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Sub Code: NCS 086
Roll No.

# B.TECH
## (SEM VIII) THEORY EXAMINATION 2017-18
## QUANTUM COMPUTING

*Time: 3 Hours* *Total Marks: 100*

**Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.

### SECTION A

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

a. Differentiate between Digital Computer and Quantum Computer.
b. How quantum information is used in quantum computing?
c. What is the significance of static and dynamic measures in quantum information
d. What is Entanglement?
e. How Quantum Circuits are used in Quantum Computing?
f. Write two Quantum Operations and two types of Quantum Noise.
g. What is Shannon Entropy?
h. What are the applications of Quantum Computing?
i. What are ion traps?
j. How information and entropy are related?

### SECTION B

**2. Attempt any *three* of the following: 10 x 3 = 30**

a. Compute the QFT for the given two qubit vector {1, 0, 1, 0}.
b. What are the conditions for Quantum computation? Explain Optical Photon Quantum Computer.
c. Explain in detail different type of Quantum Noise.
d. How Stabilizer codes are used to compute Quantum Error Correction?
e. Elucidate the postulates of Quantum mechanisms.

### SECTION C

**3. Attempt any *one* part of the following: 10 x 1 = 10**

(a) How Quantum Search is used for unstructured databases? Explain Grover's search algorithm.
(b) Discuss the applications and limitations of Quantum operations.

**4. Attempt any *one* part of the following: 10 x 1 = 10**

(a) How the simulation of Quantum Systems is done, explain with example?
(b) Quantum computing helps in speed up the solutions of NP complete problems, illustrate with an example.

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**5.** **Attempt any *one* part of the following:** **10 x 1 = 10**

(a) Compare Harmonic Oscillator Quantum Computer and Optical Photon Quantum Computer.

(b) Compare DFT and QFT.

**6.** **Attempt any *one* part of the following:** **10 x 1 = 10**

(a) How fault tolerant quantum computation is done for quantum error correction?

(b) Explain the Markov Process for quantum information.

**7.** **Attempt any *one* part of the following:** **10 x 1 = 10**

(a) What is the role of data compression in quantum error correction?

(b) What is the global perspective of quantum computing?

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