Assignment 7

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment.

Due on 2021-03-10, 23:59 IST.

6. The electrostatic energy of a quantum dot depends — to the gate voltage
   - quadratically
   - linearly
   - exponentially
   - inversely
   No, the answer is incorrect. Score: 0
   Accepted Answers: quadratically

7. The period of Coulomb blockade oscillation is
   - inversely proportional to the gate capacitance
   - proportional to the total capacitance
   - inversely proportional to the total capacitance
   - proportional to the ratio of gate capacitance to the total capacitance
   No, the answer is incorrect. Score: 0
   Accepted Answers: inversely proportional to the gate capacitance

8. The reason for the period of classical coulomb blockade oscillations to remain constant is
   - the gate capacitance remains unchanged throughout the gate-voltage regime
   - density of states in the dot is continuous
   - single particle opening in the dot is negligible
   - the dots have parabolic confinement potential
   No, the answer is incorrect. Score: 0
   Accepted Answers: the gate capacitance remains unchanged throughout the gate-voltage regime

9. The reason for the moment of the size of the Coulomb diamonds as the number of electrons reduces on semiconducting quantum dot is
   - the dot gets smaller as the dot taken lower electron numbers
   - the dot gets larger as the gate voltage is reduced to reach lower electron number
   - the tunnel barriers gets wider as the dot is taken to lower electron numbers
   - the tunnel barrier gets higher as the dot is taken to lower electron numbers
   No, the answer is incorrect. Score: 0
   Accepted Answers: the dot gets smaller as the dot taken lower electron numbers

10. For a quantum dot with parabolic confinement potential the Coulomb blockade peaks
    - are equally spaced in gate voltage
    - are double periodic in gate voltage
    - spacing increases as the gate voltage is lowered
    - independent of the gate voltage
    No, the answer is incorrect. Score: 0
    Accepted Answers: are double periodic in gate voltage

11. For a double quantum dot with no interdot coupling the transport points on the charge stability diagram are
    - 2-fold degenerate
    - 2-fold degenerate
    - 4-fold degenerate
    - nondegenerate
    No, the answer is incorrect. Score: 0
    Accepted Answers: 2-fold degenerate

12. The spacing between the electron and hole triple points on the charge stability diagram of a double quantum dot is
    - proportional to the inter-dot capacitance
    - proportional to the ratio of the interdot capacitance to the dot capacitance
    - proportional to the total capacitance of the dot
    All of these
    No, the answer is incorrect. Score: 0
    Accepted Answers: proportional to the inter-dot capacitance

13. For a given double quantum dot system, the motion of electron at the hole-triple point is opposite to that at the electron-triple point
    - True
    - False
    No, the answer is incorrect. Score: 0
    Accepted Answers: False

14. The hole-triple point involves transport of holes
    - True
    - False
    No, the answer is incorrect. Score: 0
    Accepted Answers: False

15. For a metallic carbon nanotube quantum dot the Coulomb blockade oscillations appear
    - in sets of 4
    - in sets of 3
    - empty periodic
    - sets of these
    No, the answer is incorrect. Score: 0
    Accepted Answers: in sets of 4