Question Paper

Exam Date & Time: 31-Dec-2022 (02:30 PM - 05:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

SEVENTH SEMESTER B.TECH END SEMESTER EXAMINATIONS, DEC 2022/JAN 2023

Natural Computing [ICT 4051]

Marks: 50 **Duration: 180 mins.**

A

Answer all the questions.

Instructions to Candidates: Answer ALL questions Missing data may be suitably assumed

1) Is PDA to accept strings in which number of 0's is greater than number of 1's deterministic? Justify. (5)

A)

B) Illustrate the DNA splicing system with an example. (3)

C) Compare and contract Global version and local version of Particle Swarm Optimization (2)

2) Obtain corresponding PDA for the following grammar. (5)

A)

S -> aABC

A -> aB | a

B -> bA | b

C -> a

B) Design an NFA for the transition table given in Table Q.2B: (3)

Table Q.2B

Present State	**0**	**1**
→q0	q0, q1	q0, q2
q1	q3	E
q2	q2, q3	q3
*q3	q3	q3

C) Point out the DiVincenzo's criteria for quantum computing (2)

3) Mention and elaborate any five advantages and applications of Evolutionary Computation. (5)

A)

B) Draw a DFA for the language accepting strings containing neither '00', nor '11' as substring over input alphabets Σ = {0, 1} ? (3)

C) Construct the CFG for the language having any number of a's over the set Σ= {a}. Also, mention the (2)

regular expression for the same.

4) Discuss what is PCR (polymerase chain reaction) and how is PCR done? Also, Summarize the purpose of doing a PCR. (5)

A)

B) Compare and contrast Peptide and DNA computing. Mention the NP complete problems that has been solved using Peptide computing. (3)

C) Construct a CFG for a language L = { wCw^R | where w ϵ (a, b)*}. (2)

5) List and summarize various parameters of PSO along with their default range of values. (5)

A)

B) Explain with an example, the Leonard Adleman's steps to solve an instance of Hamiltonian path problem using DNA. (3)

C) Summarize the basic properties of quantum computing. (2)

-----End-----