22/03/25

Code No.: R22CS58233PE | R22 | H.T.No. | | | 8 | R | | | | | |

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
I–M.TECH–II–Semester End Examinations (Supply) – March 2025
QUANTUM COMPUTING
(CSE)

[Time: 3 Hours] **[Max. Marks: 60]**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 10 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A **(10 Marks)**

1. a) Define Qubit. [1M]
   b) Explain any one Quantum Logical Operation. [1M]
   c) Give an example of Density Operator. [1M]
   d) Write basics of Linear Algebra. [1M]
   e) What is Bloch sphere? [1M]
   f) What is the single Qubit gate? [1M]
   g) Write name of two Quantum Algorithms. [1M]
   h) Write difference between Deutsch's and Deutsch's-Jozsa algorithm. [1M]
   i) What is graph states in Quantum Computing? [1M]
   j) Discuss about Quantum Teleportation. [1M]

PART-B **(50 Marks)**

2. Explain briefly history of Quantum Computing. [10M]

OR

3. Distinguish between Bits and Qubits in Quantum Computing. [10M]

4. Discuss about Genomics and Proteomics with example. [10M]

OR

5. Explain Hilbert space with examples. [10M]

6. Demonstrate physical implementations of Qubit in Quantum Computing. [10M]

OR

7. Design and discuss about single and multiple Qubit gates with examples. [10M]

8. Implement the basic steps of Deutsch's-Jozsa algorithm with an example. [10M]

OR

9. Implement the basic steps of Shor's factorization algorithm with an example. [10M]

10. Discuss about Quantum Cryptography with example. [10M]

OR

11. Explain briefly Quantum Error Correction and Fault Tolerant Computation. [10M]

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