Assignment - 2.

Q1) Finer discretization means higher no. of states which require greater no. of episodes for full exploration. For only 1000 episodes, coarse discretization enables better exploration. Also, for this problem, nearby states can be generalized but in finer discretization, these states are considered independent and there is greater chance of taking counter-productive actions, leading to lower reward in general.

Q2) Finer discretization gives considerably better results. In the second setting, it takes more no. of episodes to fill and optimise the Q-Table due to its larger size, but once it is done, it provides a sort of personalization for the states, catering to the individual situations and appropriately assigning actions better than the first setting.

Q3) Discretization is a good method for simple problems with low dimensionality. For higher dimensions, the Q-Table becomes too large for efficient representation and computation. Also, for complex problems, the discretization may not be fine enough even after trying to efficiently cater to all situations.

Q4) Increasing epochs with bins may give better results because of more personalization given to the states, but the Q-Table becomes too large for efficient computation and too many episodes will be required. In this problem, generalization can be employed easily, so no need.