

DEPARTMENT OF BASIC SCIENCES

QUESTION BANK FOR CSE STREAM

MODULE -3 QUANTUM COMPUTING

Sl No.	Questions	COs	RBT Level
1.	State and explain Moore's law.	CO2	L1
2.	Elucidate the differences between classical and quantum computing.	CO2	L2
3.	Explain the representation of qubit using Bloch Sphere.	CO2	L2
4.	Define a qubit? Mention its properties.	CO2	L1
5.	Define identity operator? Show that identity operator operates on the states $ 0\rangle$ and $ 1\rangle$ leaves the same states.	CO2	L2
6.	Mention the Pauli matrices. Discuss the Pauli matrices operation on $ 0\rangle$ and $ 1\rangle$ states.	CO2	L2
7.	What is unitary operator? Show that $U^+U = UU^+ = I$	CO2	L2
8.	What are unitary row and column matrix? Explain how to find inner product of two ket vectors?	CO2	L2
9.	Illustrate orthogonality and orthonormality with an example for each.	CO2	L3
10.	Discuss CNOT gate and its operation on four different input states.	CO2	L3
	Discuss Swap gate and controlled Z gate mentioning its matrix representation and truth table.		
12.	Discuss any two single qubit gates mentioning its matrix representation and truth table.	CO2	L2
13.	Given $ \psi\rangle = \begin{pmatrix} \alpha_1 \\ \alpha_2 \end{pmatrix}$ and $ \phi\rangle = \begin{pmatrix} \beta_1 \\ \beta_2 \end{pmatrix}$ Prove that $\langle\psi \phi\rangle = \langle\phi \psi\rangle^*$	CO2	L3
14.	Discuss any two multi qubit gate mentioning its matrix representation and truth table.	CO2	L2
15.	Discuss Hadamard gate and Phase gate.	CO2	L2