

School of Computing Science and Engineering

B.Tech CSE
ETE - Jun 2023

Time : 3 Hours

Marks : 50

Sem VI - BTCS9506 - Quantum Information Theory

Your answer should be specific to the question asked

Draw neat labeled diagrams wherever necessary

1. What is a concise definition of homomorphism, and could you provide a suitable example to illustrate it? K3 CO4 (2)
2. Convert your circuit into a classical reversible one. K4 CO5 (2)
3. How quantum information is used in quantum computing? K1 CO2 (2)
4. What is a brief definition of Quantum gates? K4 CO3 (2)
5. Describe quantum information theory problem involving qubits and quantum gates. K2 CO1 (2)
6. State the different Measurement Error Mitigation in Quantum Circuits. K4 CO4 (5)
7. Determine the efficiency of Shor's algorithm in the general case when r does not divide $2n$. K6 CO4 (6)
8. Can you explain the concept of quantum entanglement and discuss its significance in the context of quantum information processing? K3 CO3 (5)
9. Construct a classical Boolean circuit with three input bits and two output bits that compute as a two-bit binary number the number of 1 bits in the input. K5 CO6 (8)
10. Can other types of measurement produce an entangled state from an unentangled one? If so, give an example. If not, give a proof. K5 CO5 (8)
11. Show that any state resulting from measuring an unentangled state with a single-qubit measurement is still unentangled. K4 CO4 (8)