School of Computing Science and Engineering

Bachelor of Technology in Computer Science and Engineering
Semester End Examination - Jun 2024

Duration : 180 Minutes
Max Marks : 100

Sem VI - E2UC506T - Quantum Computing

General Instructions
Answer to the specific question asked
Draw neat, labelled diagrams wherever necessary
Approved data hand books are allowed subject to verification by the Invigilator

1)	What is hadamard Gate?	K1(2)
2)	Illustrate the significance of quntum computing in molecular modelling for new material inventions.	K2(4)
3)	a two-qubit system in the state $|00\rangle$. Apply a controlled-NOT gate (CNOT gate) with the control qubit being the first qubit and the target qubit being the second qubit. Find the resulting state.	K2(6)
4)	a 2-qubit quantum circuit. Apply a Hadamard gate on both qubits. If the initial state is $|00>$, what is the final state?	K3(9)
5)	Which algorithm is used to tackle combinatorial optimization problems?	K3(9)
6)	Develop the theory behind quantum error-correction and its importance in building reliable quantum computers.	K5(10)
7)	How quantum codes are constructed for error calculation	K4(12)
8)	Construct a quantum circuit to find out a balanced and a constant function in a optimized way.	K5(15)
9)	Provide examples of real-world applications where the Quantum Approximate Optimization Algorithm (QAOA) can be employed	K5(15)
10)	Describe the algorithm find prime decomposition of very big numbers	K6(18)