

K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

May-June 2025-26		
Program: B. Tech		Scheme: IIB
Regular Examination: LY Semester: VIII		
Course Code: AIDLC8031 and Course Name: Quantum Computing		
Date of Exam: 23/5/2026	Duration: 02.5 Hours	Max. Marks: 60

Instructions:

- (1) All questions are compulsory.
- (2) Draw neat diagrams wherever applicable.
- (3) Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level
Q 1	Solve any two questions out of three: (05 marks each)	10		
a)	Define Quantum Computing. How is it different from classical computing?		CO1	U
b)	Define Hilbert Space and its significance in quantum computing.		CO2	U
c)	Explain superposition and entanglement.		CO1	U
Q 2	Solve any two questions out of three: (05 marks each)	10		
a)	What is Schmidt Decomposition Theorem?		CO2	U
b)	What is Dirac notation? Explain ket and bra vectors.		CO2	U
c)	Explain dual vectors with examples. Compare classical bits and quantum bits (qubits).		CO2	U
Q.3	Solve any two questions out of three. (10 marks each)	20		
a)	Explain Deutsch and Deutsch-Jozsa algorithms with circuits.	10	CO4	U
b)	Explain Grover's Quantum Search Algorithm with steps.	10	CO4	U
c)	Explain fault tolerant quantum computation in detail.	10	CO5	U
Q.4	Solve any two questions out of three. (10 marks each)	20		
a)	Apply the Bernstein-Vazirani algorithm to determine a hidden binary string and explain the working of the algorithm with a		CO4	Ap

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	suitable example.			
b)	Apply the concepts of quantum computing to explain its applications in various fields such as cryptography, healthcare, optimization, finance, and artificial intelligence.		CO5	Ap
c)	Apply the concept of quantum gates to illustrate the working of any two single-qubit gates with suitable matrix representation and examples.		CO3	Ap
