GALGOTIAS UNIVERSITY

ADMISSION NUMBER

School of Computing Science and Engineering

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

Duration : 180 Minutes
Max Marks : 100

Sem V - 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 a qubit?	K1(2)
2)	Show Quantum Approximate Optimization Algorithm (QAOA) is a quantum algorithm designed for solving combinatorial optimization problems.	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)	Prove that the application for CNOT gate two times result in the same state. Start with the initial qubit $\|01\rangle$.	K3(9)
5)	Find out the importance of quantum cryptography in modern technology.	K3(9)
6)	Discuss the challenges and opportunities arise in the development and implementation of quantum classifiers?	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)	Design an algorithm two find function is a constant function or a balanced funtion.	K6(18)