Unit 12 - Week 10 - Justifying Implementation Aspects from the Basics

Assignment-10

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-10-09, 23:59 IST.

1) A physical system must satisfy several stringent requirements to function as a quantum computer. These have been summarized as *1 point*

- DiVincenzo Criteria of a scalable and well-characterized qubits
- satisfiability criteria first proposed by B.W. Shor
- fundamental requirements on the choice of the qubits
- DiVincenzo Criteria of universal measurement capability that is not limited by the choice of qubits

No, the answer is incorrect.
Score: 0
Accepted Answers:
DiVincenzo Criteria of universal measurement capability that is not limited by the choice of qubits

2) The experimental technique to measure the spin of a single electron on a solid surface is *1 point*

- Solid state NMR
- Magnetic Resonance Force Microscopy
- Scanning Tunneling Microscopy
- All the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
Magnetic Resonance Force Microscopy

3) When qubits are prepared in a known ground state of a Hamiltonian, and the Hamiltonian is then slowly altered to a new Hamiltonian, then *1 point*

- it is known as the adiabatic quantum computing, whose ground state represents the solution to a problem
- it is known as the quantum annealing computing, whose ground state represents the solution of a problem
- it is known as the cluster state quantum computing, whose mixed state represents the solution to a problem
- it is known as the molecular quantum computing, whose excited state represents the solution to a problem

No, the answer is incorrect.
Score: 0
Accepted Answers:
it is known as the adiabatic quantum computing, whose ground state represents the solution to a problem

4) Quantum information is usually at the nanometer scale or smaller as *1 point*

- information gets corrupted with larger qubits
- real qubits should be small enough to be quantum mechanical
- the information content can be packed effectively and efficiently
- it is the conventional and convenient approach

No, the answer is incorrect.
Score: 0
Accepted Answers:
real qubits should be small enough to be quantum mechanical

5) In quantum computation with neutral atoms in optical nano structures, a typical problem is *1 point*

- atoms in adjacent lattice sites are optically resolved but are interacting
- manipulation and detection with nanosecond laser is required
- atoms in adjacent lattice sites are not optically resolved
- high fidelity of operations required at micron scales

No, the answer is incorrect.
Score: 0
Accepted Answers:
atoms in adjacent lattice sites are not optically resolved

6) Which of the following statements is definitely wrong for quantum computing? *1 point*

- Quantum Computing is based on discreteness and is not analog
- Quantum computing is based on a nonlinear equation, governing quantities (intensities) that are not directly observable
- Quantum Computing solves problems outside the definition of Church-Turing Thesis
- Quantum computing is massively parallel computing

No, the answer is incorrect.
Score: 0
Accepted Answers:
Quantum Computing solves problems outside the definition of Church-Turing Thesis

7) The lattice wavefunction of the Bose-Einstein condensate atoms used as qubits are projected into free space by *1 point*

- adiabatically releasing the cold atoms from the lattice state
- nonadiabatically releasing the cold atoms from the lattice state
- subjecting the cold atoms to spin flip transitions with an optical pulse
- thermally releasing the cold atoms from the lattice state

No, the answer is incorrect.
Score: 0
Accepted Answers:
nonadiabatically releasing the cold atoms from the lattice state

8) Which of the following precautions is needed for using the donor electron spin in Si:P as qubit? *1 point*

- Interaction with phonons that amplifies coherence
- Interaction with ^{29}Si electronic spins
- Gate errors
- Decoherence due to interaction with phonons and ^{29}Si nuclear spins

No, the answer is incorrect.
Score: 0
Accepted Answers:
Decoherence due to interaction with phonons and ^{29}Si nuclear spins

9) Gate operations for the superconducting flux qubit in the time domain is induced by *1 point*

- different electrical control pulse sequences that result in time decaying oscillating dynamics of the qubit
- different electrical control pulse sequences that result in electrical impulsive interaction of the qubit to result in Fourier response
- different electrical control pulse sequences that result in coherent quantum dynamics of the qubit in time
- different electrical control pulse sequences that result in superconducting flux qubit change their pole

No, the answer is incorrect.
Score: 0
Accepted Answers:
different electrical control pulse sequences that result in coherent quantum dynamics of the qubit in time

10) Major advantages of the superconducting qubit devices lie in *1 point*

- minimum levels of decoherence among solid state implementations
- two kinds of qubit devices either based on charge or flux degrees of freedom
- possibility of a scalable implementation of the qubits
- all the above

No, the answer is incorrect.
Score: 0
Accepted Answers:
all the above