**POORNIMA UNIVERSITY, JAIPUR**

**END SEMESTER EXAMINATION, APRIL 2023**

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|  | **2BC4102** | Roll No. | Total Printed Pages: 2 |
| **2BC4102** |  |
| BCA II Year IV-Semester (Main/Back) End Semester Examination, April 2023  **(All Spl.)** | |
| **BCACCA4102 : Design and Analysis of Algorithm** | | | |

# Time: **3**Hours. Total Marks: **60**

Min. Passing Marks: **21**

Attempt **five** questions selecting one question from each Unit. There is internal choice from Unit I to Unit V. Marks of each question or its parts are indicated against each question / parts. Draw neat sketches wherever necessary to illustrate the answer. Assume missing data suitably (if any) and clearly indicate the same in the answer.

Use of following supporting material is permitted during examination for this subject.

# **1.--------------------------Nil--------------------** **2.------------------Nil-----------------------**

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|  |  | **UNIT-I (CO1)** | **Marks** | **Bloom Level** |
| **Q.1** | **(a)** | What is Algorithm Complexity? Explain the All Asymptotic Order Notations. | **(6)** | **Knowledge** |
|  |  |  |  |  |
|  | **(b)** | What is the Divide and Conquer Method? Explain the Merge Sort Algorithm with following Example.  96, 6,86,15,58,35,4,0 | **(6)** | **Knowledge** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
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| **Q.2** | **(a)** | Find out minimum Spanning tree for the following graph using prims Algo. Write down each step of algorithm. | **(6)** | **Application** |
|  |  |  |  |  |
|  | **(b)** | Given the jobs, their deadlines and associated profits as shown-   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Jobs** | **J1** | **J2** | **J3** | **J4** | **J5** | **J6** | | **deadlines** | 4 | 3 | 3 | 5 | 4 | 2 | | **Profits** | 20 | 18 | 15 | 25 | 10 | 14 |   What will be job complete sequence for maximum profits? | **(6)** | **Application** |
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|  |  | **UNIT-II (CO2)** |  |  |
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| **Q.3** | **(a)** | Find the longest common subsequence from ABCDBCDCDD and BCDCD | **(6)** | **Application** |
|  |  |  |  |  |
|  | **(b)** | Write short notes on Backtracking algorithm. Explain The 8-queens problem. | **(6)** | **Application** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
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| **Q.4** | **(a)** | Find an optimal parenthesization of a matrix chain product whose sequence of Dimensions is <5, 10, 3, 12, 6> | **(6)** | **Application** |
|  |  |  |  |  |
|  | **(b)** | Solve the following instances of the 0/1 Knapsack Problem by dynamic Programming with Knapsack Weight M=8kg  I= <I1, I2, I3,I4>  w=<2,3,4,5>  p=<1,2,5,6> | **(6)** | **Application** |
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|  |  | **UNIT-III (CO3)** |  |  |
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| **Q.5** | **(a)** | What is the Boyer Moore string matching algorithm? Explain. | **(6)** | **Application** |
|  |  |  |  |  |
|  | **(b)** | For the given text T = <1, 3, 9, 9, 0, 2, 2, 1, 4, 1, 5, 2, 6, 7, 3, 9, 9, 2, 1> Search a pattern P = < 2, 1, 4, 1, 5 > in T using Rabin-Karp pattern matching algorithm? | **(6)** | **Knowledge** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
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| **Q.6** | **(a)** | Solve the assignment problem for 4 jobs and 4-persons with proper steps.  J1 J2 J3 J4  P1 9 2 7 8  P2 6 4 3 7  P3 5 8 1 8  P4 4 6 9 4 | **(6)** | **Application** |
|  |  |  |  |  |
|  | **(b)** | What is the Pattern matching? How do you distinguish between the Robin Karp and naive algorithms? | **(6)** | **Knowledge** |
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|  |  | **UNIT-IV (CO4)** |  |  |
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| **Q.7** | **(a)** | Explain the following terms with example-  a) Las Vegas Algorithm b) Monte Carlo Algorithm | **(6)** | **Knowledge** |
|  |  |  |  |  |
|  | **(b)** | Explain the following terms.  I Multi commodity flow ii Flow shop scheduling iii Network capacity | **(6)** | **Application** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
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| **Q.8** | **(a)** | Applying the Ford-Fulkerson method to the provided network, what do you interpret by the maximum flow network to be? (Source-A, Sink-F) | **(12)** | **Application** |
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|  |  | **UNITV (CO5)** |  |  |
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| **Q.9** | **(a)** | Define the terms P, NP, NP Complete and NP hard problems. Also give relationship between each of the class? | **(6)** | **Knowledge** |
|  |  |  |  |  |
|  | **(b)** | Define deterministic and non-deterministic algorithm with suitable example? | **(6)** | **Knowledge** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
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| **Q.10** | **(a)** | Explain the following terms with example-   1. Set-cover problem b) Vertex-cover problem | **(6)** | **Knowledge** |
|  |  |  |  |  |
|  | **(b)** | What do you mean by Clique decision problem? Show that the clique decision problem is NP Complete? | **(6)** | **Knowledge** |