Q2:

If p<1, the expected in-degree is not the same for every node, since whether the two nodes are linked depends on the random generator.

ER graph show that the number of nodes with high in-degree is similar to that with low in-degree.

ER plot is very different from the citation plot. In the latter, the number of nodes with high in-degree is relatively low compared to that with low in-degree. One explanation for this difference might be that the number of papers that are important are few in number, yet they are heavily cited by everyone else. In the ER plot, whether nodes are linked were randomly assigned, hence, the plot has a Gaussian shape.

Q3:

n = 27,770 m= 13. So, the average 352768/27770 = 12.7 ~ 13

Q4:

In Hierarchical network model, the average clustering coefficient (or degree in which nodes are connected in a graph) is not proportional to the size of the network.

DPA graph is very similar to citation graph, both show a small proportion of nodes (or papers) with high in-degree (or citation), while the majority of nodes has a low in-degree distribution.

DPA graph is very similar to “rich gets richer” phenomenon. Most of the total wealth is accumulated in a small proportion of individuals. The DPA algorithm generate edges of the new node is based on the established in-degree, hence, nodes with high in-degree tend to acquire higher in-degree over time.

“Rich gets richer” also explains the structure of the physics citation graph. Paper citated more often are read more often, and they are more likely to be cited again.