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| LOGO.jpg | **GEETHANJALI INSTITUTE OF SCIENCE & TECHNOLOGY**  (**AN AUTONOMOUS INSTITUTION**)  **(Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu)**  **(Accredited by NAAC with “A” Grade, NBA (EEE,ECE &ME) & ISO9001:2008CertifiedInstitution)** |
| **QUESTIONBANK(DESCRIPTIVE)**  **Subject Name with Code: Introduction To Quantum Technologies and applications**  **Course & Branch: B. Tech & All Branches**  **Year& Semester: III-I Regulation: RG23** | |

**UNIT - I**

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| **S. No.** | **Question** | **[BT Level] [CO] [ Marks]** |
| **2 Marks Questions (Short)** | | |
|  | Define superposition in quantum mechanics | **L1 CO2 2M** |
|  | What is wave-particle duality? | **L1 CO1 2M** |
|  | Mention two key difference between classical and quantum mechanics. | **L1 CO3 2M** |
|  | What is meant by quantization of energy? | **L2 CO2 2M** |
|  | Define entanglement with a simple example. | **L2 CO2 2M** |
|  | List any two global quantum missions. | **L1 CO2 2M** |
|  | What is the significance of the Uncertainty Principle? | **L2 CO2 2M** |
|  | Give one scientific application of quantum technology? | **L2 CO2 2M** |
| **Descriptive Questions (Long)** | | |
|  | Compare classical and quantum mechanics in terms of measurement, determinism, and system behaviour. | **L1 CO1 10M** |
|  | Elaborate on the global quantum missions from different countries | **L2 CO1 10M** |
|  | Explain the principles of superposition and entanglement with conceptual examples | **L2 CO2 10M** |
|  | Describe the Uncertainty Principle and its implications in quantum measurement | **L2 CO1 10M** |
|  | Provide an overview of different quantum systems like electrons, photons, and atoms. | **L1 CO2 10M** |
|  | Describe the Uncertainty Principle and its implications in quantum measurement | **L2 CO1 10M** |
|  | Explain the concept of quantization using atomic energy levels. | **L1CO1 10M** |
|  | What are the major components of quantum technologies? Discuss computing, communication, and sensing | **L2CO1 10M** |

**UNIT - II**

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| **S. No.** | **Question** | **[BT Level] [CO][ Marks]** |
| **2 Marks Questions (Short)** | | | |
|  | What is a qubit? | **L1 CO2 2M** |
|  | Mention any two physical implementations of qubits. | **L1 CO2 2M** |
|  | Define quantum coherence. | **L1 CO2 2M** |
|  | What is decoherence? | **L1 CO2 2M** |
|  | State two difference between classical bits and quantum bits. | **L1 CO2 2M** |
|  | Write mathematical notation of superposition in qubit | **L2 CO2 2M** |
|  | Define quantum non-locality. | **L2 CO2 2M** |
|  | Mention one philosophical implication of quantum randomness | **L1 CO2 2M** |
| **Descriptive Questions (Long)** | | | |
|  | Explain qubits using the concept of spin and polarization. | **L2 CO2 10M** |
|  | Compare classical bits with quantum bits in terms of information storage and processing | **L2 CO2 10M** |
|  | Discuss the theoretical importance of coherence and decoherence in quantum systems | **L2 CO2 10M** |
|  | Explain the concept of Hilbert spaces and quantum operators with intuitive meaning | **L2 CO2 10M** |
|  | Differentiate classical information from quantum information with suitable examples | **L1 CO2 10M** |
|  | Compare different quantum systems: trapped ions, superconducting circuits, and photons | **L2 CO2 10M** |
|  | Discuss the impact of observation in quantum theory from a philosophical standpoint | **L2 CO2 10M** |

**UNIT - III**

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| **S.No.** | **Question** | | | **[BT Level] [CO][ Marks]** | |
| **2 Marks Questions (Short)** | | | | | | |
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| **Descriptive Questions (Long)** | | | | | | |
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**Signature of the Staff:**

**Signature of Department Academic Committee Member 1:**

**Signature of Department Academic Committee Member 2:**

**Signature of Department Academic Committee Member 3:**