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Paper Id: 231549 Roll No.

B.TECH.
(SEM VII) THEORY EXAMINATION 2022-23
QUANTUM COMPUTING

Time: 3 Hours *Total Marks: 100*

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

(a) Who is the father of Quantum Computing?
(b) How Bit is different from Qubit?
(c) Are Quantum gates Reversible or Irreversible?
(d) What are the conditions for Quantum Computation?
(e) What is Nuclear Magnetic Resonance?
(f) Can Quantum computers become Self aware?
(g) Write any One characteristic of Markov Process.
(h) Write any 3 Quantum Operations.
(i) Is Shannon entropy positive or negative?
(j) Define Shor Code.

SECTION B

2. Attempt any *three* of the following: **10x3 = 30**

(a) Why are we so interested in Quantum Computers and Quantum Simulators in current time-period?
(b) What hurdles do researches face in developing a Quantum Computer?
(c) What is entanglement in Quantum Computing?
(d) What is quantum electrodynamics? Why it is important in Quantum computing?
(e) With the help of an example explain error correction with reference to Quantum Computing.

SECTION C

3. Attempt any *one* part of the following: **10x1 = 10**

(a) What are the 3 key attributes to measure the performance of Quantum Computers?
(b) Differentiate between classical computing and Quantum computing.

4. Attempt any *one* part of the following: **10x1 = 10**

(a) What are the Universal Quantum Gates? Explain in detail.
(b) Is there any application for why to search through an unstructured database, the average number of check is N/2 in classical computation?

5. Attempt any *one* part of the following: **10x1 = 10**

(a) How do Photon Quantum Computers work?
(b) What are the 3 types of Quantum Computer? Explain in detail.

6. Attempt any *one* part of the following: **10x1 = 10**

(a) What types of problem are best suited for Quantum Computing?
(b) How does Quantum Noise appear on a digital image? Explain in detail.

7. Attempt any *one* part of the following: **10x1 = 10**

(a) What is Quantum error correction code? Explain.
(b) What is Stabilizer Code?

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