QUESTION 1

The MONTHLY price data of the five stocks (IBM, COCA COLA, AMD, NETFLIX, JP MORGAN) is being used to compute optimal portfolio using Markowitz model. We got the weights as follows:

* IBM – 0.557567291
* COCA COLA – 0.125853049
* AMD – 0.035581021
* NETFLIX – 0.136140142
* JP MORGAN - 0.144858498
* LAMBDA - -0.0058714

Here, thing to notice is that Lambda has negative weight, which means that we should short Lambda and the excel calculations suggest that we should buy the other 5 stocks in the weights written above. Also, combined these stocks in the portfolio, the portfolio generates:

* Return = 11.19%
* Standard Deviation = 5.42%
* Variance = 0.29%
* Sharpe Ratio = 1.511959499

Key point to note is that the Sharpe ratio is POSITIVE, which means that the portfolio has performed well. But at the same time, if we compare the variance, it has significantly Increased. So, we can say that the portfolio generates positive annual return, and the Sharpe ratio and standard deviation denotes the optimal level of risk. Point to note is that, with calculating the optimal risky portfolio, the variance has decreased, with decrease in expected return but comparatively the Sharpe ratio has risen from 0.49 to 1.51195 .

QUESTION 2 (SINGLE INDEX MODEL)

* As per the answer – We need to invest 32.96% in active and 67.04% in market portfolio.
* The initial position in active portfolio includes 5.37% IBM, - 19.30% COCA COLA, 46.80% AMD, 0.60% NETFLIX and -0.51% JP MORGAN and 67.04% in market portfolio which makes the total of portfolio to 100%.
* The beta of the active portfolio is 2.30431999
* The alpha of the active portfolio is 3.63%
* 23.05022% is the adjusted position in the active portfolio
* The risk premium for the portfolio is 2.871%
* The variance of the portfolio is 0.01001592205
* The Sharpe ratio of the single index model we made is 0.286872902
* The variance of the model is 0.21910041

Now, why did we do this?

Because we can, with the single index model we can beat the market on a risk adjusted basis. which is the main and most important benefit of this model. This model provides a framework to beat the market on a risk adjusted basis. Now suppose we had 1000$ to invest, we would be investing 53.74$ in IBM, MINUS 193.02$ in Coca Cola, 468.03$ in AMD, 5.95$ in Netflix, minus 5.10$ in JP Morgan. Here investing in minus means that we need to short those stocks i.e coca cola and JP morgan.

The SIM model has higher Sharpe ratio than the market portfolio indicating that it has more attractive return and it’s a better investment, and it has performed a little well than the market.