, L\}$, $S7 = \{H, M, N\}$, $S8 = \{D, N, R\}$, $S9 = \{J, K, P\}$ and $S10 = \{O, P, Q, R\}$ Find the minimum set cover using greedy algorithm with relevant pseudo code. 10

PART – B (2 x 10 = 20 Marks)

- 4 Alice has a text file of n – bits, and Bob similarly has a m – bit pattern file. To check the integrity of the file with Alice Bob transmitted his m – bit file to Alice. Alice checked the pattern received from Bob with the Rabin Karp String matching algorithm. The prime number used by Alice is “29”. The contents of the Text are: “314192053589792053” and content of the pattern is: “2053”. How Alice checked the pattern received from Bob using the algorithm with step by step results.
- 5 Find min Vertex cover for the following graph:
- 10

