CBCS SCHEME

USN

18NT52

Fifth Semester B.E. Degree Examination, July/August 2021
Quantum Mechanics and Simulation Techniques

Time: 3 hrs. Max. Marks: 100

Note: *Answer any FIVE full questions.*

1 a. Explain summary of principle experiments and inferences. (10 Marks)
b. Discuss experimental background of Quantum Machines in detail. (06 Marks)
c. Write a note on uncertainty principle. (04 Marks)

2 Derive an expression of Schrödinger's wave equation for a freely moving particle moving in
i) 1-Dimension
ii) 3-Dimension. (20 Marks)

3 a. Explain about the fundamental postulates of Quantum machines. (10 Marks)
b. Explain Quantum operator and observable in detail. (10 Marks)

4 a. Discuss about expectation values in detail. (10 Marks)
b. Explain Schrodinger, Heisenberg in Interaction pictures in detail. (10 Marks)

5 a. Define Turing machine of explain the working with one example. (10 Marks)
b. Differentiate between reversible and irreversible computation. (10 Marks)

6 a. Explain about Quantum bits with illustration. (08 Marks)
b. Describe in brief about natural phenomena as computing process. (08 Marks)
c. Write a note on Quantum Computation. (04 Marks)

7 a. Explain the need and technology adopted for surgical simulation. (10 Marks)
b. Discuss about Virtual Environment (VE) in detail. (10 Marks)

8 a. List and explain advantages of simulations. (08 Marks)
b. Explain :
i) Tele surgery
ii) Endoscopy. (12 Marks)

9 a. Briefly discuss about Monte Carlo Method in detail. (10 Marks)
b. Explain Peptides, Alpha helix and beta sheet in detail. (10 Marks)

10 a. Discuss about protein data bank in detail. (10 Marks)
b. Discuss 'heme' in detail with neat sketch. (10 Marks)

* * * * *

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.