**Time: 3 hours** **Max. Marks: 80**

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***Instructions:***

*i. Question 1 is compulsory.*
*ii. Solve any three from the remaining questions Q2 to Q6.*
*iii. Provide illustrations wherever required.*

Q1.

| | | |
|---|---|---|
| A | What are the various Quantum state transformations? | (10) |
| B | Write a note on circle notation for Multi-Qubit Registers. | (10) |

Q2.

| | | |
|---|---|---|
| A | Explain Quantum Arithmetic briefly. | (10) |
| B | Discuss Quantum Gates. | (10) |

Q3.

| | | |
|---|---|---|
| A | What is the benefit of QPU in the field of Computer Graphics? | (10) |
| B | Explain the Quantum Circuit Model of Computation. | (10) |

Q4.

| | | |
|---|---|---|
| A | Compare Quantum Supersampling (QSS) with Conventional Supersampling? | (10) |
| B | How is linear Algebra performed in Quantum Computing? | (10) |

Q5.

| | | |
|---|---|---|
| A | How does Quantum computing differ from Traditional Computing? | (10) |
| B | Discuss the various Single Qubit Gates. | (10) |

Q6.

| | | |
|---|---|---|
| A | What is Quantum Teleportation? Discuss the pros and cons of Quantum teleportation. | (10) |
| B | Give a write-up on general Quantum Operations. | (10) |

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