CBCS SCHEME

USN | | | | | | | | | | |

15NT61

Sixth Semester B.E. Degree Examination, June/July 2019
Quantum Mechanics and Simulation Techniques

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Write a note on uncertainty principle and complementarity. **(06 Marks)**

b. Derive an expression for wave packets in space and wave packets in time. **(10 Marks)**

OR

2 a. Derive an expression for Schrödinger's wave equation for a freely moving particle in one dimension. **(10 Marks)**

b. Explain summary of principle experiments and inferences. **(06 Marks)**

Module-2

3 a. Explain Poission brackets and communtator brackets along with their properties. **(06 Marks)**

b. Explain Schrodinger, Heisenberg and Interaction pictures in detail. **(10 Marks)**

OR

4 a. Discuss expectation values and probabilities in detail. **(08 Marks)**

b. Explain quantum mechanical operators in detail. **(08 Marks)**

Module-3

5 a. Differentiate between reversible and irreversible computation. **(08 Marks)**

b. Describe Moore's law in detail. Mention its importance in miniaturization. **(08 Marks)**

OR

6 a. Define quantum bits. Explain with Bloch sphere. **(08 Marks)**

b. Define quantum computation. Add a note on properties of quantum computation. **(08 Marks)**

Module-4

7 a. Write a note on need and technology of surgical simulation. **(08 Marks)**

b. Write a note on applications of virtual environment technology. **(08 Marks)**

OR

8 a. Write a note on advantages of simulators. **(06 Marks)**

b. Explain : i) Telesurgery ii) Endoscopy. **(10 Marks)**

Module-5

9 a. Briefly discuss Monte Carlo method in detail. **(10 Marks)**

b. Discuss Heme in detail with a neat sketch. **(06 Marks)**

OR

10 a. Explain peptides, alpha helix and beta sheet in detail. **(10 Marks)**

b. Discuss Protein Data Bank in detail. **(06 Marks)**

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