2)

a) Provide precise and concise …

Ans- In the RFib algorithm, if T(m) = T(m-1) + T(m-2) + time taken to execute the addition operation, where T(k) is the time taken to execute the compute the answer for n=k.

In the IFib algorithm, there are approximately 6 instructions in each cycle and (approx. equal symbol) n cycles instructions thus the algorithm is linear in time which leads to the linear graph.

CleverFib is logarithmic in time thus the graph of time taken versus log2(n) is a straight line.

b)

Ans- The slopes of the graphs are approx. 0.7, 6 \* 10^-9 and 2.5\*. Although the graphs are straight lines, the number of statements in each recursive or iterative cycle is different. Also different instructions will take different time to get executed hence the slopes vary.

c)

i) The time taken to execute *each call* of CleverFib may be more than RFib or IFib. However, this difference is very small since the time taken to perform a single addition operation varies from the time taken to perform a single multiplication operation only slightly.  
As the value of n increases, the *number of calls* increases at a faster rate for IFib and much more so for RFib hence they take more time to compute the result.

ii) It doesn’t affect the relative speed of the algorithm as the speed of the algorithm depends both upon the number of calls as well as the time it takes to execute each call (the contribution of the latter becoming increasingly irrelevant as n increases). The very small number of calls in the CleverFib algorithm make it extremely fast.

3) The RAM model helped us evaluate the approximate running time based upon the number of instructions that the computer must execute to arrive at the result. It was **quite accurate** in computing the running time of an algorithm which we can infer from the fact that the practical data that was obtained and then plotted on the graph followed the shape that was expected from the word RAM model. Also it was **very accurate** in comparing the execution time of two algorithms as the data obtained in the table was consistent with the behavior expected based upon the RAM model.