My answer to Question 2:

No, the problem formulation is not correct/complete. First, τ or the path is a continuous function, as in $\tau: [0, 1] \rightarrow C_{free}$, not $\tau = [q_I, q_G]^T$, such that $\tau(1) = q_I$ and $\tau(1) = q_G$. Second, although τ is assumed to be continuous, it can be described/defined in a finite number of points (through sampling-based algorithms like RRT) by interpolation between those defined points. Third, if the motion planning algorithm is not deterministic, i.e., it is probabilistic, feasible path planning must be defined probabilistically, i.e., the probability that the algorithm finds an existing solution converges to 1 when the number of iteration/samplings goes to infinity.